Rounding-up in Reported EPS, Behavioral Thresholds, and Earnings Management

SOMNATH DAS* and HUAI ZHANG

Department of Accounting (MC 006)
College of Business Administration
University of Illinois at Chicago
Chicago, IL 60607-7123
Fax: (312)-996-4520

First Draft November 2000

Current Draft April 2002

*Corresponding author. Tel.: (312)-996-4482; Fax: (312)-996-4482; Email: sdas@uic.edu.

The comments and suggestions of Larry Brown, Ilia Dichev (the Referee), Ram Ramakrishnan, Lenny Soffer, Jake Thomas, Michelle Yetman, Jerold Zimmerman (the Editor) and seminar participants at the University of Illinois-Chicago, University of Iowa, University of Minnesota, New York University and Yale University are gratefully acknowledged. We also gratefully acknowledge the contribution of I/B/E/S. Inc. for providing earnings forecast data. This data has been provided as part of a broad academic program to encourage earnings expectations research.

Rounding-up in Reported EPS, Behavioral Thresholds, and Earnings Management

ABSTRACT

Reported earnings per share (EPS) are frequently rounded to the nearest cent. This paper provides evidence that firms manipulate earnings so that they can round-up and report one more cent of EPS. Specifically, we examine the digit immediately right of the decimal in the calculated earnings per share number expressed in cents. Evidence is presented that firms are more likely to round-up when managers ex-ante expect rounding-up to meet analysts' forecasts, report positive profits, or sustain recent performance. Further investigation provides evidence that working capital accruals are used to round-up EPS.

Keywords: Behavioral thresholds; Earnings management; Earnings per share; Rounding.

JEL Classifications: M41, M43, G14.

Rounding-up in Reported EPS, Behavioral Thresholds, and Earnings Management

1. Introduction

Public firms typically are required to report earnings per share (EPS), which, loosely speaking, is computed as the net earnings available to common stockholders divided by the weighted average number of common shares outstanding during the fiscal period[1]. Rounding to the nearest cent is required when the calculated EPS is not an integer in cents. This reporting practice thus provides an opportunity for managers to manipulate net earnings (the numerator) upwards by a small amount and use rounding to report an additional cent of EPS, especially in settings where such upward manipulation will assist in meeting behavioral thresholds, such as analysts' forecasts.

The business press recently reported anecdotal evidence of managers rounding-up reported earnings per share to meet analysts' forecasts. For example, the 'Heard on the Street' column of the *Wall Street Journal* recently reported that Discount retailer Dollar General "pleased Wall Street by reporting earnings of 17 cents a share for its fiscal first quarter ended April 28 – exactly what securities analysts had projected. Relieved investors, who had seen some other retailers report disappointing earnings, bid the stock up 50 cents on May 9, the day of the report, while the broad market indicators were down" (McGough 2000a). The company actually had earned only 16.575 cents a share, but following general accounting norms and rounding to the nearest cent helped meet analysts' forecasts. Similarly, another company, Black Box, reported net income that exactly met analysts' forecasted EPS of 72 cents a share, by rounding-up from the actual EPS of 71.505 cents a share. Black Box earned more than 14 million in its

---

[1] The calculation of EPS differs between basic (primary) and diluted (fully diluted) EPS.

quarter and if it had earned *just $750.63 less*, it would have had to report that it had earned 71 cents instead of 72 cents a share (McGough 2000b). While rounding *per se* is not manipulation, such anecdotal evidence highlights the small amount of earnings that managers need to upwardly manipulate the numerator, so that they can round-up the reported earnings per share to meet analysts' forecasts or other thresholds.

This paper provides systematic evidence about whether, when and how, firms manage earnings to round-up reported EPS. Specifically, this paper provides evidence that firms round-up earnings more frequently than would be expected by mere chance. This evidence is neither year-specific nor industry-specific. We find evidence that firms try to round-up earnings so that they can meet analysts' forecasts, report positive profits and sustain recent performance. Specifically, firms are more likely to round-up earnings when managers believe *ex-ante* that rounding-up will help meet their thresholds / benchmarks. Finally, we also find that firms with high working capital accruals are more likely to round than firms with low working capital accruals. This result suggests that managers use working capital accruals to round-up earnings.

The remainder of the paper is organized as follows. The next section briefly reviews previous literature. Section 3 describes the data and sample selection. Section 4 discusses the research methodology, measurement of variables and the associated empirical results. Section 5 summarizes and concludes the paper.

2. Literature Review

The paper is directly related to the results in Thomas (1989). He observes more zeroes and fewer nines than expected by chance in the second-from-left-most digit for firms reporting profits and an opposite pattern for firms reporting losses. His evidence is consistent with the widely documented cognitive behavior where $40 is perceived to be significantly larger than

$39.95, and conversely, $39.95 is perceived to be significantly smaller than $40 (Gabor and Granger 1964; Schindler and Kirby 1997; Stiving and Winer 1997). Hence, firms have incentives to manipulate earnings to report a round number when they have profits (i.e., $40 million) and to report a number such as $39.95 million when they have losses. Thomas (1989) also documents that there is a greater proportion of EPS numbers divisible by ten cents and five cents for firms reporting profits. The evidence suggests that firms exercise discretion to increase earnings when the level of earnings or earnings per share is slightly below a round number. However, there is no evidence that links the documented unusual pattern with either earnings management or specific managerial incentives. This paper extends Thomas (1989) in the following ways. First, instead of focusing attention on the last cent (the second-from-left-most digit) in the reported EPS (earnings), we focus on the digit immediately right of the decimal of the *calculated earnings per share* in cents and thus provide additional evidence to the unusual patterns documented in Thomas (1989). Second, we provide evidence that rounding-up is more prevalent in situations where managers expect rounding-up to help meet certain behavioral thresholds, suggesting specific incentives associated with rounding above and beyond the general incentive to report an extra cent of EPS. Third, we provide evidence of an association between earnings management and rounding-up in reported EPS. We find that firms with high working capital accruals are more likely to round-up their earnings. Our results suggest that managers utilize working capital accruals to round-up earnings.

Our paper is also related to the literature that documents unusual patterns in reported earnings around behavioral thresholds: reporting positive profits, sustaining recent performance and meeting analysts' expectations. (Burgstahler and Dichev (1997), Degeorge et al. (1999), Dechow et al. (2000)). A maintained assumption of these papers is that the cross-sectional distributions around the thresholds should be smooth, under the null hypothesis of no earnings management. However, they find that there are “too few” observations directly below the thresholds and “too many” observations at or directly above the thresholds. Their evidence is consistent with managers manipulating earnings to cross the thresholds. The results in our paper are consistent with these studies. Our contribution, however, is in providing evidence that rounding-up in reported EPS results from earnings management and hence is a potential venue through which managers attempt to meet their benchmarks.

Related research by DeFond and Park (2000) provides additional motivation for our examination of the association between rounding-up and meeting of analysts’ forecasts. They provide evidence that unscaled earnings surprises in cents per share have value relevance incremental to earnings surprises scaled by the closing share price two trading days prior to the earnings announcement. Evidence is shown that the incremental market reward (penalty) for exceeding (falling short of) analysts’ expectations is more drastic when the actual earnings are within 3 to 4 cents per share of analysts’ forecasts. Their evidence thus highlights the benefit of reporting one additional cent in the proximity of analysts’ forecasts.

3. Data and Sample Selection

Our sample is formed by merging the I/B/E/S Summary database with Standard & Poors’ Quarterly Compustat (including Industrial, Full Coverage and Research Files)[2]. Our research focuses on rounding-up in basic (primary) EPS. Prior to SFAS #128, primary EPS is computed as earnings after preferred dividend requirements and adjusted for any dollar savings due to common stock equivalents divided by the weighted average number of common shares outstanding adjusted for conversion of common stock equivalents. After the adoption of SFAS

[2] We use quarterly data instead of annual data because we want to maximize the number of observations in our sample. The main findings of our paper are replicated using annual data.

#128, basic EPS is computed as earnings available to common stockholders divided by the weighted average number of common shares outstanding. The final sample comprises all firms for which the following data are available: income before extraordinary items adjusted for common stock equivalents[3] (Compustat data item # 10); the number of common shares used to calculate quarterly basic (primary) EPS (Compustat data item # 15); extraordinary items and discontinued operations (Compustat data item # 26); the last available mean consensus earnings forecast before the quarterly earnings announcement[4], and actual quarterly EPS as reported by IBES. The sample period extends over the fiscal years 1989 through 1998, yielding 103,944 firm-quarter observations. The number of observations ranges from 6,663 for year 1989 to 16,447 for year 1997.

4. Empirical results

4.1 Prevalence of rounding-up

We first examine the pervasiveness of rounding-up. To identify firms that round-up their EPS, we calculate earnings before extraordinary items per share by dividing quarterly income before extraordinary items adjusted for common stock equivalents (Compustat data item #10) by the number of common shares used to calculate quarterly basic (primary) EPS (Compustat data item #15)[5]. We calculate net income per share by dividing the sum of quarterly income before extraordinary items adjusted for common stock equivalents (Compustat data item #10) and

[3] Prior to adoption of SFAS #128, this data item represents net income after preferred dividend requirements and adjusted for any dollar savings due to conversion of common stock equivalents but before extraordinary items and discontinued operations. After adoption of SFAS #128, this data item is largely set equal to income before extraordinary items available for common stockholders (Compustat data item #25). We investigate the difference between the two data items, for firms with a footnote indicating adoption of SFAS #128. Among the total of 2195 observations, the difference is equal to zero for all except 8 observations.

[4] Forecasts made on a diluted basis are converted to forecasts made on a primary basis using the IBES adjustment factor.

[5] Prior to SFAS #128, this data item represents the weighted average or actual number of common shares outstanding, adjusted for conversion of common stock equivalents.

extraordinary items and discontinued operations (Compustat data item #26) by the number of common shares used to calculate quarterly basic (primary) EPS (Compustat data item #15). If a firm reports positive earnings and the digit immediately right of the decimal of the calculated EPS expressed in cents is greater than or equal to 5, then the indicator variable for rounding-up takes on the value of 1, and 0 otherwise. If a firm reports a loss, then, if the digit immediately right of the decimal is less than 5, the indicator variable takes the value of 1, and 0 otherwise. In sum, if the indicator variable takes the value of 1, under commonly used rounding scheme, the firm will report one more cent than otherwise[6].

Under the null hypothesis of no earnings management, we would expect 50% of the sample firms to round-up purely by chance[7]. We test this null hypothesis, using standard Chi-square test, (i) for the total sample, (ii) the sub-sample of firms reporting profits and (iii) the sub-sample of firms reporting losses. These results are presented in Panel A and B of Table 1. *X* refers to the first digit immediately right of the decimal of the calculated EPS expressed in cents. Panel A reports the results when we measure rounding-up using calculated net income per share. We find that, in cases where firms report profits, the proportion is abnormally high (54.6% versus 50%) for firms with *X* between 5 and 9 (which means those firms get to report one more cent of profits) and the proportion is abnormally low (45.4% versus 50%) for firms with *X* between 0 and 4 (which means those firms don't get to report one more cent of profits). A Chi-

---

[6] We can also identify rounding-up firms by comparing the calculated EPS with the reported EPS. We find that, after applying the rounding scheme, for both EPS measures, our calculated number is equal to the reported number for 91% of the observations in our sample. Further investigation shows that the differences are largely due to special scenarios. Most importantly, we obtain identical results when we perform our main tests using the sub-sample where the calculated and the reported EPS numbers are identical.

[7] Following Thomas (1988), an alternative benchmark expectation can be obtained using Benfords' law (1938). According to Benford's law, the digit should fall into 0 - 4 range more often than 5 - 9 range. Given that most of the firms in our sample report profits, Benford's law would predict that we see more non-rounding-up firms (with the digit equal to or below 4) than rounding-up firms (with the digit above 4). Our inferences are stronger when we use Benford's (1938) law to derive the expected proportion.

square test of differences in proportion rejects the null that the actual proportion is equal to the expected proportion at the 0.1% level. On the other hand, for firms reporting losses, the proportion is abnormally high (53.4% versus 50%) for firms with *X* between 0 and 4 (which means those firms get to report one less cent of losses), while the proportion is abnormally low (46.6% versus 50%) for firms with X between 5 and 9. Chi-square test results reject the null that the actual proportion is equal to the expected proportion at the 0.1% significance level. For the full sample, we find that the proportion of rounding-up firms is 54.4%, significantly higher than the expected proportion of 50%. Panel B reports the results when we measure rounding-up using calculated earnings before extraordinary items per share. These results are similar to the results in Panel A. The overall proportion of firms rounding-up earnings is 54.3%, significantly higher than the expected proportion of 50%. Overall, the abnormal pervasiveness of rounding-up suggests that managers manipulate earnings so that they can round up EPS.

To test whether our null (expected proportion is equal to 50%) is reasonable, we investigate the pervasiveness of rounding-up of (a) sales per share, (b) operating income before depreciation per share, and (c) cash flows from operations per share[8]. We choose these *per share* variables because managers supposedly either have no means or have no incentives to round up these variables. Our definition of rounding for these three variables is similar to the way we define rounding in EPS.[9] This analysis is based on a subsample of firm-quarters where we additionally require that the three per share data are non-missing. This subsample comprises of 78878 observations. Our results are reported in Panel C, D and E of Table 1.

[8] We thank the referee for suggesting these to us.

[9] Sales, operating income before depreciation and cash flow from operations per share are computed by dividing sales (Compustat #2), operating income before depreciation (Compustat #21) and net cash flow from operations (Compustat #108) by the number of shares used to compute EPS (Compustat #15).

We find that the proportion of rounding-up firms is 49.7%, 50.2% and 50.1% for sales per share, operating income before depreciation per share and net cash flow from operations per share, respectively. We cannot reject, at the 10% level, the null that the proportion of rounding-up firms is equal to 50% for the three variables under investigation. This evidence provides support for the use of 50% as the null.

INSERT TABLE 1 ABOUT HERE

Under the assumption of no earnings management, the cross-sectional distribution of the digit immediately right of the decimal in the calculated earnings per share is expected to be relatively smooth. If managers take advantage of the rounding scheme, for firms reporting profits (losses), we expect to observe a discontinuity in the cross-sectional distribution at 5 (-4), i.e., “too few” observations with the digit equal to 4 (-5) and “too many” observations with the digit equal to 5 (-4)[10]. Following Burgstahler and Dichev (1997) and Degeorge et al. (1999), we examine the distribution of the digit and report our results in Figures 1 and 2.

Figure 1 reports the frequency of the digit for firms reporting positive net income. Under the assumption of no earnings management, we expect the frequencies across digits to be uniform. However, the frequency decreases from 0 to 4 and this declining trend is abruptly interrupted at the point of 5. After the point of 5, there is no clear trend. This distribution seems to suggest that firms with digits below 5 tend to manipulate their earnings upwards to cross the hurdle and report one more cent of EPS. Moreover, the closer the digit is to 5, the more likely it’s manipulated upwards. To test the statistical significance of this abnormal distribution, we use the procedure outlined in Degeorge et al. (1999)[11]. The test on the discontinuity at the point of 5

[10] To distinguish between firms reporting profits and firms reporting losses, we use a negative sign to indicate the digit for firms reporting losses.

[11] See Appendix I of Degeorge et al. for details of this test (1999).

yields a Student *t* statistics of 3.93, significant at the 1% level, confirming the discontinuity at the point of 5.

INSERT FIGURE 1 ABOUT HERE

Figure 2 reports the distribution of the digit for firms reporting losses. Figure 2 shows that the frequency declines from –9 to -5. There is a sudden jump at the point of –4. The frequency then declines again from –4 to 0. The statistical test of Degeorge et al. (1999) on the discontinuity at the point of -4 yields a *t* statistic of 3.39, which is significant at the 1% level, and thus confirms the discontinuity.

INSERT FIGURE 2 ABOUT HERE

To further investigate the discontinuity, we examine the frequency distribution of the digit immediately right of the decimal of net income per share expressed in cents for firms reporting losses and firms reporting profits. The results are reported in Table 2 (the statistically significant p-values are shown in bold). Panel A reports the results for the subsample of firms reporting positive earnings. Consistent with the finding from Figure 1, the magnitude of deviation from the expected proportion is the highest for firms with the digit of 4. The frequency is significantly higher than expected for firms with the digit above 4 and the opposite is true for firms with the digit between 1 and 4. Panel B reports the results for the subsample of firms reporting negative earnings. We find that the frequency is significantly different from expected frequency only for firms with the digit around the rounding hurdle (which is 4). Contrary to the findings in Panel A, the frequency for firms with the digit below 5 is in general significantly higher than expected while the opposite is true for firms with the digit above or equal to 5. Further examination shows that the magnitude of the deviation from the expected proportion is the largest for firms with the digit of 4. This evidence is consistent with our previous test of discontinuity.

To further test whether our null (expected proportion is equal to 50%) is reasonable, we repeat the analysis on sales per share, operating income before depreciation per share and cash flows from operations per share. Our results are reported in Table 2. We cannot reject 10% as the expected proportion at the 5% level for 46 out of the total 50 cases. Moreover, we find that, for the three variables, there is no statistically significant discontinuity at 4 or 5 as the digit immediately to the right of the decimal place in the per share value expressed in cents. This evidence provides additional support for the null that we use.

INSERT TABLE 2 ABOUT HERE

We also examined whether the abnormal frequency of rounding-up is concentrated in any particular fiscal quarter. Our tests show that the proportion of rounding-up firms is significantly higher than the proportion of non-rounding-up firms, in each of the four quarters. Examination of the annual time-series patterns in rounding-up during our sample period also shows that rounding-up is not limited to any one particular year. Similarly, for each industry in our sample, the proportion of rounding-up firms is higher than 50% and thus rounding-up appears to be prevalent across all industries.

Together, the results documented in Table 2, Figure 1 and Figure 2 provide evidence that the frequency of rounding-up is abnormally high, which implies that firms manage their earnings to round-up reported EPS.

4.2 Rounding-up EPS – When and How?

Our evidence is consistent with managers manipulating earnings upwards to round-up reported EPS. We now investigate two related research questions: First, *when* are firms more likely to round-up their EPS? The primary focus is to identify the incentives for rounding-up. Second, *how* do firms manage to round-up earnings?

For the first research question, we hypothesize that firms are more likely to round-up earnings when managers ex-ante expect rounding-up to help meet behavioral thresholds: meet analysts' forecasts, report profits and sustain previous performance. We also expect that firms, who normally report EPS of high (low) magnitude, are less (more) likely to round-up because the benefit of rounding is relatively small (big). For example, rounding from 1.5 to 2 cents means a 33.3% increase while rounding from 10.5 to 11 cents is only a less than 5% increase. Thus, firms that normally report earnings of high (low) magnitude have less (more) incentive to round-up.

For the second research question, we hypothesize that firms use working capital accruals to report more earnings so that they are able to round-up and reap the benefits of rounding. Earnings manipulation which is specifically aimed at rounding-up can only be done during the short interval of time which is before earnings is officially announced, *but* after detailed information of the pre-rounded EPS number becomes available to the management. Given the limited time frame, managers are unlikely to resort to non-working capital accruals, such as depreciation. Furthermore, since managers are only looking for an amount that will help them round up to the next higher cent, the dollar amount of the required earnings manipulation is likely to be small and manipulation through non-working capital accruals, such as depreciation, is likely to generate an amount too big for that purpose. We therefore, conjecture that managers manipulate earnings mainly through working capital accruals.

When Do Firms Round-up? – To Meet Thresholds

As documented in the recent literature, firms have incentives to manage earnings and beat certain benchmarks. As suggested by Burgstahler and Dichev (1997), Degeorge et al. (1999), and

Dechow et al. (2000), firms are motivated to manage earnings to meet analysts' forecasts, report profits and sustain previous performances. Managers' incentives to round up are determined by investors' sensitivity to an additional cent in the reported EPS. If the reported EPS is near the benchmarks, investors are sensitive to the additional cent (Defond and Park 2000). Thus, managers are more motivated to round up when the pre-rounded EPS is near the behavioral benchmarks.

To examine whether firms use rounding to meet the behavioral thresholds, we first examine the frequency of rounding-up around those behavioral thresholds. Under the null that rounding-up is unrelated to meeting thresholds, the proportion of rounding-up firms will not be different from the sample average for the observations with reported EPS 'exactly meeting' the thresholds. We thus examine the frequency of rounding-up for firms that (a) exactly meet analysts' forecasts, (b) report 1 cent profit and (c) report EPS exactly equal to the EPS in the same fiscal quarter of the previous year. It is possible that some firms with zero reported EPS use rounding-up to avoid losses. However, we do not examine firms that report zero earnings because, by definition, for those firms, the digit immediately right of the decimal is equal to zero and hence they are classified as non-rounding-up firms. We measure analysts' forecast errors as the difference between IBES reported earnings and analysts' forecasts. We use I/B/E/S reported earnings to ensure better match with analysts' forecasts. It is possible that rounding-up in Compustat reported earnings may not increase IBES reported numbers. By using I/B/E/S reported earnings instead of Compustat reported earnings to calculate forecast errors, we are essentially introducing a possible mismatch that biases against finding any significant association between rounding-up and analysts' forecast errors. Two different measures of EPS are used and our results are reported in Table 3.

The results in Table 3 suggest that the frequency of rounding-up is significantly greater than the sample average for those firms that exactly meet analysts' expectations. The proportion of rounding-up firms is 56.1% (55.8%) when we measure rounding-up using net income per share (earnings before extraordinary items per share). The chi-square test results show that the proportion is significantly higher than the sample average. The evidence seems to suggest that managers are more likely to round up when rounding-up can help meet analysts' forecasts.

We find similar results for firms reporting one-cent profit. The proportion of rounding-up firms is significantly higher than the sample average, regardless of which EPS measure is used. Our results are thus consistent with the notion that firms round-up more frequently so that they can report profits and/or avoid reporting losses.

The proportion of rounding-up firms is higher than the sample average for firms with seasonal difference in EPS equal to zero. We find slightly stronger results when we use earnings before extraordinary items per share. Our results suggest that firms round-up earnings so that they can sustain previous performance.

To test the generalizabilty of our results which are based on a sample restricted to firm-quarters with analysts' forecasts, we performed the main tests on the sample of firm-quarter observations that have no matching analysts' forecasts.[12] The results based on this sample show that the proportion of rounding up firms is 51.3%. Although the proportion of rounding-up firms is higher than 50% on this sample, it's lower than the proportion on the sample requiring analysts' forecasts. This result indicates that rounding-up takes place more frequently for firms with analysts' following than for firms without analysts' following. It is consistent with the

[12] Other requirements on the sample are a) net income per share can be computed; b) the time period is the same as the time period of the sample used in the paper.

notion that firms' with no analysts following are perhaps less motivated to round up their earnings because they do not have to meet an analyst forecast.

Overall, the results in Table 3 provide evidence that firms round-up earnings to meet the three behavioral thresholds: meet analysts' forecasts, report profits, and sustain previous performance.

INSERT TABLE 3 ABOUT HERE

Relation Between Behavioral Thresholds and Rounding-up – Additional Tests

Defond and Park (2000) regress market-adjusted earnings announcement returns on dummy variables representing forecast errors in cents per share after controlling for forecast errors scaled by price. While the stock price impact of falling short of (exceeding) forecast earnings by more than four cents per share is generally significant, the magnitude tends to flatten out after reaching four cents per share. Their evidence supports the claim that investors are more sensitive to one additional cent if it's in the proximity of analysts' forecasts. Drawing on their results, we expect that the less earnings per share number deviates from the thresholds, the more motivated the manager is to round-up and report one more cent of EPS. We use three measures of the deviation from the three thresholds: (i) *ABSDIF* (the absolute value of analysts' forecast error), which measures the deviation from analysts earnings forecasts; (ii) *ABSEPS* (the absolute value of EPS), which measures the deviation from the benchmark of zero; and (iii) *ABSDEPS* (the absolute value of the seasonal difference in EPS), which measures the deviation from the prior period performance.

On a related front, Skinner and Sloan (1999) provide evidence that investors harshly penalize high growth firms reporting negative earnings surprises[13]. This suggests, that high

[13] Anecdotal evidence abounds for this assertion.

growth firms have a greater incentive to meet analysts' expectations and consequently, they are more likely to round-up earnings. We examine this conjecture by testing the association between growth and the proportion of rounding-up firms. Following Skinner and Sloan (1999), we measure growth as the ratio of the market value to the book value of equity (*MB*). The market value at the end of the fiscal quarter is calculated by multiplying the closing price at the end of the fiscal quarter by common shares outstanding at the end of the fiscal quarter (Compustat data item #14 multiplied by Compustat data item #61). Book value is the book value in the current fiscal quarter (Compustat data item #59).

It's difficult for analysts to predict special items, which is part of earnings from continuing operations. Firms with large special items are more likely to deviate far from analysts' forecasts and thus are less likely to round-up earnings. We expect that firms with large special items are less likely to round-up earnings. We measure special items as reported special items (Compustat data item #32) deflated by total assets (Compustat data item #44). We measure the magnitude of special items with *SPECI2*, which is special items (deflated by total assets) squared. Our expectation is that the less *SPECI2*, the more likely firms round-up their earnings.

We hypothesize that the propensity to round is negatively related to the normal magnitude of the reported EPS. Rounding-up means less to firms who typically report large EPS numbers than to firms who typically report small EPS numbers. For example, rounding from 2.5 to 3 cents means a 20% increase while rounding from 51.5 cents to 52 cents is only a 1% increase. Thus, firms who typically report large (small) EPS numbers have less (more) incentive to round-up. We measure normal magnitude of EPS (*SIZE*) as the average absolute value of previous eight quarters' (excluding current quarter) net income per share[14].

[14] The average absolute value of past EPS captures the concept of "normal" magnitude of EPS better than the absolute value of current EPS. We believe the marginal benefit from rounding is related to investors' sensitivity

We now test these additional hypotheses. Within each quarter, we rank observations into five quintiles according to each of the variables discussed above. Table 4 reports the proportion of rounding-up firms in each quintile for each of the variables used[15]. Also reported in Table 4 are the results from a ranked probit regression. The dependent variable in the regression is an indicator variable, which takes on the value of 1, if a firm rounds-up and 0, otherwise. The independent variable in the regression is the rank of the observations, which ranges from 0, for the lowest quintile, to 4, for the highest quintile.

The results in Table 4 confirm our expectations. The probit regressions yield slope coefficients that have the predicted sign and the slope coefficients are all significant at the 1% level.

Specifically, we find that the proportion of rounding-up firms decreases monotonically from the lowest quintile of *ABSDIF* to the highest quintile of *ABSDIF*. The slope coefficient is negative and significant, which means that the farther away the reported EPS deviates from analysts' forecasts, the less likely firms engage in rounding-up earnings. Similar findings can be found for *ABSEPS* and *ABSDEPS*. These results further confirm our prior that firms round-up more often when the EPS number is close to the thresholds.

We find that high growth firms are more likely to round-up earnings than low growth firms. The proportion of rounding-up firms goes up from 53.3%, for the lowest market-to-book

---

towards EPS. If the magnitude of reported EPS differs a lot from the normal magnitude of EPS, investors are likely to put little weight on the reported EPS, which leads to little or no incentives for the managers to round up. For example, suppose, General Motors, who normally reports quarterly earnings of 1 dollar per share, reports 3 cents for a particular quarter, due to a sudden transitory decrease in demand. Managers have little incentives to round up, because of the transitory nature of the quarter's earnings. In other words, it makes little or no difference whether earnings drops from 1 dollar to 4 cents per share or to 3 cents per share.

[15] We choose to use this non-parametric approach because it mitigates problems due to outliers.

quintile, to 54.5%, for the highest market-to-book quintile. The probit regression also yields a positive and significant slope coefficient.

We find that firms with large special items are less likely to round-up earnings. The proportion of rounding-up firms goes down from 55.0%, for the firms with zero special items to 49.8%, for the firms in the highest special item quintile. The slope coefficient is negative and significant.

The proportion of rounding-up is negatively correlated with the rank of normal magnitude of EPS. 56.1% of firms in the lowest quintile round-up earnings while the same proportion is only 51.6% for the firms in the highest quintile. The ranked probit regression yields significant supporting evidence.

How Do Firms Manage to Round-Up?

Having documented the prevalence and motivations for rounding-up, it is natural to ask the question – how do firms manage to round-up? In this section, we hypothesize and test that managers round-up earnings through the use of working capital accruals.

We conjecture that at the end of the fiscal period, managers will observe pre-rounded EPS. If, through manipulation of a small amount of earnings, the company can report one more cent of EPS, managers may manage earnings and round up EPS. Before manipulating earnings, managers must know whether the pre-rounded EPS needs to be rounded up and the magnitude of needed earnings manipulation, which requires a rather precise knowledge of pre-rounded EPS. We posit that managers would use working capital accruals to round-up earnings. There are two reasons. First, given the limited time managers have between manipulating pre-rounded EPS and closing the books, they are unlikely to resort to non-working capital accruals, such as depreciation. Second, since managers are only looking for an amount that will help them round up to the next higher cent, the dollar amount of the required earnings manipulation is likely to be very small and manipulation through non-working capital accruals, such as depreciation, is likely to generate an amount too big for that purpose.

Our hypothesis is consistent with previous literature (e.g., Rangan 1998, Teoh et al. 1998) that documents the use of working capital accruals to increase earnings[16].

Following Rangan (1998) and Teoh et al. (1998), we define working capital accruals as:

$$WCACC = (\Delta CA - \Delta CASH) - (\Delta CL - \Delta STD)$$

where ΔCA = change in current assets (Compustat data item #40)

$\Delta CASH$ = change in cash and short term investments (Compustat data item #36)

ΔCL = change in current liabilities (Compustat data item #49)

ΔSTD = change in current portion of long-term debt (Compustat data item #45).

Every variable in the above equation is deflated by previous quarter's *Total Assets* (Compustat data item #44).

Similar to our earlier analysis, within each quarter, we rank observations into quintiles based on our measure of working capital accruals. Table 4 reports the proportion of rounding-up firms for each quintile. Results from estimating a univariate probit rank regression are also reported. The proportion of rounding-up firms goes from 54.2%, for the lowest working capital accrual quintile, to 56.0%, for the highest working capital accrual quintile. The probit regression yields a significant positive slope coefficient. Our results suggest that managers use working capital accrual to manage earnings upwards so that they can round-up[17].

[16] Our inferences are the same when we replace working capital accruals with discretionary accruals obtained from the quarterly Jones' (1991) model. However, our results are somewhat weaker when we use discretionary accruals.

[17] Collins and Hribar (1999) finds that accruals computed through the use of consecutive balance sheet data items are affected by capital structure changes such as mergers and acquisitions. It's not clear how this measurement error influences our results. Moreover, given that a relatively small proportion of firms engage in capital structure change

As an alternative, it is possible that, instead of manipulating earnings (the numerator), managers manage to round-up by reducing the number of shares outstanding and thus reducing the denominator in the calculation of EPS. For example, managers can reduce the number of shares outstanding through share repurchases. To investigate this possibility, we examine the mean and median percentage change in the number of shares outstanding for rounding-up firms and non-rounding-up firms. Specifically, to obtain this percentage change, we first subtract the prior quarter's number of shares outstanding from the current quarter's number of shares outstanding and then divide it by the previous quarter's number. The mean (median) of the percentage is 4.12% (0.11%) for rounding-up firms while the mean (median) is 3.79% (0.10%) for the non-rounding-up firms. The mean and the median values of the percentage change are both higher for rounding-up firms. This evidence is thus contrary to the notion that rounding-up is achieved through reduction in the number of shares outstanding.

INSERT TABLE 4 ABOUT HERE

Multivariate Analysis

Next, we estimate a multivariate probit regression to examine the incremental influence of the individual variables, in determining the propensity to round-up EPS. This is particularly useful given that there is substantial correlation between variables we investigate.

Initially, we run the probit regressions using raw values. However, results obtained using raw values are likely to be influenced by the time-series variation in the independent variables[18].

---

and that our dependent variable is essentially a frequency measure, we don't expect that our results suffer substantially from this measurement error. Following Bradshaw et al. (1999), we re-compute working capital accruals through the use of change in working capitals as reported from the cash flow statement (which is immune from this measurement error) and our results remain unaltered.

[18] Take market to book ratio for example. Market to book increases steadily over our sample period. Hence, a relatively high ratio in 1989 may be, in a relative sense, too low a ratio in 1998. Thus, sorting on market to book irrespective of the time period, (i.e., pooling across time) may be equivalent to sorting on sample years. This may lead to spurious inferences.

We therefore control for the time-series variation in the independent variables by subtracting from the raw value the median value for all firms in the particular quarter to which the observation belongs. We do not adjust *ABSDIF*, *ABSEPS* and *ABSDEPS* because they represent the proximity to the thresholds. For purposes of this estimation, we restrict the original sample to firms with (i) book values greater than zero; (ii) reported earnings not equal to zero[19], and (iii) absolute scaled values of *SPECI2* and *WCACC* less than 1. To alleviate concerns related to outliers, we Winsorize all the other independent variables (*SIZE*, *ABSDEPS*, *ABSEPS* and *ABSDIF)* at the top and bottom one percent[20]. The regression results are reported in Table 5.

INSERT TABLE 5 ABOUT HERE

Among the three variables that represent the ex-post deviation from thresholds, *ABSDEPS* is not significant at the 10% level in all the regressions; *ABSEPS* and *ABSDIF* are significant at the conventional level in all the regressions. These results suggest that rounding-up is more prevalent for firms whose earnings are within the proximity of either the break-even point or analysts' forecasts.

Table 5 also shows that *SPECI2* (squared value of special items deflated by total assets) is no longer significant even at the 10% level. This suggests that controlling for all other factors, special items do not seem to have any incremental explanatory power to predict the likelihood of rounding-up. As argued before, firms with large special items are more likely to deviate far from analysts' forecasts and thus are less likely to round-up earnings. While this is true in an univariate sense (see Table 4 discussed before), Table 5 shows that special items are no longer significant, after controlling for the ex-post deviation from the thresholds (*ABSEPS, ABSDEPS* and *ABSDIF*). The magnitude of special items represents the likelihood of pre-rounded EPS

[19] We have this restriction because by definition, firms reporting zero earnings are classified as non-rounding firms.

being in the neighborhood of analysts' forecasts. Our result is consistent with the notion that this likelihood is better captured by the deviations from analysts' forecasts (*ABSDIF*).

The market-to-book ratio is also no longer significant in the multivariate probit regression, after controlling for ex-post deviation from benchmarks. The market-to-book ratio represents the intensity of the incentive to meet analysts' forecasts because of the 'torpedo effect' on stock prices (Skinner and Sloan 1999). However, rounding can only increase EPS by one cent. Our multivariate results suggest that, even for high growth firms with strong incentive to meet analysts' forecasts, if actual EPS is far away from the benchmark, rounding-up will not help meet the benchmarks and managers will not round-up more frequently.

SIZE is significant in all the regressions. We interpret this evidence to be consistent with the notion that firms who typically report large (small) EPS numbers have less (more) incentives to round-up because rounding-up brings relatively more (less) benefit.

WCACC is significantly correlated with the rounding-up indicator in all the regressions. This result suggests that managers use working capital accruals to manage earnings upwards so that they can round-up and report one more cent.

Overall, there are four variables that are consistently significant at the conventional level: the absolute value of EPS, the absolute value of analysts' forecast errors, working capital accruals and size. Our evidence thus suggests that firms use working capital accruals with the primary purpose of reporting profits and meeting analysts' forecasts, but are less likely to round up when rounding-up brings relatively small increase in EPS.

---

[20] We obtain similar results when we delete firms in the top and bottom one percent of the distribution of the variables.

5. Summary and Conclusion

This paper investigates the digit immediately right of the decimal of the calculated earnings per share number expressed in cents. We find, for firms reporting profits, the proportion of firms with the digit above (below or equal to) 4 is significantly higher (lower) than the expected proportion, while the opposite is true for firms reporting losses. The evidence seems to suggest that managers exercise their discretion so that they can round-up earnings. Our empirical evidence is consistent with managers manipulating earnings upwards so that they can report one more cent of EPS. Further investigation provides evidence that firms use working capital accruals to round-up earnings so that they can meet behavioral thresholds: report positive profits, sustain recent performance and meet analysts' forecasts.

Rounding-up can only add one more cent to EPS. From an economic standpoint, it may therefore seem insignificant. However, an extra cent, under some circumstances, may lead to significant valuation consequences. Numerous anecdotal evidences show that firms falling short of street expectations by one cent are often harshly penalized by investors. Similar systematic evidence is found in Defond and Park (2000) and Skinner and Sloan (1999). Such evidences provide some support for the economic significance of an extra cent of EPS and are consistent with our results that rounding-up is more frequent around analyst's forecasts.

To further evaluate the economic significance of rounding-up, we examine the sample observations used in this study. We find that for 36.1% of the observations in our sample, one-cent increase in basic EPS excluding extraordinary items is equivalent to a percentage increase greater than or equal to 5%. Second, for 16.6% of the observations in our sample, the actual EPS as reported by I/B/E/S is either equal to or less than analysts' forecast by 1 cent. For those firms, rounding-up avoids or can potentially avoid the drastic negative market response to reported EPS falling short of analysts' forecasts by one cent. Overall, we find that 54.5% of firm-quarters round up their EPS. Under the null of no earnings management, the rounding-up proportion should be only 50%. Our results thus suggest that the additional 4.5% of firm-quarters are engaged in earnings manipulation to round-up EPS. This points to the popularity of rounding-up.

REFERENCES

Benford, F., 1938. The Law of Anomalous Numbers, *Proceedings of the American Philosophical Society*, (March), pp. 551-572.

Burgstahler, D. and I. Dichev, 1997. Earnings Management to Avoid Earnings Decreases and Losses, *Journal of Accounting & Economics*, Vol. 24 (December), 99-126.

Collins, D. and P. Hribar. 1999. Errors in Estimating Accruals: Implications for Empirical Research, Working Paper, University of Iowa.

Dechow, P., S. Richardson, and I. Tuma, 2000. Are Benchmark Beaters Doing Anything Wrong?, Working Paper, University of Michigan.

Degeorge, F., J. Patel, and R. Zeckhauser, 1999. Earnings Manipulations to Exceed Thresholds, *Journal of Business*, Vol. 72, 1-33.

DeFond, M. L. and C. W. Park. 2000. Earnings Surprises Expressed in Cents per Share: Stock Price Effects and Implications for Accruals Management, Working Paper, University of Southern California, August.

Gabor, A. and C. Granger. 1964. Price Sensitivity of the Consumer, *Journal of Advertising Research*, Vol. 4 (December) 40-44.

Jones, J., 1991. Earnings Management During Import Relief Investigations, *Journal of Accounting Research*, Vol. 29. (Autumn). 193-228.

McGough, R. 2000a. How 'Round-Ups' Can Give Stocks a Hard Ride, *Wall Street Journal*, July 21.

McGough, R. 2000b. This Practice Doesn't Square with Analysts, *Chicago Tribune*, August 8, Section 6, p.3.

Rangan, S. 1998. Earnings Management and the Performance of Seasoned Equity Offerings. *Journal of Financial Economics* 50 (October): 101-122

Schindler, R. M. and P. N. Kirby, 1997. Patterns of Rightmost Digits Used in Advertised Prices: Implications for Nine-Ending Effects. *Journal of Consumer Research* Vol. 24 (September): 192-201

Skinner, D. J. and R. G. Sloan, 1999. Earnings Surprises, Growth Expectations, and Stock Returns Or Don’t Let an Earnings Torpedo Sink Your Portfolio, Working Paper, University of Michigan.

Stiving, M, and R. S. Winer, 1997. An Empirical Analysis of Price Endings with Scanner Data, *Journal of Consumer Research*, Vol. 24 (June) 57-67.

Teoh, S., I. Welch and T. Wang. 1998. Earnings Management and the Post-issue Underperformance in Seasoned Equity Offerings. *Journal of Financial Economics* 50 (October): 63-99.

Thomas, J. K. 1989. Unusual Patterns in Reported Earnings, *The Accounting Review*, Vol. 54 No. 4 (October) pp. 773-787.

Table 1
Frequency of Rounding

	Positive[1]		Negative[2]		Round	
	0 <= X[3] < 5	5 <= X	0 <= X < 5	5 <= X	YES[4]	NO
Panel A: Net Income Per Share						
N[5]	38,295	46,054	10,473	9,122	56,527	47,417
Actual Proportion	45.4	54.6	53.4	46.6	54.4	45.6
P-value[6]	0.001		0.001		0.001	
Panel B: Earnings before Extraordinary Items Per Share						
N	38,762	46,235	10,171	8,776	56,406	47,538
Actual Proportion	45.6	54.4	53.7	46.3	54.3	45.7
P-value	0.001		0.001		0.001	
Panel C: Sales Per Share						
N	39,663	39,215	0	0	39,215	39,663
Actual Proportion	50.3	49.7			49.7	50.3
P-value	0.111				0.111	
Panel D: Operating Income before Depreciation Per Share						
N	35,084	35,224	4,293	4,232	39,562	39,316
Actual Proportion	49.9	50.1	50.4	49.6	50.2	49.8
P-value	0.598		0.509		0.381	
Panel E: Net Cash Flow from Operations Per Share						
N	28,518	28,482	10,965	10,867	39,493	39,385
Actual Proportion	50	50	50.2	49.8	50.1	49.9
P-value	0.880		0.507		0.701	

Note:
1. Positive means that the value of the calculated per share value is positive.
2. Negative means that the value of the calculated per share value is negative.
3. *X* refers to the first digit immediately right of the decimal of the calculated per share value expressed in cents.
4. “Yes” means that the company rounds up the per share value and “No” means the company does not round up the per share value.
5. N reports the total number of observations, which includes both rounding-up firms and non-rounding-up firms.
6. P-value is the P-value of the Chi-square test with the test proportion equal to the expected proportion, which is 50% in all the cases.

Table 2

Frequency Distribution of the Digit Immediately Right of the Decimal

	0	1	2	3	4	5	6	7	8	9
Panel A: Deviation from Expected Proportions (percent of subsample) for Positive Earnings (n=74650)										
	0	1	2	3	4	5	6	7	8	9
Dev.	1.5	-0.4	-1.4	-1.8	-2.5	0.7	0.9	1.0	0.4	1.5
P-value	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**
Panel B: Deviation from Expected Proportions (percent of subsample) for Negative Earnings (n=17531)										
	0	1	2	3	4	5	6	7	8	9
Dev.	0	-0.1	0.5	1.1	1.7	-1	-0.9	-0.7	-0.7	0.1
P-value	0.879	0.657	0.033	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	0.626
Panel C: Deviation from Expected Proportions (percent of subsample) for Sales Per Share (n=78878)										
	0	1	2	3	4	5	6	7	8	9
Dev.	0	-0.1	0.1	-0.1	0.1	-0.1	-0.1	-0.1	0.3	0
P-value	0.966	0.298	0.337	0.605	0.563	0.510	0.589	0.345	**0.013**	0.726
Panel D: Deviation from Expected Proportions (percent of subsample) for Positive Operating Income before Depreciation (n=70308)										
	0	1	2	3	4	5	6	7	8	9
Dev.	-0.1	0.1	0.2	-0.2	-0.1	0	0	-0.2	0.2	0.1
P-value	0.214	0.344	0.182	0.179	0.556	0.699	0.742	0.156	0.155	0.344
Panel E: Deviation from Expected Proportions (percent of subsample) for Negative Operating Income before Depreciation (n=8525)										
	0	1	2	3	4	5	6	7	8	9
Dev.	0	0.9	-0.3	0	-0.3	-0.7	-0.2	0.5	-0.1	0.1
P-value	0.899	**0.009**	0.438	0.986	0.376	**0.024**	0.626	0.165	0.843	0.652
Panel F: Deviation from Expected Proportions (percent of subsample) for Positive Net Cash Flow from Operations (n=57000)										
	0	1	2	3	4	5	6	7	8	9
Dev.	0	-0.1	0	-0.1	0.1	0.2	-0.1	0	0.2	-0.2
P-value	0.978	0.605	0.834	0.625	0.308	0.135	0.485	0.769	0.224	**0.049**
Panel G: Deviation from Expected Proportions (percent of subsample) for Negative Net Cash Flow from Operations (n=21832)										
	0	1	2	3	4	5	6	7	8	9
Dev.	0	-0.2	0.1	0.1	0.2	-0.3	-0.1	0	0.1	0.1
P-value	0.889	0.44	0.738	0.531	0.291	0.141	0.539	0.996	0.79	0.473

Notes: Dev. is calculated by subtracting the expected proportion (10%) from the actual proportion. P-value is the P-value of the Chi-square test with the test proportion equal to the expected proportion, which is 10% in all the cases.

Table 3

Frequency of Rounding at Behavioral Thresholds[1]

	Meet Forecasts[1]	Report 1 cent Profit[2]	Seasonal Difference=0[3]
Panel A: Net Income Per Share			
N[4]	16,825	1,277	1,832
Proportion of Rounding (%)	56.1	60.1	56.3
P-value (Test proportion=54.4%)	0.001	0.001	0.107
Panel B: Earnings before Extraordinary Items Per Share			
N	16,825	1,271	1,884
Proportion of Rounding (%)	55.8	59.6	56.2
P-value (Test proportion=54.3%)	0.001	0.001	0.096

Note:

1. "Meet Forecasts" indicates that the observations having EPS reported by I/B/E/S equal to analysts' forecasts.
2. "Report 1 cent Profit" and "Seasonal Difference=0" are defined differently in the two panels. In Panel A, they are defined using net income per share while in Panel B, they are defined using Earnings Before Extraordinary Items per share.
3. Seasonal difference is calculated as current EPS minus the EPS of the same fiscal quarter in the previous year.
4. N reports the total number of observations, which includes both rounding-up firms and non-rounding-up firms.

Table 4

Frequency (in percentage) of Rounding in Net Income Per Share
for Firms in Quintiles Based on Various Variables

		Quintiles					Rank regression	
	N.	1[1]	2	3	4	5	Intercept	Slope
ABSDIF	103,944	56.2	55.6	54.6	53.4	52.0	0.164*	-0.027*
ABSEPS	103210	57.7	56.1	55.0	52.9	51.0	0.198*	-0.042*
ABSDEPS	70009	57.1	55.8	54.5	54.0	51.7	0.181*	-0.032*
MB	100861	53.3	54.0	55.2	55.1	54.5	0.094*	0.009*
SPECI2	97032	55.0	52.4	53.0	53.3	49.8	0.124*	-0.027*
SIZE	91842	56.1	55.9	55.0	52.8	51.6	0.168*	-0.030*
WCACC	82150	54.2	54.1	55.2	55.3	56.0	0.100*	0.012*

Note:
* means significant at the 1% level.
1. Quintile 1 is the quintile with the lowest value of the variable under investigation.

DEFINITIONS

ABSDIF	is the absolute value of analysts' forecast error, computed as the I/B/E/S reported actual earnings minus last mean consensus analysts' forecasts before earnings announcement.
ABSEPS	is the absolute value of net income per share. The analysis is based on observations reporting non-zero earnings.
ABSDEPS	is the absolute value of the difference between current quarter EPS and the EPS of the same fiscal quarter of the previous year.
SPECI2	is the ratio of special items divided by total assets, the whole ratio squared. The first quintile has all the observations that take on value zero. The rest 4 groups are formed based on the magnitude of *SPECI2*.
MB	is market-to-book ratio.
SIZE	is the average absolute value of previous 8 quarters' net income per share.
WCACC	is the working capital accruals.

Table 5

Results of Probit Regression

	Intercept	*SPECI2*	*ABSDEPS*	*ABSEPS*	*ABSDIF*	*WCACC*	*MB*	*SIZE*
Panel A: Dependent Variable is Rounding in Net Income Per Share								
Raw value								
Estimate	0.209	0.601	0.002	-0.096	-0.230	0.322	-0.0006	-0.050
P-value	0.0001	0.393	0.886	0.0001	0.0005	0.005	0.118	0.009
After adjusting for Quarterly Average[1]								
Estimate	0.189	0.628	-0.003	-0.100	-0.095	0.273	-0.0005	-0.050
P-value	0.0001	0.372	0.821	0.0001	0.045	0.018	0.148	0.009
Panel B: Dependent Variable is Rounding in Earnings before Extraordinary Items Per Share								
Raw value								
Estimate	0.196	-0.174	0.005	-0.063	-0.233	0.354	-0.0002	-0.062
P-value	0.0001	0.803	0.670	0.0007	0.0004	0.002	0.526	0.002
After adjusting for Quarterly Average								
Estimate	0.173	-0.136	0.0009	-0.066	-0.106	0.307	-0.0002	-0.062
P-value	0.0001	0.846	0.944	0.0004	0.025	0.008	0.602	0.002

DEFINITIONS

ABSDIF is the absolute value of analysts' forecast error, computed as the I/B/E/S reported actual earnings minus last mean consensus analysts' forecasts before earnings announcement

ABSEPS is the absolute value of either net income per share or earnings before extraordinary items per share, corresponding to the definition of the rounding-up variable.

ABSDEPS is the absolute value of the difference between current quarter EPS and the EPS of the same fiscal quarter of the previous year.

SPECI2 is the ratio of special items divided by total assets, the whole ratio squared.

MB is market-to-book ratio.

SIZE is the average absolute value of previous 8 quarters' net income per share.

WCACC is the working capital accruals.

Notes:

1. *MB*, *SPECI2*, *WCACC* and *SIZE* are computed by subtracting the median value for that particular quarter.

Figure 1
Frequency of the Digit for Firms Reporting Positive Net Income

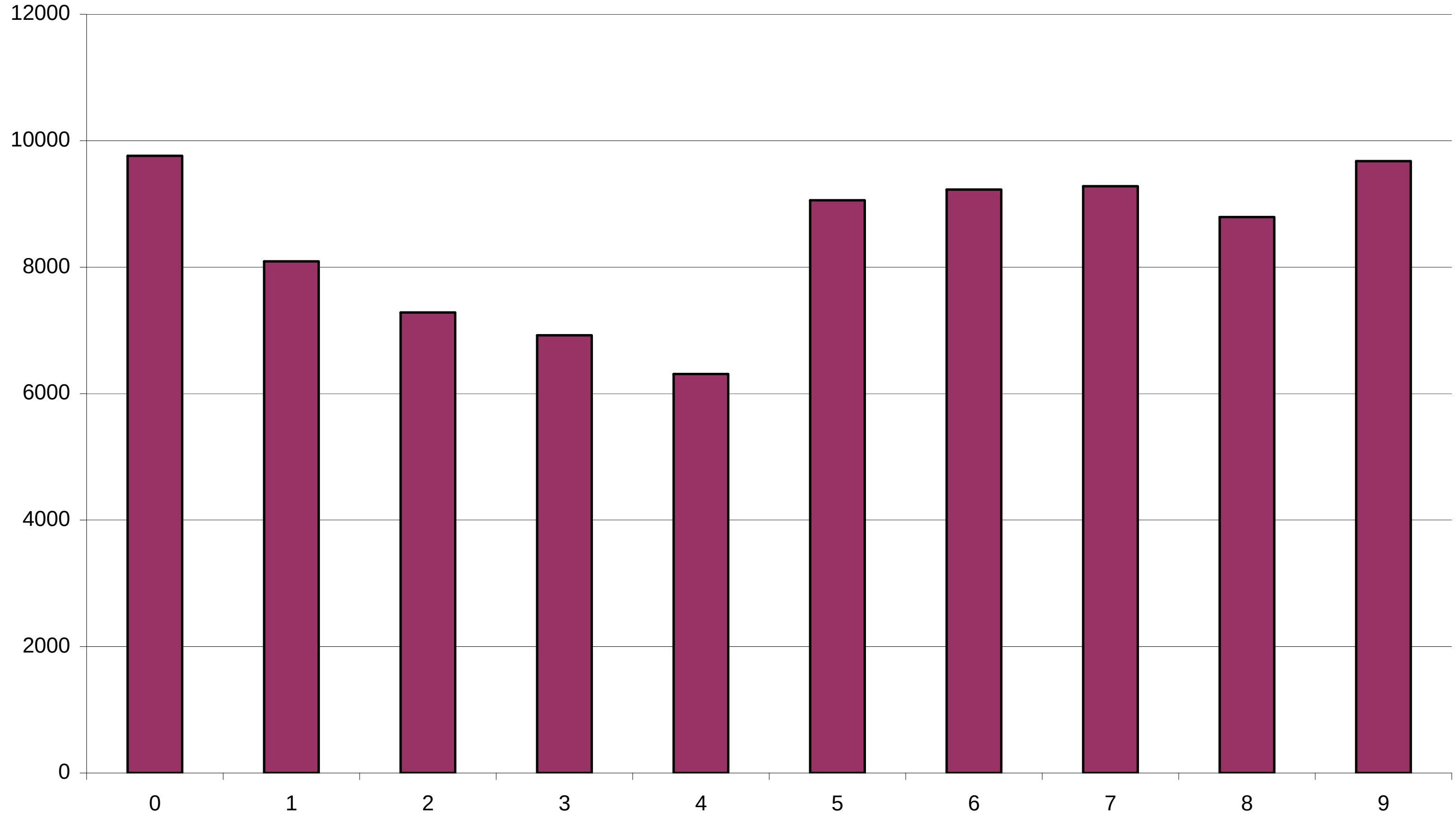

Figure 2
Frequency of the Digit for Firms Reporting Negative Net Income