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# Articulation in Cash Flow Statements: A Resource for Financial Accounting Courses

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Teaching and educational notes

## Articulation in cash flow statements: a resource for financial accounting courses

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### Abstract

Recent accounting research (Bahnsen, P., Miller, P., & Budge, B. (1996). Nonarticulation in cash flow statements and implications for education, research and practice. *Accounting Horizons*, 10, 1–15 has shown that firms implementing the indirect method for reporting cash flows under SFAS 95 rarely produce financial statements that articulate cleanly. The purposes of this paper are (1) to provide financial accounting educators with a list of companies for which articulation does exist, (2) to describe the process by which educators can update the list in the future, or modify it to suit their own preferences, and (3) to present an analysis of firms' reporting practices on the cash flow statement, which may be of interest to more advanced students studying the complexities of the statement of cash flows. This analysis of reporting practices involves an assessment of the articulation of individual COMPUSTAT line items (e.g. inventory) and subsets of line items (e.g. inventory, receivables, deferred taxes, and depreciation) for the 1998 data year. The findings indicate that relatively few firms report consistent values for single line items and that very few firms report consistent values across subsets of line items. Although the rate of articulation decreases as firm size, and hence reporting complexity, increases, 74 large, publicly-traded firms for which clean articulation does exist were identified. This list of firms should prove useful to introductory accounting educators who use real-world examples for classroom purposes. © 2000 Elsevier Science Ltd. All rights reserved.

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### 1. Introduction

Using actual corporate financial statements to illustrate methods or applications of concepts increases the relevance of financial accounting courses by exposing

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accounting and finance majors to different types of disclosures. Reporting variations can, however, be confusing to beginning and even early-intermediate accounting students. Financial accounting courses should, therefore, incorporate real-world financial statements that allow students to build a bridge between textbook examples and the extensive variation they are likely to encounter both in subsequent courses and in practice.

This paper has three objectives. First, the paper provides a list of companies for which basic 1998 financial statement relationships are relatively clear. Firms identified in the paper exhibit 'clean' articulation between the balance sheet and the statement of cash flows; that is, changes in the operating assets and liabilities in the balance sheet map unambiguously into the adjustments to net income used to calculate cash flows from operations. Second, the paper describes the process by which educators can update the list in the future, or modify it to suit their own preferences. Finally, the paper analyzes the firms' reporting practices by assessing the articulation of individual COMPUSTAT line items (e.g. inventory) and subsets of line items (e.g. inventory, receivables, deferred taxes, and depreciation) for the 1998 data year.

Bahnsen, Miller and Budge (1996) show that 75% of the data points in a large sample of COMPUSTAT firms contain a material degree of non-articulation between corporate balance sheets and statements of cash flow. While it is instructive for advanced students to see examples of non-articulation, to explore the reasons behind non-articulation, and to consider the related policy implications, students who are just beginning to learn about the statement of cash flows need to see examples of articulating statements before they can think critically about more advanced issues. This paper provides real-world examples that educators can use to demonstrate articulation between financial statements. Using actual company examples is consistent with the Accounting Education Change Commission's challenge to educators "to make lessons more relevant and to lend a real-world perspective to their classroom" (Accounting Education Change Commission, 1990).

The financial statements of firms that articulate cleanly can be a valuable resource for instructors of introductory and intermediate financial accounting courses. For example, many instructors assign end-of-term projects that involve analysis of financial statements of public companies. The financial statements that are selected are often so complex that students are unable to comprehend them. While financial statements for firms identified in the paper are not necessarily simple, they do avoid the complication of non-articulation, enabling instructors to ask inferential questions about cash payments and receipts. The authors have used these financial statements in intermediate accounting as a review before preparing for more complex cash flow statements, and in a graduate-level financial analysis course to provide tractable examples of preparing pro forma statements for forecasting and valuation.

## **2. Articulating firms**

Educators who include real-world analyses in financial accounting courses are likely to prefer using firms that students recognize. Table 1 presents a complete list

Table 1  
Companies with clean articulation of receivables, inventory, depreciation, and deferred taxes at fiscal year-end 1998<sup>a</sup>

Company name	Assets (\$millions)
Adams Resources & Energy	122
Alcan Aluminium Ltd <sup>a</sup>	9901
Altera Corp <sup>a</sup>	1093
Amer Italian Pasta Co-CI A	259
Amgen Inc	3672
Anheuser-Busch Cos Inc <sup>a</sup>	12,484
Antec Corp	533
Barry (R.G.)	111
Beringer Wine Est Hld-CI B <sup>a</sup>	544
BJS Wholesale Club Inc	812
Books-A-Million Inc	246
Briggs & Stratton	793
Buckle Inc <sup>a</sup>	145
Buenos Aires Embt-ADR B	397
Burlington Resources Inc	5917
Carbo Ceramics Inc	99
Casey's General Stores Inc <sup>a</sup>	480
Centex Corp <sup>a</sup>	3416
Central Sprinkler Corp	177
Chromcraft Revington Inc <sup>a</sup>	130
Cohu Inc	162
Coldwater Creek Inc	98
Consolidated Papers Inc	3627
Dallas Semiconductor Corp	461
Dayton Hudson Corp	14,191
Deltic Timber Corp	273
Eagle Hardware & Garden Inc	602
Fastenal Co <sup>a</sup>	251
Fedders Corp	305
Finish Line Inc-CI A	256
Food Lion Inc-CI A	3676
General Cable Corp/DE	651
Glacier Water Services	101
Gorman-Rupp Co	127
Graybar Electric Co Inc	1168
Hershey Foods Corp	3404
Houston Exploration Co <sup>b</sup>	569
International Manufacturing Services	127
Kaman Corp-CI A	587
Lacrosse Footwear Inc	99
Lamson & Sessions Co	161
Lattice Semiconductor Corp	489
Mazel Stores Inc	114
Mercantile Stores Co Inc	2178
Midwest Express Holdings Inc	220
Moore Products Co <sup>a</sup>	102
Mylex Corp	111

(continued on next page)

Table 1 (continued)

Company name	Assets (\$millions)
MYR Group Inc	110
Nashua Corp <sup>a</sup>	134
National Presto Inds Inc <sup>a</sup>	295
National Steel Corp	2484
Orange-Co Inc-New	208
Petroleum Development Corp	111
Phillips-Van Heusen	660
Premisys Communications Inc <sup>a</sup>	139
Publix Super Markets Inc	3617
Rex Stores Corp	261
Rocky Shoes & Boots Inc	97
Royal Appliance Mfg Co <sup>a</sup>	117
Ruddick Corp	932
Sheldahl Inc <sup>a</sup>	136
Sherwin-Williams Co	4065
Shiloh Industries Inc <sup>a</sup>	355
Spectra-Physics Lasers Inc	157
Sturm Ruger & Co Inc <sup>a</sup>	197
Symmetricom Inc <sup>a</sup>	115
TJ International Inc <sup>a</sup>	731
Tractor Supply Co <sup>a</sup>	265
United Industrial Corp	184
VLSI Technology Inc	922
Wet Seal Inc-Ct A	184
Winn-Dixie Stores Inc	3069
Zilog Inc	297
Zions Co-Operative Mercantile	139

<sup>a</sup> All non-financial, non-utility companies in size quartiles 3 and 4 (total assets greater than \$95.10 million) with clean articulation of receivables, inventory, depreciation, and deferred taxes at fiscal year-end 1998.

<sup>b</sup> Denotes companies that also articulate with respect to payables.

of the 74 firms in the two largest size quartiles with articulating receivables, inventory, depreciation, and deferred taxes.<sup>1</sup> The list of firms presented in Table 1 excludes public utilities and financial institutions, as some of the accounting issues associated with these types of firms are likely to be beyond the scope of many financial accounting courses.

Although no “big names” such as General Motors, IBM, Walt Disney, or Coca-Cola appear in the list, there are a number of relatively well-known companies. Department store operators such as Dayton-Hudson (which operates both Target and Mervyn’s) and Mercantile Stores (which operates a variety of stores such as

<sup>1</sup> Firms that also articulate with respect to payables are identified in Table 1.

McAlpin's, Gayfers and Maison Blanche) are included, as are specialty outlets such as Buckle and Wet Seal. Other familiar names include Amgen, Anheuser-Busch, Hershey Foods, Sherwin-Williams, and Winn-Dixie. Table 1 also provides a nice mix of large manufacturing concerns, including Alcan Aluminum, National Steel, Briggs and Stratton, and Consolidated Papers, as well as high-tech companies like Dallas Semiconductor, Lattice Semiconductor, and Altera. In short, the list of firms in Table 1 should prove to be a useful resource for educators who are interested in using real-world companies to illustrate the interplay that exists between different sets of financial statements.

### **3. Procedures for developing a list of firms with cleanly articulating statements**

In order to lend a sense of timeliness and relevance to their discussions and assignments, accounting instructors often prefer to use financial data that are relatively recent. Therefore, the analysis presented in this paper is based on COMPUSTAT firms reporting for data year 1998. Appendix A provides a detailed description of the method used in this paper so that educators can replicate the procedure for future time periods.

Because this paper addresses articulation, changes in selected balance sheet items (i.e. from 1997 to 1998) were compared to the corresponding items as reported in the statement of cash flows at year-end 1998. Firms with missing values for total assets on COMPUSTAT in either 1997 or 1998, financial services firms, firms in regulated industries, and firms that changed their fiscal year-ends in 1998 were eliminated from the sample. The final sample includes 6338 companies (refer to Appendix A for more complete details on the data collection and analysis procedures).

### **4. Data analysis**

#### *4.1. Firm size*

In conducting the articulation analysis, all COMPUSTAT firms were partitioned into quartiles based on size (the reported value of total assets at year-end 1998). Firms included in the first quartile reported total assets of less than \$22.5 million while the median firm reported total assets of approximately \$95.1 million. The third quartile includes firms with total assets of less than \$426.5 million. The largest firm in the sample, General Electric, reported total assets at year-end 1998 of \$355.9 billion. Six cash flow statement items from the operating section were compared to the changes in the balance sheet items. Not surprisingly, the reporting complexity of larger firms makes them less likely to have financial statements that cleanly articulate. In fact, for the largest quartile only 1% of the sample articulates for the primary items in the operating section of the cash flow statement. However, there are 74 firms in the two largest size quartiles that do articulate for these items (see Table 1).

#### 4.2. Data availability

In order for articulation to be identified, firms must have complete data available from COMPUSTAT. Table 2 presents descriptive information regarding data availability for the sample of firms. The analysis emphasizes operating activities; that is, receivables, inventories, depreciation, deferred taxes, accounts payable, and current income taxes payable (see Appendix B for a description of the COMPUSTAT line items).<sup>2</sup>

Panel A of Table 2 presents the number of firms reporting (1) non-missing, non-zero balance sheet values for the individual line items in both 1997 and 1998 or (2) non-missing, non-zero income statement values for the line items in 1998. Data

Table 2  
Descriptive statistics<sup>a</sup>

	Quartile 1 Assets < = \$22.52 M	Quartile 2 < Assets < = \$95.10 M	Quartile 3 < Assets < = \$426.54 M	Quartile 4 Assets > = \$426.54 M
Number of firms ( <i>N</i> = 6338)	1585	1584	1585	1584
<i>Panel A:</i>				
<i>Balance sheet or income statement data available in 1997 and 1998</i>				
12 (receivables — total)	1427	1490	1517	1526
13 (inventories — total)	1089	1141	1238	1413
135 (deferred taxes and ITC — BS) <sup>b</sup>	160	410	664	890
150 (deferred taxes and ITC- IS) <sup>b</sup>	392	877	1220	1351
170 (accounts payable)	1555	1561	1551	1559
114 (depreciation and amortization — IS)	1520	1525	1536	1535
<i>Panel B</i>				
<i>Statement of cash flows data available in 1998</i>				
1302 (accounts receivable)	1389	1414	1440	1371
1303 (inventory)	1085	1092	1161	1227
1126 (deferred taxes and ITC)	363	799	1085	1083
1304 (accounts payable)	1334	1249	1212	1075
1125 (depreciation and amortization)	1536	1532	1545	1536

<sup>a</sup> COMPUSTAT firms reporting data for both 1997 and 1998, having no change in fiscal year-end, and reporting a non-zero value for total assets. Firms are grouped by size quartile, based on total assets reported for data year 1998. Financial companies and utilities are excluded from the analysis.

<sup>b</sup> BS, balance sheet, IS, income statement, ITC, investment tax credit

<sup>2</sup> The data generally are classified based on the simplest specification of each line-item. For example, balance sheet receivables are defined as total receivables (COMPUSTAT item #2), which include trade receivables, tax refunds due, and other current receivables, and which are adjusted for provisions for doubtful accounts. The simplest definition of cash flow receivables (COMPUSTAT item #302) excludes changes in taxes receivable and provisions for doubtful accounts.

availability generally is an increasing function of firm size. For example, only 160 (10%) of the firms in the first quartile reported deferred tax balance sheet data for both years, compared to 890 (56%) of the firms in the fourth quartile. Similarly, only 392 (25%) of first-quartile firms reported deferred taxes on their 1998 income statements, compared to 1351 (85%) of fourth-quartile firms. The same general trends exist for the remaining items in Panel A.

Panel B provides a comparable breakdown based on data reported in firms' cash flow statements. The figures are similar to those presented in Panel A. For example, 363 (23%) firms in the first quartile reported a deferred tax line-item on their 1998 statement of cash flows, compared to 1083 (68%) firms in the fourth quartile. As with the data from Panel A, the smallest discrepancies occur with depreciation and amortization, an item that is more likely to be both present and relatively straightforward across most subsets of firms. In total, however, the data presented in Table 2 suggest that larger firms are more likely than smaller firms to report complete COMPUSTAT data.

#### 4.3. *Articulation of individual line items*

Table 3 presents a breakdown of articulation across individual line items (Panel A), as well as across subsets of line items (Panel B). Financial statement line items are defined as articulating if the difference between the change in the balance sheet value and the statement of cash flow value is less than or equal to 0.001 (\$1000).<sup>3</sup> Each cell in Table 3 presents both the number of firms and the proportion of firms, relative to those with non-missing, non-zero items, that have clean articulations. For example, in Panel A the 394 firms in the first quartile reporting a change in total balance sheet receivables equal to the change in receivables reported on the statement of cash flows represent 28% of the 1427 first-quartile firms reporting non-missing, non-zero balance sheet items for both 1997 and 1998. Similarly, the 168 fourth-quartile firms with articulating receivables represent 11% of the 1526 fourth-quartile firms reporting non-missing, non-zero balance sheet items for both years.

The proportion of firms reporting articulating line items generally decreases with firm size. For example, 55% of first-quartile firms report inventory consistently across statements, compared to 15% of fourth-quartile firms. Similarly, 52% of first-quartile firms have current taxes payable that articulate, compared to only 10% of fourth-quartile firms. The same trends hold for every other operating activity that was investigated, with the smallest discrepancies observed for the depreciation and amortization line item (as in Table 2). In other words, although more large firms report complete data, the increasing reporting complexity of these firms results in fewer incidents of line item articulation.

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<sup>3</sup> Our data are not materially affected when we define articulation as a difference of less than or equal to 0.01 (\$10,000). Again, this is not to say that firms with differences in excess of these figures do not, at some level of materiality, articulate. Our analysis is simply intended to provide a list of firms with relatively clean articulations because these are the types of firms that could be used most productively in financial accounting courses.

Table 3  
Number and proportion of firms with clean articulations by size quartile<sup>a,b</sup>

<i>Panel A: line item reconciliations</i>	Quartile 1	Quartile 2	Quartile 3	Quartile 4
Receivables				
Change in 12 equals 1302	394 (28%)	320 (22%)	245 (16%)	168 (11%)
Inventories				
Change in 13 equals 1303	594 (55%)	493 (43%)	382 (31%)	215 (15%)
Accounts payable and accruals				
Change in (170 + 1153) equals 1304	472 (30%)	288 (18%)	175 (11%)	53 (3%)
Deferred taxes and ITC				
150 equals 1126	234 (60%)	544 (52%)	694 (57%)	726 (54%)
Income taxes payable				
Change in 171 equals 1305	94 (52%)	154 (36%)	130 (20%)	83 (10%)
Depreciation and amortization				
114 equals 1125	1095 (72%)	1078 (71%)	993 (65%)	940 (61%)
<i>Panel B: subset reconciliations</i>				
Receivables, inventory, and depreciation	157 (15%)	155 (14%)	101 (8%)	62 (5%)
Receivables, inventory, depreciation and deferred taxes	30 (10%)	51 (7%)	43 (4%)	31 (3%)
Receivables, inventory, depreciation, deferred taxes, and payables	15 (5%)	16 (2%)	13 (1%)	8 (1%)

<sup>a</sup> Proportions are presented parenthetically.

<sup>b</sup> Items are defined as reconciling if the difference across financial statements is less than or equal to 0.001 (\$1,000).

It is also interesting to note the incidence of articulation across, as opposed to among, quartiles. For example, of the 6338 firms included in the initial sample only 1684 (27%) report inventory consistently across statements. Relatively uncomplicated items such as depreciation tend to favor articulation, with 4106 (65%) firms reporting equal values across statements. However, items that are likely to include a variety of different effects reconcile much less frequently. Accounts payable and accruals, for example, articulate for only 988 (16%) of the sample firms, with 760 (77%) of these observations coming from firms in the first and second quartiles. Similar findings obtain for current taxes payable as well as for total receivables. In sum, the data suggest that clean articulation of operating activities under the indirect format is a relatively infrequent occurrence, even when line items are examined one at a time. In the following section, the analysis is extended to include evaluations of subsets of financial statement line items.

#### 4.4. Articulation of line-item subsets

Given that one purpose of this paper is to develop a list of firms that educators can use for discussions and/or assignments in financial accounting courses, the findings presented in Panel A of Table 3 are of little help. In other words, knowing

that XYZ Corporation reports articulating values for deferred taxes would be of limited benefit if the remainder of XYZ Corporation's financial statements did not articulate. For this reason, Panel B of Table 3 presents a breakdown of the frequency with which various subsets of operating activities reconcile cleanly. The proportions in Panel B reflect the number of firms reporting reconciling items relative to the number of firms reporting non-missing values for all line items included in each particular subset. For example, 157 first-quartile firms report articulating values for receivables, inventory, and depreciation, which represents 15% of the firms included in the first quartile that reported non-missing values for all three variables.

The first subset, (firms with articulating values for receivables, inventory, and depreciation) includes 475 firms, with relatively few (62) coming from the fourth quartile. When the requirement of articulating deferred taxes is introduced, the total number is cut to 155; 30 from the first quartile, 51 from the second quartile, 43 from the third quartile and 31 from the fourth quartile. It is important to note that the definition of articulating deferred taxes used in this paper includes firms having income statement disclosures of deferred taxes arising during the current year equal to the change in deferred taxes as presented in the statement of cash flows. When changes in deferred taxes as per the balance sheet are compared to changes in deferred taxes as per the statement of cash flows, fewer firms articulate.<sup>4</sup>

The last subset included in Panel B adds the requirement of articulating accounts payable and accruals. When this restriction is imposed, the total number of surviving firms drops to 52, only eight of which are from the largest quartile. In total, the statistics presented in Panel B of Table 3 show that when articulation is defined as encompassing the three line items having the most common individual reconciliations — receivables, inventory, and depreciation — financial statements for only 7% of the original 6338 firms are found to articulate. When the deferred tax articulation requirement is added only 2% of the firms qualify, and the inclusion of payables reduces the figure to less than 1%.

#### *4.5. Articulation of investing and financing activities*

The analyses presented heretofore have been limited to the investigation of articulating operating activities. The rationale for this process is twofold. First, reconciling most investing and financing activities to their corresponding values in the balance sheet, statement of stockholders' equity, or footnotes is considerably easier than reconciling operating activities. Second, while COMPUSTAT presents detailed information for some items in the statement of cash flows, analysis of financial statement footnotes is often required to "fill in the gaps" that are not immediately obvious from an examination of the individual line items. For example, although COMPUSTAT

<sup>4</sup> The reason for the discrepancy is likely due to the variety of ways in which firms disclose deferred taxes on their balance sheets. Some firms strictly apply the tenets of SFAS 109, while many others opt for other forms of disclosure — no netting of deferred tax amounts by type or classification, inclusion in "other assets" as opposed to disclosure as an individual line item, etc. Such variation and/or aggregation decreases the likelihood that deferred tax balance sheet items as per COMPUSTAT will reconcile with deferred taxes as shown in statements of cash flow.

does provide information regarding additions to and reductions from long-term debt, many firm-specific presentation and disclosure differences exist (e.g., with respect to capital lease obligations, short-term debt classifications, and retirements) which make highly structured cross-statement comparisons difficult. Such comparisons are particularly difficult with investing activities, given the complexities associated with accounting for marketable securities, acquisitions, and the like.

For the sample of firms shown in Table 1, cross-statement comparisons were made regarding common stock repurchases, stock option transactions, dividend payments, changes in long-term debt, and additions to property, plant and equipment. Because there is considerable variation in how and where firms report these items, very few instances of articulation were found for these events. For example, only ten of the 74 firms reported cleanly articulating treasury stock transactions and nine reported articulating changes in long-term debt.

For illustrative purposes, 10-K filings for ten companies were selected at random for a more detailed analysis. Most of the investing and financing activities for these firms were able to be reconciled based on additional detailed information provided in the financial statement footnotes — information that typically is not available for operating activities. For example, the 1998 statement of cash flows for Briggs and Stratton shows a \$15 million repayment on 9.21% senior notes. Although the balance sheet provides only a single, aggregated long-term debt figure, the debt footnote shows a decrease in the 9.21% senior notes of \$15 million. Similarly, the statement of shareholders' equity shows a \$2.757 million decrease in additional paid-in capital and a \$12.045 million decrease in treasury stock associated with the exercise of stock options. These figures, which are not shown as line items in the balance sheet, correspond directly to the \$9.288 million "proceeds from exercise of stock options" shown in the statement of cash flows. In general, these data are consistent with the authors' previous experience with the articulation of investing and financing activities; that is, given sufficient footnote disclosure the articulation of such activities generally can be verified.

## 5. Concluding remarks

This paper presents a list of publicly-traded companies for which clean financial statement articulation exists. In addition, the paper provides a description of the process used to compile the list, and an analysis of the reporting practices that were observed during the compilation process.

The data indicate that less than 2% of the COMPUSTAT firms active during 1998 articulate across the subset of receivables, inventory, depreciation, and deferred taxes. This finding, combined with the results of Bahnson et al. (1996), reveals that it is difficult for instructors of financial accounting courses to effectively discuss financial statement relationships using actual corporate filings.

It is important to note that the firms in the articulation sample are not the *only* publicly-traded firms having articulating financial statements. For example, the 10-K for Applied Signal Technology — a company that the authors have used for

classroom discussion purposes — presents financial statements that articulate completely; however, the firm's cash flow data are missing on COMPUSTAT. The same circumstances likely exist for many other companies. In this paper, COMPUSTAT is simply being used as a crude, but convenient, tool to develop a list of firms for which articulation does appear to exist.

The primary goal of this paper is to facilitate the efficient introduction of real-world financial data into financial accounting courses, not to produce an exhaustive list of all companies that have transparent financial statements. Without question, there are many articulating firms that do not survive the sample screens; however, the list of companies provided in Table 1 should prove to be a very useful resource for financial accounting instructors who wish to incorporate actual financial statement data into their courses.

#### **Appendix A. Description of data collection and analysis**

- Step 1. Pull COMPUSTAT data for 1996 through 1998. Adjust for COMPUSTAT's fiscal year coding (i.e., if  $FYR < 6$  then  $YEAR = YEAR + 1$ ). Define lag variables for 1998 (representing 1997 values) for all desired balance sheet and income statement items so that the 1998 record for each firm contains all relevant 1997 data as well.
- Step 2. Keep only the 1998 record for each firm. That is, drop the 1997 data year because, as a result of Step 1, the relevant 1997 items are included as lag variables in the 1998 data record. Remove firms having missing values or zero values for total assets in 1998 or 1997, firms changing their fiscal year-ends during 1998, and firms with four-digit SIC codes between 4800 and 4999 or between 6000 and 6999.
- Step 3. Determine total asset quartiles based on 1998 data for surviving sample from Step 2.
- Step 4. Flag firms with line items having non-missing and non-zero balance sheet or income statement values for 1998 and 1997 and corresponding statement of cash flow values for 1998. For example, all records having non-missing and non-zero values of  $INV$  (1998 inventory),  $LAGINV$  (1997 inventory), and  $CFINV$  (1998 change in inventory from statement of cash flows) are retained for the analysis of inventory articulation in Step 5.
- Step 5. For survivors from Step 4, compare changes in balance sheet values (1998–1997) or income statement values to the corresponding statement of cash flow values (1998), defining "articulation" when the absolute value of the difference is less than 0.001 (\$1000). For example, if the absolute value of  $(INV - LAGINV) + CFINV$  is less than 0.001, the inventory line-item for the firm of interest is defined as articulating. Output by quartile.

Step 6. Repeat Steps 4 and 5 using line-item subsets rather than individual line items. See Panel B of Table 3 for selected subsets.

Step 7. Output list of largest companies (quartiles 3 and 4) with articulation across receivables, inventory, depreciation, and deferred taxes.

#### Appendix B. Description of COMPUSTAT line items by item number

COMPUSTAT item number	Item description
2	Receivables — total
3	Inventories — total
14	Depreciation and amortization (income statement)
35	Deferred taxes and investment tax credit (balance sheet)
50	Deferred taxes (income statement)
70	Accounts payable
71	Income taxes payable
125	Depreciation and amortization (statement of cash flows)
126	Deferred taxes and investment tax credit (statement of cash flows)
153	Accrued liabilities
302	Accounts receivable — change (statement of cash flows)
303	Inventory — change (statement of cash flows)
304	Accounts payable and accrued liabilities — change (statement of cash flows)
305	Accrued income taxes — change (statement of cash flows)

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