Leading Contributing Institutions to the Elite Accounting Journals: Affiliation on Publication vs. Current Institutional Affiliation

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This study exams the ranking by institutional affiliation of authors appearing in the six elite accounting journals (Accounting Review; Accounting, Organizations and Society; Contemporary Accounting Research; Journal of Accounting and Economics; Journal of Accounting Research and Review of Accounting Studies) over the past 25 years (1985-2009). Unlike previous studies that rank schools' appearances in accounting journals, this study compares the rankings of schools that appear on the articles at time of publication against ranking of schools based on authors' current institutional affiliation. In a mobile academic marketplace, the schools with faculty appearing most frequently in the leading journals may change over time.

INTRODUCTION

The academic institutions that publish frequently in the leading journals gradually establish a pecking-order, or ranking of perceived quality. Absolute numbers of publications do not necessarily indicate an academic program is one of high quality, but sheer numbers combined with those numbers appearing in the leading publications of the discipline represents a fairly good starting point in establishing a ranking of program quality or, at least, rigor.

In previous articles, accounting departments have been ranked based on the number of publications in various journals or based on citation analysis. In one of the earlier such studies, a ranking of institutions contributing to the *Journal of Finance* by Heck, Cooley and Hubbard (1986) was constructed around the first 40-year history of that journal. They identified the authors frequently appearing in *JOF* and ranked the institutions of the authors, and by were the authors received their doctorate, based on the number of published articles. In a broader summary, Moore and Taylor (1980) compiled the number of articles and pages published in five groupings of major business journals—finance, marketing, management science, behavioral management, and general business.

Other studies have included the ranking of leading institutional contributors to the *Accounting Review* (Heck and Bremser, 1986) and to the *American Economic Review* (Heck, 1992), while Chan, Chen and Cheung (2007) provide a global ranking of accounting research and examine the elite degree and elite affiliation effect based on 24 accounting journals over a 15 year period. In these earlier studies, the rankings were generally based on the affiliation of the authors listed in the journal articles. One potential shortcoming of ranking departments based on frequency of publication

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is that the authors who publish those articles may subsequently move on to another institution. This begs the question of whether there might be a difference in institutional ranking based on the affiliation of authors at the time of publication versus institutional ranking based on the authors' current institutions. Given the potential mobility of faculty, it would seem reasonable that the leading contributing accounting departments may change as faculty move from one institution to another. Presumably, the very best accounting departments will seek to attract the faculty who appear most frequently in the elite accounting journals.

In this study, institutions are ranked based on the frequency of appearances in the six elite accounting journals - *Accounting Review (AR); Accounting, Organizations and Society (AOS); Contemporary Accounting Research (CAR); Journal of Accounting and Economics (JAE); Journal of Accounting Research (JAR) and Review of Accounting Studies (RAS)* using the affiliation of authors as it appears in the article and then compared to the institutional ranking in the same elite accounting journals based on the institutions where those authors are currently employed. These six journals were chosen based on the fact they have the highest current impact factors and article influence scores of all the major accounting journals ranked by ISI Web of Knowedge (ISI, 2009).

THE DATA

All articles from the six elite accounting journals were collected for the twenty-five year period of 1985 through 2009. The affiliations of the authors, as noted in the publications were compiled. Only regular articles were included – comments, replies, and editorials were eliminated. Once these data on article affiliations were collected, the current affiliations of the authors were compiled. Current affiliations were determined based on department directories at university web sites. It should be noted that such web sites are not always kept perfectly up to date, however, the number of errors in the web sites is likely to be small enough to not lead to serious ranking errors. Not all affiliations of every author could be determined, as some may have left academia, are deceased, or possibly moved on to an obscure institution. However, it is important to note that despite the fact that the number of affiliations is obviously less for the current faculty, as compared to the affiliations in the journals, all of the larger and better known departments were fairly accurately determined.

A summary of the data collected, by journal, is shown in Table 1. Over the twenty-five year period there were a total of 7,725 appearances in the six elite journals, while there are 4,758 appearances based on current department faculty rolls. One major reason for the disparity between the number of appearances based on the institution on the article versus current institution is that only those departments that had any reasonable chance of being ranked were examined. There were dozens of departments that had maybe one or two appearances over the 25 years, so it would be highly improbably that these departments could move up in the rankings based on current faculty since we only rank the top 100 institutions.

The data in Table 1 shows that the *Accounting Review* and *Accounting, Organizations and Society* have published considerably more articles during the twenty-five year period. The average number of appearances per article is similar for all six journals, with an average for all six at 2.01 appearances per article – with *AOS* averaging slightly less appearances per article than the other five journals. An interesting fact that can be gleamed from this data suggests just how difficult it is to get published – and especially with any frequency – in these six leading accounting journals. With 7,725 total appearances over the twenty-five year period, that yields an average of about 309 appearances

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per year. Taking into consideration that there are several thousand full-time, tenure-track accounting faculty – and not even counting the competition from thousands of economics, finance and other business disciplines for getting published in these journals – the odds do seem to be quite small for the average accounting academic to get published in these journals, even with rare frequency.

Table 1. Summary Data of Articles and Appearances: 1985-2009

Journal	Articles	Appearances	Articles Per Year	Appearances Per Article
Accounting Review	947	1914	37.8	2.02
Accounting, Organizations and Society	879	1535	35.2	1.75
Contemporary Accounting Research	627	1299	25.1	2.07
Journal of Accounting and Economics	542	1153	21.7	2.13
Journal of Accounting Research	649	1358	26.0	2.09
Review of Accounting Studies	204	466	14.6	2.28
All Six Journals	3848	7725	153.9*	2.01

*Sum of articles per year for six journals does not equal the total for all six journals because authors published across several journals

THE INSTITUTIONAL RANKINGS

The ranking of institutions appearing most frequently in the six elite accounting journals are shown in Table 2. The top five institutions based on affiliation in the article are Chicago, Pennsylvania, Stanford, Michigan and Texas. The top five institutions based on current department faculty are Stanford, Pennsylvania, Southern California, U. Washington and Texas. Only two of the top five are the same for both rankings, with considerable shifting of positions between the two rankings. Among the top 20 institutions, seven move up slightly when current department faculty are considered, eleven move down slightly, while four (Pennsylvania, Texas, Illinois and Arizona) stay in the same positions. Three schools move into the top 20 when current department faculty are considered – Ohio State, UCLA and Wisconsin. Of the top 20 institutions, the institution moving down the most between affiliation ranking on article to current faculty ranking is Penn State (12 places), while the institution moving up the most is UCLA (15 places).

To determine whether the rankings of institutions differs based on affiliation on article versus current institution department faculty, a paired-ranking test using the Spearman's rho statistic is conducted. The calculated Spearman's rho is 0.735 (116 d.f.) and a corresponding p-value that is less than .001. Therefore, the conclusion is drawn that there is no significant difference in the rankings between affiliations reported in the articles compared to current school affiliation. Thus, if we wish to rank schools for their contributions to the leading accounting journals, using the affiliations reported on the articles appears to be sufficient. The conclusion can thus be drawn that regardless of any likely faculty mobility over time, such movements appear to have little impact on how institutions are ranked regarding their publication contributions.

Table 2. Leading Contributing Institutions to the Elite Accounting Journals

Accounting Review; Accounting, Organizations and Society; Contemporary Accounting Research;
Journal of Accounting and Economics; Journal of Accounting Research and Review of Accounting Studies

Ranking by Institution Listed in Articles versus Ranking by Institution's Current Faculty

By Institution Listed in Article				By Institution's Current Faculty		
Rank	Institution	Appearances		Rank	Institution	Appearances
1	Chicago	146		1	Stanford	181
2	Pennsylvania	145		2	Pennsylvania	124
3	Stanford	138		3	Southern California	115
4	Michigan	134		4	U. Washington	107
5	Texas	130		5	Texas	106
6	Columbia	107		6	North Carolina	102
7	U. Washington	106		7	Chicago	101
8	Southern California	103		8	Michigan State	95
9	NYU	96		9	Northwestern	88
10	Penn State	94		10	NYU	85
11	Illinois	93		11	Illinois	82
12	Northwestern	92		12	Iowa	80
13	Duke	91		13	Ohio State	76
14	Cornell	89		14	Michigan	75
15	Iowa	88		15	UCLA	74
16	Indiana	84		16	Columbia	73
17	Arizona	80		17	Arizona	71
18	North Carolina	79		18	Duke	71
19	Alberta	77		19	Cornell	70
20	Michigan State	75		20	Wisconsin	70
21	Washington U. (St. Louis)	75		21	Penn State	69
22	Minnesota	73		22	Texas A&M	67
23	UC Berkeley	73		23	UC Berkeley	65
24	Wisconsin	72		24	MIT	62
25	Ohio State	69		25	Indiana	60
26	Harvard	66		26	Notre Dame	60
27	Hong Kong Science	66		27	Arizona State	58
28	British Columbia	64		28	Baruch	58
29	Florida	62		29	Georgia	58
30	UCLA	61		30	Harvard	56
31	Emory	57		31	Missouri	55
32	New South Wales	57		32	Toronto	53
33	MIT	56		33	Alberta	52
34	Arizona State	54		34	Minnesota	52
35	Notre Dame	54		35	Emory	51

Table 2. Leading Contributing Institutions to the Elite Accounting Journals (continued)

Accounting Review; Accounting, Organizations and Society; Contemporary Accounting Research;
Journal of Accounting and Economics; Journal of Accounting Research and Review of Accounting Studies

Ranking by Institution Listed in Articles versus Ranking by Institution's Current Faculty

By Institution Listed in Article				By Institution's Current Faculty		
Rank	Institution	Appearances		Rank	Institution	Appearances
36	Manchester	53		36	Temple	50
37	Texas A&M	53		37	New South Wales	49
38	Carnegie Mellon	51		38	Hong Kong Science	48
39	London School of Econ	50		39	Pittsburgh	48
40	Colorado	48		40	Queens	47
41	Georgia	48		41	London School of Econ	46
42	Toronto	45		42	Oklahoma	45
43	Waterloo	45		43	Florida	44
44	Baruch	43		44	Rice	44
45	Rochester	43		45	Boston College	40
46	Missouri	40		46	BYU	39
47	Oklahoma	40		47	Georgia State	39
48	Yale	40		48	Texas Dallas	38
49	Pittsburgh	39		49	Washington U. (St. Louis)	35
50	Georgia State	38		50	Yale	33
51	Boston College	37		51	Houston	32
52	Florida State	37		52	Kentucky	32
53	Purdue	37		53	SMU	32
54	Rutgers	32		54	New Mexico	30
55	SUNY Buffalo	32		55	Cardiff	29
56	Connecticut	32		56	Waterloo	29
57	Nanyang	31		57	Laval	28
58	Queens	30		58	Maryland	28
59	Maryland	29		59	Utah	28
60	Alabama	28		60	Hong Kong Poly	27
61	London Business School	28		61	Monash	27
62	South Carolina	28		62	City U. Hong Kong	26
63	Boston U.	27		63	Manchester	26
64	Houston	27		64	U. Miami	26
65	Melbourne	27		65	George Washington	25
66	BYU	26		66	Oregon	25
67	Oxford	26		67	Carnegie Mellon	24
68	Rice	26		68	Rochester	24
69	SMU	26		69	Dartmouth	23
70	Temple	25		70	Florida State	23

Table 2. Leading Contributing Institutions to the Elite Accounting Journals (continued)

Accounting Review; Accounting, Organizations and Society; Contemporary Accounting Research;
Journal of Accounting and Economics; Journal of Accounting Research and Review of Accounting Studies

Ranking by Institution Listed in Articles versus Ranking by Institution's Current Faculty

By Institution Listed in Article				By Institution's Current Faculty		
Rank	Institution	Appearances		Rank	Institution	Appearances
71	Utah	25		71	Northeastern	23
72	Dartmouth	23		72	Virginia	23
73	Georgetown	23		73	Alabama	22
74	North Carolina State	23		74	Arkansas	22
75	New Mexico	23		75	Purdue	22
76	Oregon	23		76	South Carolina	22
77	Texas Dallas	23		77	Melbourne	21
78	Illinois Chicago	22		78	North Texas	21
79	Kentucky	22		79	Texas Christian	21
80	Louisiana State	22		80	British Columbia	20
81	MacQuarie	22		81	Calgary	19
82	Queensland	22		82	Lancaster	19
83	McMaster	21		83	North Carolina State	19
84	Northeastern	21		84	Tilburg	19
85	Syracuse	21		85	Colorado	18
86	San Diego State	19		86	Tulane	18
87	Simon Fraser	19		87	Boston U.	17
88	UC Irvine	19		88	Tennessee	17
89	Case Western Reserve	18		89	Georgetown	16
90	Edinburgh	18		90	Queensland	16
91	Monash	18		91	San Diego State	16
92	Massachusetts	18		92	Bentley	15
93	Virginia	18		93	Connecticut	15
94	Virginia Tech	18		94	Kansas	15
95	George Mason	17		95	Nanyang	15
96	INSEAD	17		96	Georgia Tech	14
97	Lancaster	17		97	INSEAD	14
98	Vanderbilt	17		98	Memphis	14
99	Arkansas	16		99	Rutgers	14
100	Auckland	16		100	Vanderbilt	14
101	Calgary	16				
102	Hong Kong Poly	16				
103	Texas Christian	16				
104	Tilburg	16				
105	North Texas	16				
106	Warwick	16				

CONCLUSION

This study exams the ranking by institutional affiliation of authors appearing in the six leading accounting journals over the past 25 years (1985-2009) based on institutional affiliation listed on the article at time of publication versus the authors' current institutional affiliation. The study results suggest that despite a relatively mobile academic community, the ranking of schools varies little as a result of faculty movement. It would seem quite acceptable to rank schools based on affiliation at the time of publication without generating any bias against schools whose faculty may tend to change over time.

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The Effect of Residual Income on Relations Among Alternative Accounting Methods

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The Effect of Residual Income on Relations Among Alternative Accounting Methods

ABSTRACT: It is well known that when prices are increasing and units in inventory do not decrease, FIFO will report larger income than average cost. Indeed, this property is one of the more important features that distinguish the two inventory methods. As the use of residual income increases, one question that becomes relevant is whether, under these same conditions, FIFO will also report larger residual income than average cost. Is it possible that under these conditions average cost will report a larger residual income and reverse the usual average cost-FIFO relationship? Further, if such a reversal occurs, is it likely to occur frequently, or will it be a rare event? These are questions that have been ignored in the literature, and the answers are not intuitively obvious. The contribution of this paper is to answer these questions. The analysis shows that average cost residual income can indeed exceed FIFO residual income, even when both units and prices are increasing, and develops a necessary and sufficient condition for this result to occur. Through a series of examples I also show that this result should not be an uncommon event. These findings should provide for more informed evaluations of the average cost – FIFO choice when residual income is used as the performance measure.

Key Words: residual income, average cost, FIFO

The Effect of Residual Income on Relations Among Alternative Accounting Method

INTRODUCTION

Research on residual income has evolved primarily along two lines. One line deals with the use of residual income for equity valuation (e.g., Ali, Hwang and Trombley, 2003; Baginski and Wahlen, 2003; Feltham and Ohlson, 1995; Kohlbeck and Warfield, 2007; Schueler and Krotter, 2008). The second line addresses the use of residual income as a measure of periodic performance (e.g., Balachandran, 2006; Bromwich and Walker, 1998; Christensen, Feltham and Wu, 2002; Wallace, 1997). An interesting aspect of residual income that has been largely ignored is the manner in which residual income can alter the relationships among alternative accounting methods. Thus, preparers and users of residual income numbers may find that the usual relationships among, say, inventory methods or depreciation methods, are reversed when used in conjunction with residual income. This paper addresses this aspect of residual income by analyzing the effect of residual income on two common inventory methods, average cost and first-in-first-out (FIFO).

It is well known that when inventory growth rates are nonnegative and unit costs are increasing average cost will report lower income than FIFO and that this difference will grow over time as long as the specified conditions prevail.[1] For this reason average

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[1] Martin (1992) shows that unit costs can increase even if prices are falling; hence, FIFO can report higher income in periods of decreasing prices. This result can occur if fixed manufacturing costs are sufficiently large and volume decreases by an amount such that total cost per unit increases.

cost is usually considered a more conservative choice than FIFO. But this relationship may not hold when residual income is used as the performance measure. A few moments reflection make it clear why a reversal of the normal average cost-FIFO relationship might occur. Average cost will produce a higher cost of goods sold expense, but a lower asset value and hence a lower charge for the cost of capital that is used in the computation of residual income. However, it is less clear whether these opposite effects are sufficient to reverse the usual average cost-FIFO relationship. In the following analysis I develop a model of inventory valuation and residual income to show (1) the necessary and sufficient condition for a reversal to occur, and (2) the length of time required for a reversal given specific values of the relevant variables. The motivation for this analysis is to further our understanding of relationships among alternative accounting methods so that more informed evaluations may be made (both ex ante and ex post) of the effects of selections made from overlapping sets of accounting techniques.

The analysis proceeds as follows: I develop equations for the differences between average cost and FIFO in inventory, cost of goods sold, net income and residual income. In the residual income section the necessary and sufficient condition for average cost residual income to exceed FIFO residual income is developed. The penultimate section computes and discusses the reversal point, where average cost residual income overtakes FIFO residual income, and the last section provides concluding remarks.

ANALYSIS

Inventory Difference

The following relationships are used to develop a model of inventory valuation . FIFO inventory at the end of period n can be expressed as:

$$I_{f,n} = u_n p_n = u_0 (1+g)^n p_0 (1+r)^n, \text{ where:} \tag{1}$$

u_0 = units in beginning inventory at n = 0,

p_0 = cost per unit at n = 0,

g = periodic growth rate in units, $g \geq 0$, and

r = periodic growth rate in unit costs, $r > 0$.

For ease of exposition I assume that all units are priced at end-of-period prices and that sales are greater than beginning inventory. These assumptions reduce the complexity of the analysis without altering the general nature of the conclusions. The analysis is conducted for the case where $g \geq 0$ and $r > 0$, i.e., the circumstances under which FIFO income always will exceed average cost income.

Average cost inventory at the end of period n can be expressed as

$$I_{a,n} = u_n \overline{p}_n, \text{ where:} \tag{2}$$

$\overline{p}_n$ = weighted average unit cost at the end of period n.

An equation for $\overline{p}_n$ is developed as follows:

$$\overline{p}_1 = \alpha p_0 + (1-\alpha)p_1, \text{ where:}$$

$\alpha = u_0 / (u_0 + P_1)$,

$1 - \alpha = P_1 / (u_0 + P_1)$, and

P_1 = units purchased in period one.

To further simplify the analysis, I assume a constant value for α and write

$$\begin{aligned}
\overline{p}_2 &= \alpha \overline{p}_1 + (1-\alpha)p_2 \\
&= \alpha[\alpha p_0 + (1-\alpha)p_1] + (1-\alpha)p_2 \\
&= \alpha^2 p_0 + (1-\alpha)(\alpha p_1 + p_2)
\end{aligned}$$

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$$\overline{p}_3 = \alpha \overline{p}_2 + (1-\alpha)p_3$$
$$= \alpha\left[\alpha^2 p_0 + (1-\alpha)(\alpha p_1 + p_2)\right] + (1-\alpha)p_3$$
$$= \alpha^3 p_0 + (1-\alpha)(\alpha^2 p_1 + \alpha p_2 + p_3).$$

In a similar fashion, and using $p_n = p_0(1+r)^n$,

$$\overline{p}_n = \alpha^n p_0 + (1-\alpha)\left[\alpha^{n-1}p_0(1+r) + \alpha^{n-2}p_0(1+r)^2 + \ldots + p_0(1+r)^n\right].$$

The term in the set of square brackets is a geometric progression with a common ratio of $(1+r)/\alpha$. Using the formula for the first n terms of a geometric progression, $\overline{p}_n$ now can be expressed as

$$\overline{p}_n = \alpha^n p_0 + (1-\alpha)\left[\frac{\alpha^{n-1}p_0(1+r)\left[1-\left[\frac{1+r}{\alpha}\right]^n\right]}{1-\left[\frac{1+r}{\alpha}\right]}\right]$$

which, after a number of algebraic manipulations, can be simplified to

$$\overline{p}_n = \frac{p_0\left[r\alpha^{n+1} + (1-\alpha)(1+r)^{n+1}\right]}{(1+r) - \alpha}. \tag{3}$$

The difference between the current unit cost and the average unit cost, denoted $D_{p,n}$, is

$$D_{p,n} = p_0(1+r)^n - \frac{p_0\left[r\alpha^{n+1} + (1-\alpha)(1+r)^{n+1}\right]}{(1+r) - \alpha}$$

which, after further simplification, is reduced to

$$D_{p,n} = A\left[(1+r)^n - \alpha^n\right], \quad \text{where} \tag{4}$$

$$A = \frac{r\alpha p_0}{1+r-\alpha} > 0.$$

It is of interest to describe the shape and properties of this function. As I show below, $D_{p,n}$ is a monotonically increasing function with an inflection point. Taking the first (partial) derivative of $D_{p,n}$ with respect to n yields

$$\frac{\partial D_{p,n}}{\partial n} = A\left[(1+r)^n \ln(1+r) - \alpha^n \ln\alpha\right].$$

Since $(1+r) > 1$ and $\alpha < 1$, $\partial D_{p,n}/\partial n > 0$ and thus equation (4) is a monotonically increasing function. Taking the second derivative of (4) and setting it equal to zero gives

$$\frac{\partial^2 D_{p,n}}{\partial n^2} = A\left[(1+r)^n [\ln(1+r)]^2 - \alpha^n (\ln\alpha)^2\right] = 0. \tag{5}$$

To obtain the inflection point, denoted n_p^I, I divide (5) by A and solve for n as follows:

$$(1+r)^n [\ln(1+r)]^2 = \alpha^n (\ln\alpha)^2$$

Taking logs of both sides gives

$$n\ln(1+r) + 2\ln\left[\ln(1+r)\right] = n\ln\alpha + 2\ln(\ln\alpha), \text{ or}$$

$$n_p^I = \frac{2\ln(\ln\alpha) - 2\ln[\ln(1+r)]}{\ln(1+r) - \ln\alpha}. \tag{6}$$

Further,

$$\frac{\partial^3 D_{p,n}}{\partial n^3} = A\left[(1+r)^n [\ln(1+r)]^3 - \alpha^n (\ln\alpha)^3\right], \tag{7}$$

which is the same as (5) except that $\ln(1+r)$ and $\ln\alpha$ are raised to the third power. Hence if (5) vanishes at $n = n_p^I$, (7) is positive at $n = n_p^I$, confirming that (6) is an inflection point that curves upward. These properties are useful in interpreting the difference functions for net income and residual income, which are developed subsequently. Figure 1 shows a graph of (4) for selected values of the variables.

Figure 1
Current Unit Cost Minus Average Unit Cost
$$\alpha = .25, \quad r = .05, \quad p_0 = 100$$

$D_{p,n}$
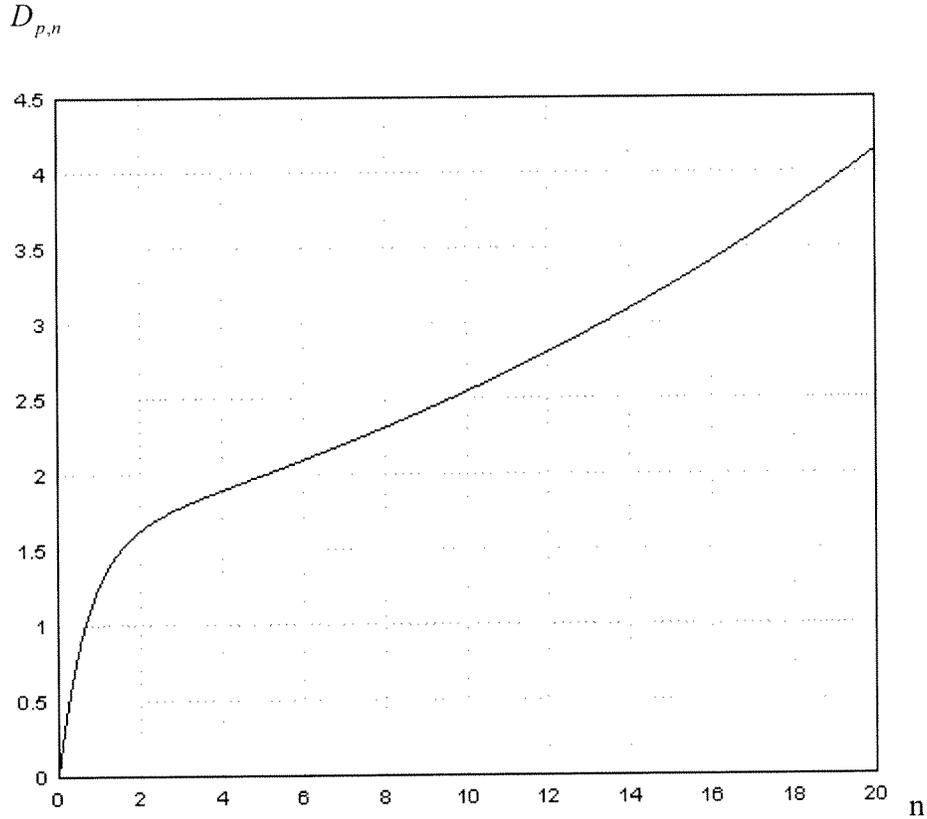
Cost of Goods Sold Difference

The Difference in cost of goods sold under average cost $(C_{a,n})$ and under FIFO

$(C_{f,n})$ in period n, denoted $D_{c,n}$, is the difference in ending inventories minus the

difference in beginning inventories, i.e.,

$$D_{c,n} = C_{a,n} - C_{f,n}$$
$$= (I_{f,n} - I_{a,n}) - (I_{f,n-1} - I_{a,n-1}). \tag{8}$$

Using equations (1) and (2), $D_{c,n}$ is expressed as

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$$D_{c,n} = u_0(1+g)^n(p_n - \bar{p}_n) - u_0(1+g)^{n-1}(p_{n-1} - \bar{p}_{n-1}).$$ (9)

Since $(p_n - \bar{p}_n)$ increases over time, (9) reflects the usual relationship between average cost and FIFO, i.e., average cost produces the higher cost of good sold, and the difference between the two cost methods increases over time given the stipulated conditions of $r > 0$ and $g \geq 0$. Substituting (4) for the unit cost difference gives

$$D_{C,n} = u_0(1+g)^n A\left[(1+r)^n - \alpha^n\right] - u_0(1+g)^{n-1} A\left[(1+r)^{n-1} - \alpha^{n-1}\right]$$

which reduces to

$$D_{C,n} = B\left[(1+g)^n(1+r)^n - (1+g)^n\alpha^n - (1+g)^{n-1}(1+r)^{n-1} + (1+g)^{n-1}\alpha^{n-1}\right],$$

where $B = \dfrac{u_0 p_0 r \alpha}{1+r-\alpha} = u_0 A$.

Where possible, I will use z for the combined growth in g and r, i.e., $(1+z) = (1+g)(1+r)$. Additionally, I define $d = \alpha(1+g)$ and assume $d < 1$, which would seem to be the usual case. To have a value of $d > 1$, we must have $(u_0/(u_0 + P_1))(1+g) > 1$, which reduces to $u_0(g) > P_1$. Since u_0 is normally less than P_1 and g is normally substantially less than one, a value of $d > 1$ should be unusual. Viewed another way, if $\alpha = 0.3$, for d to be greater than one g would have to be greater than 2.33, or a growth rate in excess of 233 per cent. Substituting this notation in the previous equation and simplifying further gives

$$D_{C,n} = B\left[z(1+z)^{n-1} + (1-d)d^{n-1}\right].$$ (10)

Net Income Difference

The difference in net income (NI) under the two inventory methods, $D_{N,n}$, is the

cost of good sold difference reduced by income taxes.

$$D_{N,n} = NI_{f,n} - NI_{a,n} = (C_{a,n} - C_{f,n})(1-t)$$

$$= B\left[z(1+z)^{n-1} + (1-d)d^{n-1}\right](1-t), \text{ where} \tag{11}$$

$t = $ income tax rate.

It is also useful to examine the shape of equation (11). Taking the first derivative

with respect to n and setting it equal to zero yields

$$\frac{\partial D_{N,n}}{\partial n} = B(1-t)\left[z(1+z)^{n-1}\ln(1+z) + (1-d)d^{n-1}\ln d\right] = 0, \text{ or} \tag{12}$$

$$z(1+z)^{n-1}\ln(1+z) = -(1-d)d^{n-1}\ln d. \tag{13}$$

Taking logs of both sides to solve for n gives

$$\ln\left[z\ln(1+z)\right] + (n-1)\ln(1+z) = (n-1)\ln d + \ln\left[-(1-d)\ln d\right]. \tag{14}$$

Because $d < 1$, $\ln d < 0$, and the term in the square brackets on the right-hand side of

(14) is positive; thus, its log exists. Solving for n provides a minimum point, n_N^*,

in the net income difference function (11).

$$n_N^* = \frac{\ln\left[-(1-d)\ln d\right] - \ln\left[z\ln(1+z)\right]}{\ln(1+z) - \ln d} + 1. \tag{15}$$

The second derivative of $D_{N,n}$ is

$$\frac{\partial^2 D_{N,n}}{\partial n^2} = B(1-t)\left[z(1+z)^{n-1}\left[\ln(1+z)\right]^2 + (1-d)d^{n-1}(\ln d)^2\right] \tag{16}$$

which is positive for all positive values of n verifying that n_N^* is a minimum point of the

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$D_{N,n}$ curve. This function decreases rapidly until it reaches a minimum point and then increases more slowly with time. A graph of the net income difference is shown in Figure 2. The inflection point in the unit cost difference function (4) is what causes the cost of goods sold difference function (10) (and hence the net income difference function (11)) to obtain a minimum point. Before the inflection point the *change* in the unit cost difference function falls, and after the inflection point the *change* rises. As can be seen from equation (9), it is precisely this *change* in the unit cost difference that determines the difference in the cost of goods sold. As I show in the next section, the residual income difference function can have a shape similar to the net income difference function, but only for certain values of key variables.

Residual Income Difference

Residual income (RI) is defined as after-tax income less a cost-of-capital charge based on total assets (or some similar measure, such as total assets minus current liabilities). The difference in periodic residual income that is due to the choice between FIFO and average cost is the difference in the after-tax cost of goods sold plus the difference in the portion of the cost-of-capital charge that is related to the difference in beginning inventory values. The residual income difference is

$$D_{R,n} = RI_{f,n} - RI_{a,n}$$

$$= (C_{a,n} - C_{f,n})(1-t) + k(I_{a,n-1} - I_{f,n-1}), \text{ where}$$

$k = \text{cost of capital.}$

(17)

Using partial results from (8) and (4) the beginning inventory difference is

$$I_{a,n-1} - I_{f,n-i} = u_0(1+g)^{n-1}(\overline{p}_{n-1} - p_{n-1})$$

$$= u_0(1+g)^{n-1}A\left[\alpha^{n-1} - (1+r)^{n-1}\right]$$

which, using previous definitions of B, d and z, can be simplified to

$$I_{a,n-1} - I_{f,n-1} = B\left[d^{n-1} - (1+z)^{n-1} \right].$$ (18)

Substituting results from (11) and (18) into (17) gives an equation for $D_{R,n}$ in terms of the relevant variables.

$$D_{R,n} = B(1-t)\left[z(1+z)^{n-1} + (1-d)d^{n-1} \right] + kB\left[d^{n-1} - (1+z)^{n-1} \right].$$ (19)

After further algebraic manipulation, (19) can be written as

$$D_{R,n} = B\left[\left(z(1-t) - k \right)(1+z)^{n-1} + \left((1-d)(1-t) + k \right)d^{n-1} \right].$$ (20)

When $D_{R,n}$ is negative (positive) average cost residual income is greater than (less than) FIFO residual income. At $n = 1$, $D_{R,n} = B(1-t)(z+1-d) > 0$, and FIFO residual income is always the larger number. This initial relationship exists because the cost-of-capital charge, which is based on opening inventory values, is the same under both inventory methods in period one, but the first-year cost of goods sold will be larger for average cost. Further, if $k < z(1-t)$, $D_{R,n}$ will be positive for all values of n, and the effect of inventory choice on residual income will be the same as the effect on net income; i.e., FIFO will produce the larger income number.

If $k = z(1-t)$, the first term in (20) becomes zero, and the equation remains positive but approaches zero as n increases. On the other hand, if $k > z(1-t)$, equation (20) may be either positive or negative. To analyze equation (20) further, I again employ derivatives. The first three derivatives of $D_{R,n}$, taken with respect to n, are

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$$\frac{\partial D_{R,n}}{\partial n} = B\left[\left(z(1-t)-k\right)(1+z)^{n-1}\ln(1+z) + \left((1-d)(1-t)+k\right)d^{n-1}\ln d\right] \tag{21}$$

$$\frac{\partial^2 D_{R,n}}{\partial n^2} = B\left[\left(z(1-t)-k\right)(1+z)^{n-1}\left(\ln(1+z)\right)^2 + \left((1-d)(1-t)+k\right)d^{n-1}(\ln d)^2\right] \tag{22}$$

$$\frac{\partial^3 D_{R,n}}{\partial n^3} = B\left[\left(z(1-t)-k\right)(1+z)^{n-1}\left(\ln(1+z)\right)^3 + \left((1-d)(1-t)+k\right)d^{n-1}(\ln d)^3\right] \tag{23}$$

Setting (21) equal to zero and solving for n gives

$$n_R^* = \frac{\ln\left[-\ln d\left((1-d)(1-t)+k\right)\right] - \ln\left[\left(z(1-t)-k\right)\ln(1+z)\right]}{\ln(1+z)-\ln d} + 1 \tag{24}$$

If $k \geq z(1-t)$, the last term in the numerator of (24) is undefined and (21) cannot

equal zero; hence, an optimum point does not exist in $D_{R,n}$. But if $k < z(1-t)$, a

minimum point occurs in $D_{R,n}$ at n_R^*, and the residual income difference function has a

shape similar to the net income difference function. When $k < z(1-t)$, (22) is positive,

verifying that n_R^* is a minimum point.

When $k > z(1-t)$, $D_{R,n}$ is a monotonically decreasing function with an inflection

point. The inflection point, n_R^I, is obtained by setting (22) equal to zero and solving for n.

$$n_R^I = \frac{\ln\left[(\ln d)^2(1-d)(1-t)+k\right] - \ln\left[-\left(\ln(1+z)\right)^2\left(z(1-t)-k\right)\right]}{\ln(1+z)-\ln d} + 1 \tag{25}$$

To verify the preceding statements, consider first equation (21). When

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$k > z(1-t)$, the first term in (21) is negative. Recall that $d < 1$, hence $\ln d < 0$ and the second term in (21) also is negative; thus the entire equation is negative, verifying that $D_{R,n}$ is monotonically decreasing. Turning next to equation (23), and using similar reasoning, (23) also is negative, which verifies that n_R^I is an inflection point in $D_{R,n}$. Further, $D_{R,n}$ is concave upward at $n < n_R^I$ and concave downward at $n > n_R^I$, guaranteeing that $D_{R,n}$ will become negative at some value of n. Thus, $k > z(1-t)$ is both a necessary and sufficient condition for average cost residual income to exceed FIFO residual income. In words, this condition states that for average cost residual income to exceed FIFO residual income the cost of capital must exceed the after-tax combined growth rate in units and unit cost.

The above relationships are shown graphically in Figure 2. To facilitate comparisons three functions are shown in Figure 2: the net income difference ($NI_f - NI_a$), the residual income difference ($RI_f - RI_a$) with $k < z(1-t)$ and the residual income difference with $k > z(1-t)$. The curves have the described shapes, and the differences due to inventory method choice ultimately becomes larger through time regardless of whether the difference remains positive or becomes negative. Observe that in Curve 2 (case 8 in Table 1) the necessary and sufficient condition is not met and FIFO residual income is always larger than average cost residual income, but in Curve 3 (case 7 in Table 1) the necessary and sufficient condition is met and average cost residual income becomes the larger number between periods three and four.

From Figure 2 it is apparent that inventory-method choice produces a difference

in residual income that is considerably less than the difference it produces in net income.

From this comparison one might be tempted to conclude that in a residual-income

Figure 2

Inventory-Method Induced Differences in Net Income and Residual Income

$$\alpha = .25, \ t = .35, \ g = .10, \ r = .05, \ u_0 = 1000, \ p_0 = 100$$
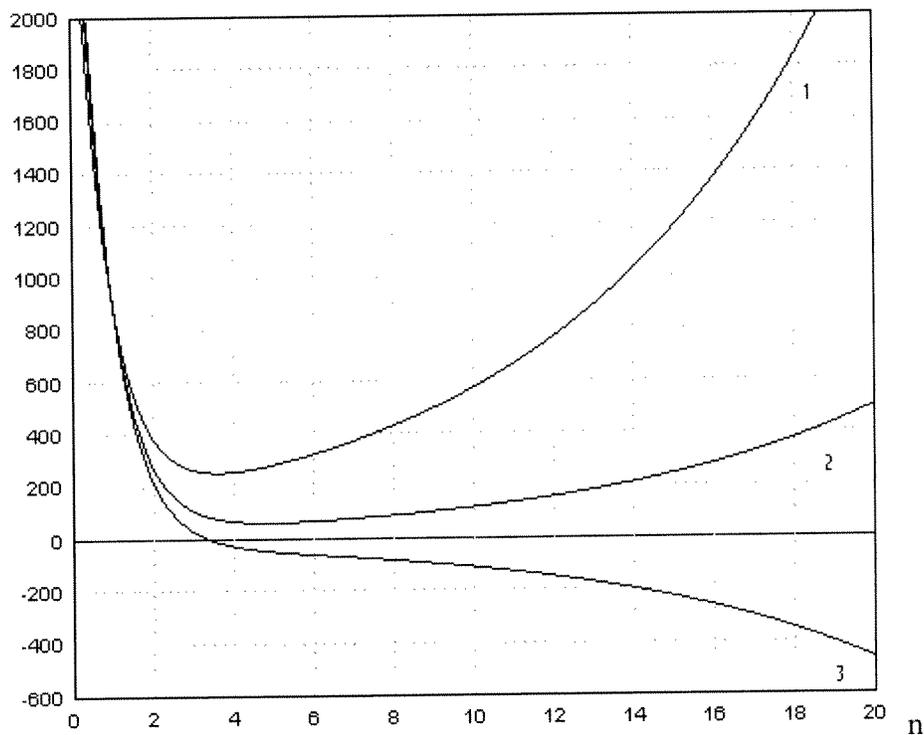
Curve 1: $NI_f - NI_a$

Curve 2: $RI_f - RI_a$, with $k = .08 < z(1-t)$

Curve 3: $RI_f - RI_a$, with $k = .12 > z(1-t)$

world the choice of inventory method is simply less important. However, it is also true that residual income itself, if positive, will be substantially less than net income. Thus, the inventory-method difference may have a larger *relative* effect on residual income than on net income. If evaluations based on residual income depend to a large degree on whether it is a positive or negative number (i.e., whether actual returns exceed required returns), the inventory-method difference may turn a favorable evaluation into an unfavorable one (or vice versa).

Reversal Point

I define the reversal point as the point where the residual income difference becomes zero. Beyond this point FIFO no longer gives the larger value of residual income. To compute this point, equation (20) is set equal to zero and solved for n, giving the following equation:

$$\text{Reversal } n = \frac{\ln\left[(1-d)(1-t)+k\right] - \ln\left[k - z(1-t)\right]}{\ln(1+z) - \ln d} + 1 \tag{26}$$

With $k > z(1-t)$ the reversal point is defined and has a positive value.

Turning to the question of whether a reversal should be a likely event or a rare event, observe that if $g = 0$, the necessary and sufficient condition for a reversal becomes $k > r(1-t)$. Since the cost of capital usually exceeds the inflation rate, we would expect this condition to be met. Thus low unit growth rates in inventory make it quite likely that a reversal point will exist, and average cost residual income will at some point exceed FIFO residual income, while very high physical growth rates make it quite likely that

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FIFO residual income will remain larger. Ceteris paribus, higher values of k and t and lower values of g and r increase the likelihood of a reversal point and decrease the time required to reach the reversal point.

Table 1 shows the reversal point for a range of values of the variables. All cases except case eight have $k > z(1-t)$, and a reversal point occurs. Case eight has $k < z(1-t)$, and the reversal point is not defined. In these examples the reversal point varies from 2.86 periods to 4.32 periods. Additional examples could be constructed, but those presented in Table 1 appear sufficient to suggest that reversal points should occur with reasonable frequency.

CONCLUDING REMARKS

The preceding analysis shows that average cost residual income can exceed FIFO residual income under conditions where average cost net income always is less than FIFO net income. The occurrence of this event depends upon the relationships among the cost of capital, growth rates in unit inventory and unit costs, and the tax rate. Specifically, if the cost of capital exceeds the after-tax combined growth rate in unit inventory and unit cost, average cost residual income will, at some point, exceed FIFO residual income; otherwise, FIFO will always produce the larger residual income number. Inventory methods often are selected on the basis of anticipated income effects. Firms that use residual income for evaluation purposes should find the results presented here useful for these decisions. Additionally, ex-post evaluations by firm managers, as well as auditors

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and other financial analysts, should benefit from an understanding of these relationships. Lastly, empirical researchers should be able to generate testable hypotheses related to the reversal condition.

In separate analyses I have shown that $k > z(1-t)$ is also a necessary and sufficient condition for LIFO residual income to exceed FIFO residual income, and a necessary, but not sufficient, condition for LIFO residual income to exceed average cost residual income. Details of these analyses are not presented here because at this time it appears that the SEC will soon mandate use of international reporting standards, which prohibit the use of LIFO, making comparisons with LIFO less relevant. Nevertheless, these results for LIFO suggest that the reversal condition developed in this paper, or similar conditions, may also apply to other sets of alternative accounting methods. The similar results across inventory methods are somewhat surprising since the mathematical cost functions across inventory methods are dissimilar in substantial ways.

One interesting property of residual income when used in conjunction with the clean surplus rule is that the current book value of the firm plus the present value of all future residual income numbers is equal to the present value of all future cash flows. This equality holds for any set of accounting methods. However, because the choice of inventory method can have tax consequences it can also affect the present value of cash flows, and thus is relevant even in a lifetime evaluation. More importantly, managers and investors commonly make short-term evaluations and are interested in periodic results; thus, the relationships presented here are relevant to these users.

Table 1

Reversal Points for Selected Values of Variables

Case	α	t	g	r	z(1-t)	k	Reversal n
1	.25	.35	.03	.03	.0396	.08	2.86
2	.25	.35	.05	.03	.0530	.08	3.14
3	.25	.35	.05	.05	.0666	.08	3.60
4	.25	.35	.05	.05	.0666	.10	2.99
5	.25	.35	.10	.03	.0865	.10	3.64
6	.25	.35	.10	.03	.0865	.12	3.03
7	.25	.35	.10	.05	.1008	.12	3.39
8	.25	.35	.10	.05	.1008	.08	n/a
9	.25	.35	.15	.05	.1349	.14	4.32
10	.15	.35	.10	.03	.0865	.10	3.00
11	.15	.30	.10	.03	.0931	.10	3.39

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Theory, Expectations, and Accounting for Environmental and Related Liabilities

Abstract

The purpose of this paper is to examine contingent environmental liabilities (CELs) in light of their unique nature and compare their nature to relevant accounting research. With these findings in mind we determine if proposed Financial Accounting Standard Board (FASB) accounting guidance is sufficient for proper accounting treatments. To answer this question we examined the underlying nature of ECLs and their relation to Non-Environmental Contingent Liabilities (NECLs). We compared our findings with relevant research, and the FASB (2008) Exposure Draft.

We found that the underlying nature of ECLs is very similar to NECLs. However, since ECLs tend to be in an earlier evolution stage of information knowledge about the liability, ECLs are resolved over a longer time period, are on average larger, and are more variable than non-environmental contingent liabilities (NECLs). Therefore current reporting guidance is insufficient for accounting for ECLs.

The Financial Accounting Standards Board has an outstanding exposure draft on accounting for contingencies. This exposure draft falls far short of the needs that users have for information on contingencies. The FASB should extend the guidance that they are proposing, particularly for ECLs, to insure proper reporting.

This paper pinpoints a tangible reason why ECLs need to be considered separately from other types of liabilities when setting accounting guidance. It shows how ECLs in the early evolutionary stage are more variable and need increased disclosure over NECLs.

Theory, Expectations, and Accounting for Environmental and Related Liabilities

I. Introduction

As we move forward in this new century a primary measure of financial success will be a company that has limited its environmental damage and successfully avoided remediation costs (Gore and Blood, 2006). However financial reporting at this time does not successfully account for potential environmental accounting costs (Al-Tuwaijri *et al.*, 2004, Hughes *et al.*, 2001, Cho and Patten, 2007, Patten, 2007). Failure to account for environmental damage limits the ability of investors to make informed judgments about the long term financial success of companies (Gore and Blood, 2006, Goodman and Little, 2003).

After the fall of Enron and implementation of the Sarbanes-Oxley Act the financial community has become increasingly sensitive to corporate risk and potential contingencies (Berlin and Goldberg, 2005). The Financial Accounting Standards Board (FASB) has re-written a number of standards in response to these concerns such as SFAS 143 and Interpretation #47, and is currently revising financial accounting standards for contingencies to address these issues (FASB, 2008).

On July 1 of 2009 the FASB formally adopted the Accounting Standards Codification (ASC) that superseded the FASB statements listed above. For the purposes of the discussion the FASB statements will be referred to in their historical context, with their new correct references in brackets. For example SFAS 143 and Interpretation #14 are now listed under liabilities as ASC 410-30 and ASC 410-20 respectively.

However, at this time, in spite of numerous calls for environmental accounting reform, the FASB currently refuses to address environmental contingent liabilities (ECLs) separately from non-environmental contingent liabilities (NECLs) (FASB, 2005a), even though in the past they have done so (FASB, 1989 [ASC 410-30-45-6],1990 [ASC 410-30-25/55],1993).

This brings us to the questions addressed in this paper. First are ECLs sufficiently accrued and disclosed in financial statements? Second, should ECLs have separate reporting guidance from NECLs? If so, what should this entail and does the current FASB exposure draft meet these needs?

II. The environmental problem

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Environmental and resource economics presents an approach to understanding the interaction between the economy and the environment. General references presenting environmental and resource economic theory and applications include Field (2006) and Tietenberg (2006, 2007). Firms interact with the environment in two primary ways: the environment is a source of inputs or raw materials and the environment is place to deposit waste products. Issues such as externalities, the public-good nature of the environment, and lack of private property rights, are issues which complicate the firm/environment interaction. Operating in an unregulated market system, the environment is a free resource to the firm. Government regulation (through standards, taxing, transferable permits, subsidies, etc.) tries to properly price the use of the environment and thus the environment becomes an explicit cost to the firm.

Society has been demonstrating during the last few decades a social preference for environmental protection through electing officials who initiate or support environmental regulation and responsibility. Beginning in the 1960s federal and state environmental laws and regulations and civil penalties have forced businesses to recognize their responsibility for at least some environmental degradation.

The market system does not produce the socially optimal allocation of resources (a market failure) when there are externalities. According to economic theory, the economy is producing efficiently (and optimally) when quantities of goods (or services) are produced where the marginal social cost of production equals the marginal social benefit of the good. The marginal social benefit is equal to the private benefit (consumer's benefit) plus the benefit to others (external benefit). The marginal social cost is equal to the private cost (firm's cost) plus the cost to others (external cost). For example, assume a firm produces a product and emits waste products into a nearby stream. The firm's private costs include what it costs to produce the product (raw materials, capital, labor, and the pipe to the nearby stream). The external cost would be the damage to the stream's water quality borne by society. The firm has not compensated society for the use of the stream as a waste disposal system. Because the market does not account for the external cost of the use of the stream (the environment), the market results in an inefficient use of resources. If the government regulates the use of the stream and "charges" the firm for the use of the stream, then what was an external cost becomes part of private costs. This is called

internalizing the externality.

A public good is a good which if it is made available to one person, it is then available to all. The classic example is a lighthouse. Once the lighthouse is built and is operational, all can use the lighthouse to navigate without paying. You can not effectively charge the users for the use of the product. It would not be profitable for a private entrepreneur to build a lighthouse. Thus, the market system under-produces public goods. Environmental quality can be viewed as a public good. Public goods are usually provided by the government with the use of tax revenue to pay for the production.

An open access resource has uncontrolled use of the resource because of a lack of property rights. Who owns the air, the Great Lakes, rivers or the ocean? Garrett Hardin (1968) described this as the "tragedy of the commons." Because no one owns the resource, it is doomed to overuse.

Imposing environmental regulation is difficult because of the differences in social preferences between owners and other stakeholders of businesses who benefit from the environment as a free factor compared to society in general which is harmed by the resulting environmental pollution. Regulators have promulgated legislation in an attempt to include environmental costs and limit environmental damage. Environmental laws and regulations limit future damages, provide fines and penalties for current damages, and require that corporations pay for the damage from past action. Environmental laws and regulations are in a state of constant change due to the differing preferences of the many stakeholders, frequent changes in political power, and the current state of knowledge and dissemination of that knowledge. The ultimate goal of regulation is to have a more socially efficient use of the environment.

As time progresses and as society learns more about the effects of damage to our environment, society passes additional environmental legislation. The result of ongoing environmental legislation is that corporations not only have to take responsibility for current environmental damage but in some cases they are also held responsible for damage which occurred in the past. Figure 1 summarizes the major U.S. environmental legislation.

While the socially optimal level of the use of the environment may not be attainable, its elusiveness does not prohibit us from attempting to move in that direction. This depends on knowledge of

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the nature of environmental damage, and the dissemination of that knowledge. Scientific researchers are responsible for understanding the nature of environmental damage. Accountants are responsible for informing stakeholders of the impact of environmental damage to the firm. The earlier and more completely the impact is disclosed, the better the decisions by both internal and external stakeholders of the firm.

The payment for environmental damages may be deferred; however, knowledge of the obligation for future payments precedes actual payment. In many cases the knowledge of a potential future payment is known years in advance of the payment. Many of these contingencies are not reported because they are considered remote possibilities under current reporting guidance.

Accounting for ECLs at the time of initial identification may provide an additional service to stakeholders. Accounting for ECLs may also force managers to make more socially optimal decisions since these affect the economics of the firm. Managers have incentives to delay or defer accrual of expenses (often to the detriment of a company's stakeholders) in order to enhance the perceptions of a corporation's performance during the current period. Earlier recognition of the contingent future liabilities may help to move production with environmental impacts from the current period efficient point toward the socially optimal point.

III. Accounting Standards and Practice

SFAS 5 [ASC 450] historically is the primary source of guidance for disclosure of contingent liabilities. The recognition or disclosure of an environmental liability is evaluated by whether it is probable, possible, or remote under SFAS 5. Accrual (measurement and presentation) is required when the liability is both probable and reasonably estimable. Disclosure, with or without measurement, is required when the liability is either a) possible or b) probable and not reasonably estimable. FASB Interpretation 14 [ASC 450-30] requires that if a loss is probable, and no estimate is more likely but a range can be determined, then at least the minimum estimable amount of the claim should be accrued or disclosed in the financial statements.

The AICPA released Statement of Position (SOP) 96-1 early in 1996. SOP 96-1 [ASC 410-30]

provides additional guidance for accountants dealing with potential environmental remediation liabilities. SOP 96-1 provides a comprehensive description of environmental liabilities, valuation of these liabilities, and relevant accounting guidance. SOP 96-1 applies to all entities that prepare their financial statements in conformity with GAAP for fiscal years beginning after 12/15/96. The SOP primarily addresses the issue of material environmental remediation liabilities.

The AICPA recognizes in SOP 96-1 that environmental remediation liabilities become determinable and estimable through a series of events. The SOP provides accountants with additional benchmarks for timing of recognition and disclosure within the framework of SFAS 5. Both SOP 96-1 (carrying forward the guidance originally issued in Emerging Issues Task Force (EITF) 93-5) and the SECs Staff Accounting Bulletin No. 92[1] prohibit netting liabilities against potential future claims against third parties.

More recently guidance for environmental remediation liabilities has been included in the fallout from Enron and the Sarbanes-Oxley Act. SFAS 143 [ASC 410-30], Accounting for Asset Retirement Obligations, requires accrual of the future obligations (including environmental) associated with asset retirements. Financial interpretation (FIN) 47 further clarifies FAS 143 [ASC 410-20-25] by requiring current reporting of these obligations even if there is uncertainty about the timing and nature of the settlement.

Further reporting guidance can be inferred from the minutes of FASB's March 9, 2005 board meeting on the Rose Foundations White paper on under reporting of environmental liabilities (Goodman and Little, 2003). A prime reason cited for under reporting was that companies did not aggregate multiple remote or immaterial contingency into a single probable or material contingency. The FASB refused to act on this failure because they stated the failure was a violation of GAAP, not a failure of GAAP, citing paragraph 1 of SFAS 5 which states that a contingency is "a set of circumstances" (FASB, 1975)[ASC 450-15-3]. Thus the FASB has affirmed the position that environmental liabilities should be aggregated.

While the FASB refused the Rose Foundation's plea to address environmental accounting issues separately, they have not dropped the issue. In June 2008 the FASB issued an exposure draft called

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1 The reference here is to the original staff accounting bulletin. Staff Accounting Bulletin (SAB) 103 recodified and

"Disclosure of Certain Loss Contingencies". While not specifically addressing ECLs the exposure draft addresses many of the concerns raised by ECLs. Issues raised in the exposure draft include:

- The initial disclosure of specific information about a loss contingency often does not occur until a material accrual is recognized for that loss contingency.
- The *at least reasonably possible* threshold for disclosing loss contingencies has not resulted in the disclosure of the full population of an entity's existing loss contingencies that would be of interest to financial statement users.
- The option to state that "an estimate of the possible loss or range of loss cannot be made" is exercised with such frequency by financial statement preparers that users often have no basis for assessing an entity's possible future cash flow associated with loss contingencies.
- The amounts recognized in financial statements related to contingencies are not transparent to users (FASB, 2008 paragraph A3).

The new statement requires both quantitative and qualitative information to be disclosed about all covered contingencies, unless the contingency is remote or the claim against the entity is unasserted (unless a claim will probably be asserted and the risk of loss is more than remote). The only reason why a remote or unclaimed contingency might need to be disclosed would be that the contingency (or group of contingencies) is expected to be resolved within the next year and have "a significantly financially disruptive effect on the normal functioning of an entity" (FASB, 2008 p. 3). Furthermore each company will keep a "Tabular Reconciliation of Recognized Loss Contingencies" (FASB ,2008 p. 4) from period to period. This will allow stakeholders to see how good a job the entity is doing at estimating its loss contingencies (FASB, 2008).

IV. Theoretically Correct Accounting Practices

There are two general classifications of federal environmental regulations, remediation and prevention[2] (AICPA ,1996). Remediation regulations require cleaning up past damage. Prevention regulations are geared toward preventing environmental damage from current operations. ECLs that result from remediation regulations[3] are expected to differ from ECLs which result from prevention regulations because remediation liabilities are often for removing environmental contamination from sites that were

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updated all previously issued staff accounting bulletins. The current reference would be SAB 103, Topic 5Y.

[2] The AICPA refers to prevention liabilities as regulatory liabilities in SOP 96-1.

[3] The RCRA and CERCLA are remediation type regulations.

polluted in a time when regulations prohibiting contamination did not exist. ECLs resulting from prevention

regulations[4] are expected to be treated in a similar fashion to NECLs.

There is more accounting guidance for ECLs than for NECLs which suggests that ECLs should be

more fully accrued or disclosed than NECLs[5]. However the theoretical framework which underlies the

accounting guidance for contingent liabilities makes disclosure or accrual more or less likely depending on

the characteristics of the individual contingent liability. Popular attention and research on the other hand

would suggest that ECLs are not as fully disclosed or accrued as NECLs (Freedman and Stagliano, 2008,

Goodman and Little , 2003), suggesting that the characteristics of environmental liabilities call for even

more accounting guidance than currently exists.

ECLs and NECLs are expected to differ because environmental regulations are generally more

recent and more rapidly evolving than the product liability and worker safety type regulations which result

in NECLs. During a period when regulations are new and rapidly evolving expectations of necessary

prevention costs and resulting costs of noncompliance vary between firms and often lag actual costs.

Prevention costs during the early evolutionary stage of regulation are expected to be low because

there is an expectation that any costs associated with noncompliance will be low. Therefore, costs

incurred to prevent noncompliance are also low. Figure 2 shows the hypothesized relationship between

expected costs of noncompliance with laws and regulations, prevention costs spent to avoid

noncompliance, and total costs associated with laws and regulations evolving as time increases the

information available about the final amount of the liability. The vertical axis represents the costs

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[4] Examples of prevention type regulations are the Clean Air Act, Clean Water Act, Federal Toxic
Substances Control Act, and Federal Insecticide, Fungicide , and Rodenticide Act. RCRA is both prevention and
remediation.

[5] There is a great deal of guidance directed specifically at ECLs. The FASB Emerging Issues Task Force
has issued (EITF) consensus 89-13, directed toward cleanup of asbestos ,and EITF 90-8 which covers capitalization
of certain cleanup costs. The SEC issued a release in 1979 requiring that voluntary disclosures are not misleading, a
Management Discussion and Analysis release in 1989 which placed the burden of proving that a contingent
environmental liability is not material on management, and Staff Accounting Bulletin #103 which supported EITF
93-5. The American Institute of Certified Public Accountants (AICPA) issued a detailed statement of position (SOP
96-1) which reiterated and summarized earlier guidance, providing more concrete dates for the timing of recognition
of certain types of liabilities.

associated with a given law or regulation. The horizontal axis represents the information available from the first possibility that a law or regulation might exist to the time where the law or regulation is so well incorporated into the running of business that total costs are minimized given production levels and technology.

The early stage of progression along the information line is referred to as the **early evolution stage.** The later stage of evolution along the information line is referred to as the **late evolution stage.** **Prevention costs** are costs incurred to prevent violation of a law or regulation. **Expected costs of noncompliance** are a decision maker's expectations regarding the costs that would be incurred for noncompliance with laws and regulations. **Costs of noncompliance** are cleanup costs, penalties and other litigation related costs which occur when a law or regulation is violated. **Total costs** are the total of all costs incurred with regard to a law or regulation which would be the sum of prevention costs and cost of noncompliance. The amount of total costs of the law or regulation may increase, decrease or stay the same over time given changes in the technology of prevention, or cleanup, and the strictness of the enforcement of environmental legislation.

In the early evolution stage expected costs of noncompliance are low, resulting in low prevention costs, and high costs of noncompliance. Total costs are high at this point because it is more expensive to clean up environmental damage than to prevent it from occurring. This problem is especially pronounced for remediation liabilities. Remediation liabilities are liabilities which result from a period where there was no expected legal liability for environmental damage. These regulations often apply retroactively to damage having occurred prior to the enactment of legislation. The expected costs of noncompliance were low during this period since information on the potential for environmental costs was low. In summary, when the ex-ante expectations of a potential liability are small, prevention costs aimed at reducing the ultimate liability are also small, resulting in a high ex-post realization of a liability.

As laws and regulations evolve over time expected costs of noncompliance increase, resulting in a higher investment in prevention costs, and lower costs of noncompliance. Finally when a law or regulation is fully evolved the expected costs of noncompliance become predictable and firms are able to optimally invest in prevention costs.

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Both remediation and prevention ECLs are subject to a constantly changing legal and political environment. Remediation liabilities are examples of liabilities from the early evolutionary stage, and are expected to be the largest type of liability. Prevention ECLs should fall in a middle evolutionary stage, and therefore should be smaller. Most NECLs would probably fall into the late evolutionary stage, and be the smallest. However there are some NECLs, particularly relating to health effects such as cigarette smoking or mercury included in children's vaccines which may fall into the early evolutionary category.

This issue can be illustrated by looking at examples of ECLs using three different owners of a gas station at different points in time.

- **Early Evolution**: Consider a gas station owner in the 1950's that used the land behind his gas station to dump used parts, cans, and dirt from cleaning the bays. Grease and oil soaked into the soil over the years creating a toxic dump. The gas station owner would make no effort to mitigate this problem because it was not perceived to be a problem. No one was being asked to perform pollution prevention and known cases of liability for remediation were rare. A subsequent 1980s owner of this site was suddenly jointly liable with any former owners (if they still exist) for the cleanup of this polluted site, creating a remediation type liability.

- **Mid Evolution**: Consider a similar gas station operating in the 1980's or 1990's. The owner of the station would be aware that certain types of refuse create a polluted site and that he would be responsible for the cleanup of this site. Therefore, the owner would make arrangements to have toxic materials removed by a specialty disposal company. However certain toxic materials may be still thrown onto the site at certain times either due to laziness, lack of knowledge, or expectations that one might be able to get away with it. The damage from this type of dumping would create a prevention type liability. The expected damage from this liability would be much less than the damage expected of a remediation type liability occurring prior to environmental regulation.

- **Late Evolution**: Finally, consider a similar gas station operating in the year 2050 when the EPA has become highly efficient in checking for violations. In response, the gas station owner has become efficient at ensuring that his employees can easily dispose of toxic wastes, that they are

extremely knowledgeable about which wastes are toxic, and that they know that they will get caught if they improperly dispose of the wastes. Improper disposal could still occur, but it would usually be limited to accidents. The liabilities which would result from damages at the late evolution of the law or regulation would be expected to be very small.

One would expect the variation in expected costs of noncompliance to decrease as regulations evolve and more complete information is available. The variation in expectations of costs of noncompliance would be much smaller because fines and penalties would be known, as well as, the results of enforcement actions. There are many methods for estimating the costs of non-compliance and estimates vary widely (Sullivan, 2005).

Accounting for potential liabilities may be more critical at the early evolution stage than at any later time. During the early evolution stage there are no court actions or cash flows related to the potential liability. Accounting disclosure of potential liabilities may provide the only publicly available information available to stakeholders. Accounting disclosure could provide information that moves a liability to a later evolutionary stage. By providing information stakeholders are allowed to play a decision making role by discounting stock prices if they do not agree with internal decisions. Thus the internal mangers are held to a longer run point of view, thereby reducing the total costs related to that liability.

The information is important because it is the only information available. Therefore people with diverse beliefs can make of it what they will. One investor can believe it will have no liability attached to it and discount it completely, another can believe it is very important and attach a huge liability to it. Additionally, if people have to report what they do, they will think twice about doing it. Disclosure at that time should also be primarily about quantities rather than dollars, since the variation in estimates at that time would be so high as to make any particular estimate unlikely[6].

V. Relationship between Theory, Related Guidance and Practice

A primary purpose of accounting is to provide information to stakeholders. The SFAS 5 [ASC

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[6] The progression along the evolutionary path is not linear. Changes in the political environment can cause movement both forward and backward along the evolutionary line. For example reported emissions in the Toxic Substance Release Inventory decreased annually from its inception in 1987 through 2001 (Hess 2003). Only late under the current administration has this trend changed, with emissions increasing in 2002 (Hess 2004).

450] tradeoff between accrual and disclosure occurs because when there is uncertainty, disclosure is expected to provide more information than accrual. There is evidence that there is greater variation among ECLs than among NECLs causing increased difficulty in accrual. Further, managers have asserted that a primary reason for non-accrual of ECLs is that the final liabilities are uncertain and cannot be reasonably estimated (Cole, 2001, Price Waterhouse, 1992).

A comparatively larger contingent liability is expected to be more material than other liabilities and will tend to be more fully accrued or disclosed. SFAS No. 5 and related accounting guidance prescribes that the liability should be disclosed rather than accrued when a liability is difficult to estimate (as expected with early evolution type liabilities).

Some environmental prevention cannot be handled on a periodic basis. In effect, environmental prevention is handled through capturing the pollutants during operations and/or taking action at the close of operations. The FASB dealt with this issue (both for ECLs and other situations) in SFAS No. 143 [ACS 410-20] which requires estimation of the liability at the time operations commence and recording the expense over the time when operations occur. For example, removing the gas storage tanks from the ground at the cessation of operations at a gas station in order to ensure that pollution does not occur.

Theoretically, the SFAS No. 5 contingent liability accrual and disclosure requirements satisfactorily address the difficulties caused by uncertainty when determining to accrue or disclose environmental liabilities. AICPA SOP 96-1 addresses many of the specific concerns found in practice by providing a standardized framework for the timing of recognition and disclosure of remediation type ECLs. The SEC guidance addresses more general disclosure or discussion of issues for legal, or potentially legal, environmental liabilities whether accrued or disclosed.

The effectiveness of this guidance for short and mid-term liabilities is shown in Cole (2001) and Freedman and Stagliano (1998, 2002). Cole (2001) shows that ECLs are more fully accrued and disclosed in financial statements than NECLs. Freedman and Stagliano (1998) found that following the EPA action of reporting Potentially Responsible Parties (PRPs) to the SEC significantly increased disclosures. Freedman and Stagliano 2002 found that the increased scrutiny of IPOs does not increase

disclosure beyond the levels already disclosed.

None of the papers assess whether any of the liabilities in question are adequately disclosed. In fact, Goodman and Little's Rose Foundation (2003) report asserts that for early evolution stage liabilities, that because many firms tend to have exposure to numerous liabilities with low probabilities of exposure, the probabilities and exposures of all similar liabilities should be aggregated prior to assessing probability of material impact on the firm. The current failure of accounting guidance has caused "A Gap in GAAP" (Goodman and Little, 2003).

V. Conclusion

We found that the underlying nature of the liabilities of ECLs and NECLs is very similar and on this basis should not require separate reporting practices. We further reviewed research related to accrual and disclosure of both ECLs and NECLs and found that ECLs tend to be more fully accrued or disclosed than similar NECLs (Cole, 2001), and assert that therefore reporting guidance directed towards ECLs should more profitably be directed towards all contingent liabilities.

Historical reporting guidance for contingencies has evolved within the general SFAS 5 outline [ACS 450]. Under SFAS 5 contingent liabilities are evaluated as probable, possible or remote. Measurement and presentation is only required when a liability is both probable and reasonably estimable (FASB ,1975). Any single liability that falls into an early stage of evolution would tend to be classified as remote, and therefore not accrued or disclosed under current reporting guidance.

However, many companies that have one remote ECL have numerous ECLs (Goodman and Little, 2003). We further suggest that when numerous remote ECLs are aggregated that while the probability of any single liability ending in a material liability may remain remote, the probability that at least some of the liabilities would result in material liabilities becomes probable (Goodman and Little, 2003).

In our review of research on this topic, we examined the time series nature of both ECLs and NECLs and found that due to the nature of the science, politics, and legislation which identify ECLs, that ECLs on average tend to be in an earlier stage of evolution than NECLs. Since ECLs are in this earlier evolution stage, they tend to be more variable, harder to estimate, and resolved over a longer time period

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than NECLs (Cole, 2001).

The exposure draft on contingencies goes a long way towards solving some of these problems. First, the exposure draft takes the proactive approach that all contingent losses must be disclosed, allowing only exceptions, rather than the SFAS 5 approach where you only have to disclose the liability if it reaches a certain probability threshold. Second, the requirement for both financial information and qualitative information about the nature of the risks will insure that stakeholders will be able to make better judgments than before. Finally the "Tabular Reconciliation" will spotlight each entity's disclosure performance, giving incentives to management to be accurate.

However, for early evolution type liabilities in particular, we believe that the exposure draft still falls short in three areas. The first problem is that the problem discussed above with many single remote liabilities equaling a possible or probable liability (Goodman and Little 2003) is only partially addressed in the exposure draft. In paragraph 6 of the exposure draft when discussing liabilities that must be disclosed (if they are to be resolved in the next year with disruptive effect on the firm) it is stated that a "loss contingency, or a combination of loss contingencies" (FASB 2008, p. 3) will be evaluated. In paragraph 5, when determining if a liability is remote for inclusion, or if an unclaimed liability is probable for inclusion, the wording is simply all loss contingencies. We believe that if the wording in paragraph 5 is not changed to " An entity shall disclose all loss contingencies or combination of loss contingencies...." that a large number of ECLs as well as other early evolution type liabilities that will eventually have detrimental financial impact on the entity will still fail to be disclosed in the financial statements.

The second problem falls under paragraph 5b of the exposure draft which excludes from disclosure "a loss contingency or assessment in which there has been no manifestation by a potential claimant of an awareness of a possible claim or assessment, unless: (1) It is *probable* a claim will be asserted; and (2) The likelihood of a loss, if the claim or assessment were to be asserted is more than remote" (emphasis added). Once again the term "probable" from SFAS 5 makes it unlikely that early evolution stage liabilities will be captured.

Finally paragraph 6 defines contingencies which must be disclosed under any circumstances. These contingencies are those that "regardless of the likelihood of the loss" will be resolved within the next

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year and "disrupt the normal functioning of the entity". It is our contention that there are many early stage contingencies that could potentially "disrupt the normal functioning of an entity" that financial statement users would find relevant. Many of these contingencies will not be resolved for many years. Therefore we believe that requiring both resolution within one year and disruption of the normal functioning of the entity is overly restrictive.

In summary, we believe that current reporting guidance for ECLs is insufficient to give stakeholders a clear picture of the financial well being of the firm. Not because ECLs represent environmental damage, but because the liabilities are in an early evolution stage of development and difficult to estimate. Information available to stakeholders when a liability is in the early evolutionary stage is very limited, making information disclosed in financial statements even more important. Furthermore, proposed guidance in the form of the recently released exposure draft is not sufficient to provide needed information to stakeholders.

We propose that in these cases, reporting guidance be changed. We propose that since in many cases for early evolution stage liabilities there is no reasonable estimate (Sullivan, 2005), that the amount and timing of environmental damage be disclosed so that stakeholders may make their own judgments about potential future liabilities. We propose that when there is doubt about whether an item should be included in the financial statements, indicators should be taken from other reporting agencies to determine items that stakeholders find of interest.

While this call may seem to be an overly burdensome reporting requirement it is probably not be the case. Companies are already required to report emissions of roughly 850 toxic (but not illegal) substances on a site by site basis for the Toxic Substances Release Inventory (TSRI) (EPA 1986). Using this readily available data, and reporting guidelines already developed by institutions such as the Global Reporting Initiative, would be a low cost starting point for reporting of early stage liabilities.

We further suggest that reporting emissions by quantity, rather than omitting the ECL altogether will benefit both direct stakeholders of the corporations and indirect stakeholders such as the general public. It was shown throughout the eighties and nineties that simply having to report toxic emissions in the TSRI caused companies to reduce their emissions (Hess 2003). Reporting on a corporate level

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should bring environmental damage more directly to managers' attention and further reduce emissions.

Further research is needed to determine the best reporting format for ECLs. Furthermore research needs to determine which other early stage ECLs need greater non-financial disclosure. Research in this area is critical because there is a fine line that needs to be drawn between necessary disclosure and information overload.

ECLs are a massive threat to the financial success of corporate America (Gore and Blood, 2006). In this paper we examined the nature and relevant research on ECLs and found that current financial reporting guidance is insufficient to convey the underlying threat to the investing public. Early reporting will allow stakeholders to make the best decisions about investments in firms with the lowest long run cost structure. Failure to convey this threat impairs corporate America's ability to effectively compete in a rapidly expanding international marketplace.

This paper is a first step in "creative capitalism", or forcing corporations to act in more socially conscious ways. If corporations are forced to report the damage they do to the environment they may be convinced to reduce the amount of damage. Waiting around for corporations to "do the right thing" isn't going to happen without some sort of regulation (Kinsley 2008). It is our hope that during the re-deliberations the FASB will consider the long term health of U.S. corporations and increase the reporting guidance for contingencies and for ECLs in particular.

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| **Figure 1** |
| **Major U.S. Environmental Legislation** |
| Clean Air Act (CAA, 1970, 1977, 1990): Authorizes EPA to set emissions standards to limit the release of critical and hazardous air pollutants. |
| Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA, 1972): Authorizes EPA to register all pesticides, specify the terms and conditions of their use, and remove hazardous pesticides from the marketplace |
| Safe Drinking Water Act (SDWA, 1974): Requires EPA to set drinking water standards to protect public health from hazardous substances. |
| Toxic Substances Control Act (TSCA, 1976): Requires EPA notification of any new chemical prior to its manufacture and authorizes EPA to register production or disposal of the chemical |
| Resource Conservation and Recovery Act (RCRA, 1976): Authorizes EPA to identify hazardous substances and regulate their generation, transportation, treatment, storage and disposal (Owner/Operator responsibility expanded by 1984 Hazardous and Solid Waste Amendments). |
| Clean Water Act (CWA, 1977): Requires the EPA to establish a list of toxic water pollutants and set standards. |
| Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, 1980): "Superfund Act" Requires EPA to designate hazardous substances that can present substantial danger and authorizes the cleanup of sites contaminated with such substances
Superfund Amendments and Reauthorization Act (SARA) |
| Emergency Planning and Community Right to Know Act(EPCRA, 1986): Requires states to develop programs for responding to hazardous chemical releases and requires industry to report certain hazardous substances
Sec 313 Toxic Substances Release Inventory (TSRI) |
| Pollution Prevention Act (PPA, 1990): Expands EPCRA's reporting requirements to include pollution reduction and recycling |

Figure 2
Evolution of Costs Resulting From Regulations as Information Increases

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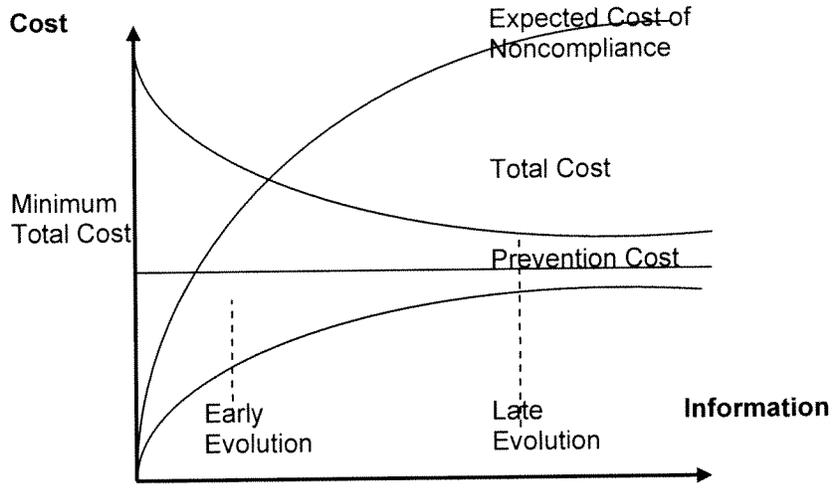
FAMILY STRUCTURE CHOICE: TAXATION AS A MOTIVATION FOR CHANGE

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ABSTRACT

Traditionally defined as the union of one man and one woman charged with the responsibility of rearing children, the notion of family now includes a variety of living arrangements including non-marital cohabitation and single parents. The current study investigates individual incentives to change family structure from a person's original status as single. This conceptual research, which is grounded in theories of marriage, proposes that federal, personal income tax is an input to change in family structure. A model of family structure change and propositions of the relationship between the federal tax and family structure are developed.

INTRODUCTION

The notion of *family* has taken on various meanings in the United States (US) over the last decade. Traditionally defined as the union of one man and one woman charged with the responsibility of rearing children, the notion of *family* now includes various living arrangements such as non-marital cohabitation and single parents. With the traditional marriage rate decreasing (Bumpass, Sweet, and Cherlin 1991), the divorce rate increasing (Thornton 1985), and the growth rate of non-marital cohabitation rapidly increasing (Clarkberg, Stolzenberg, and Waite 1995), the social concept of *family* continues to change. These dramatic changes impact everyday life (e.g., social norms and employment) and the rights (e.g., taxation, health care coverage, and inheritance) of thousands US citizens. Furthermore, the concept of *family* (i.e., marital status drives tax rates) is the basis of individual federal taxation in the US. With 85% of United States' tax revenues generated from individual income taxes (Council of Economic Advisers 2007), how the notion of *family* is perceived and codified by law has pervasive effects for both individuals and the United States' economy. The current study explores the concept of *family* and how the legal constraints and the tax benefit/cost of "marital status" is exhibited in family structure. Specifically, the current study seeks to develop a conceptual framework for addressing two questions. First, what motivates individuals to change their *family* structure? Second, how do legal constraints and federal tax incentives (disincentives) influence choice of *family* structure? In investigating these questions, the current study makes several important contributions. First, the current study is an interdisciplinary approach to investigating the impact of social movements (i.e., family structure) in the US. Second, the current study offers a conceptual framework of *family* structure change. Second, this study synthesizes existing

literature and identifies factors that influence a person's choice to change his or her *family* structure.

It is important to note the difference between marriage and *family* structure. Family structure is a broad classification that defines the choices individuals make in living/household arrangements. These arrangements do not necessitate the intimacy once traditionally associated with cohabitation of individuals. Furthermore, family structures include a variety of arrangements that are both legally and non-legally sanctioned unions. Marriage is a type of family structure in which individuals enter into a legal contract that is protected and adjudicated under state laws. Traditionally, marriage was the prerequisite to the *family* (i.e., husband, wife, and children); child rearing was the primary function of marriage. In the US today, the associate of child rearing and marriage no longer exist and the notion of *family* is socially defined and includes various arrangements (i.e., single parents, same-sex unions, and cohabitating heterosexuals with/without contractual agreements). In summary, the concept of marriage denotes a contractual arrangement defined by state laws (i.e., between one man and one woman) while *family* structure represents a social classification that defines living/household arrangements between or among individuals.

THEORETICAL FOUNDATION AND RELEVANT LITERATURE

The concept of *family* is a topic of investigation in various areas of study including family studies (e.g., Roy 2008, Soto 2006), sociology (e.g., Clarkberg 1999), law (e.g., Bowman 2004), business (e.g., Lee and Beatty 2002), population studies (e.g., Emisch 2008;), and economics (Winkler 1997). Although the current study is grounded in economic theory of marriage, a broad review of the research provides insight into the fundamental theories of family and the conceptualization of *family* across disciplines.

The most prevalence theory of family is an economic explanation of marriage. Economists hold that individuals form unions when doing so makes both partners better off (Becker, 1965, 1973). The economic gain of the joint arrangement is derived from the notion of specialization. Becker's seminal work, for which he was awarded the Nobel Prize in 1992, focused on the family as production units that produce both goods in the home and in the marketplace. By having one person specialize in domestic responsibilities while the other provided financial support, couples are more efficient than singles (Stevenson 2008). Furthermore, Becker (1965) predicts that opposites will attract to maximize the benefit of specialization. Lam (1998) found empirical support for the notion of "opposites will attract."

Similar to the Becker's economic theory is Marx's epistemology, which suggests families are social arrangements to formalize primal relationship and attend elementary needs of reproduction and survival. Two types of relationships emerge among humans: 1) those originated in elementary survival needs (i.e., mating and conjugal bonds, paternity and offspring care, transferring to patrimonial knowledge for survival), and 2) those originated for social relationships, which provide the foundation of culture (Soto 2006).

Cohen's (1987, 2002) *life-profile theory* argues that the woman traditionally invests in child bearing, child rearing, and homemaking early in a marriage with the expectation of reaping the benefits in the long-run. The man, who is relatively free of domestic responsibilities, can dedicate his efforts to climbing the latter to economic security. The *life-profile theory* suggests that marriage may be a mechanism for protecting the woman's early marriage-specific investments over time in the face of possible later mistreatment by her partner (Dnes 2007).

The "opportunity-cost" hypothesis suggests that childbearing itself is negatively related to perceived employment opportunities (Ward and Butz 1980; Hogan and Kitagawa 1985).

According to Olsen and Farkas (1990), when both partners (i.e., husband and wife) have economic opportunities, it is expected that the marriage rate will increase because of the *male employment effect,* and that childbearing rates will decrease because of the female *opportunity-cost* effect. Together, these effects should decrease out-of-wedlock childbearing.

Brien, Lillard, and Stern's (2006) model of marriage, cohabitation, and divorce is based on the *match quality* economic theory. According to this theory, single individuals not currently in a co-residential relationship randomly meet one potential partner, who has an associated *match quality* that is not immediately observed by the individual. "Rather, an individual receives a noisy signal of the true quality" (Brien, Lillard, and Stern 1006, p. 457). The decision to enter into a relationship is made without the realization of the true *match quality.* This uncertainty is eliminated with relationship experience. Individuals evaluate the *match quality* and may choose to continue in the relationship (i.e., stay married or continue cohabiting) or change the relationship (i.e., covert cohabiting into marriage, dissolve the relationship, or divorce).

In summary, theories of marriage are grounded in the fundamental notion of give and take. Individuals engage in social arrangements with the expectation of maximizing their return on their investment. Although many exogenous factors influence the decision of if or when to engage in marriage, the basic foundation of marriage is grounded in a mutually consensual social union that benefits both parties. These unions are the basis for the structure of *family.*

A less studied topic is the notion of *cohabitation.* More often associated with lower socioeconomic status (Ressler and Waters 1995) and same-sex couples (e.g., Rostosky, Riggle, Brodnicki, and Olson 2008), cohabitation as a type of *family* has received limited consideration in the literature. Rather, studies of cohabitation focus on outcomes of such arrangements, including the cause of decline in the traditional *family* (Axinn and Thornton 1992; Bumpass,

Sweet, and Cherlin 1991) and economic decision-making (Cherlin and Fomby 2004; Lichter, Qian, and Crowley 2005).

Research of cohabitation in economics, sociology, and family studies provide rich descriptive data. Western societies, in general, have shown greater acceptance of individual choices including cohabitation (Ressler and Waters 1995). This social trend is evident in the fact that half of the US population has *cohabited* by the age 30 (Bumpass and Sweet 1989). Bumpass, Sweet, and Cherlin (1991) found *cohabitation* to be a true *family status*, with most cohabitating individuals expecting to marry their partner. Cohabitation was found to be a *cause* of the decrease in marriage rates (Axinn and Thornton 1993); however, Bumpass and Sweet (1989) suggest the relationship direction to be from divorce to cohabitation. Cohabitation prior to marriage is correlated with higher divorce rates than marriage without prior cohabitation (Axinn and Thornton 1993). Reasons for cohabiting include: less personal commitment; less sexual faithfulness; individual independence; and assurance of compatibility before marriage (Bumpass, Sweet, and Cherlin 1991).

Numerous studies rely on secondary data to develop models of marriage, cohabitation, and divorce. As noted by Brien, Lillard, and Stern (2006), data from the National Longitudinal Study of the High School Class of 1092 (NLS72) is the basis for numerous studies and have found that: 1) many relationships begin as a non-marital cohabitation; 2) cohabitations are shorter lived than marriages; 3) many cohabitants are converted into marriage; 4) the risk of separation declines with the duration of the relationship; and 5) the risk of divorce in marriages preceded by a non-marital cohabitation with the same partner is higher than in other marriages. Marriage and cohabitation differ in many ways. Cohabitating couples, as compared to married couples, are less educated (Bumpress and Sweet 1989), participate less in religion (Thornton,

Axinn, and Hill 1992), are less likely to support traditional behaviors for men and women (Blumstein and Schwartz 1983; Lesthaeghe and Surkyn 1988), and are more likely to keep finances separate (Blumstein and Schwartz 1993; Winkler 1997).

In summary, cohabitation as a type of *family* has evolved as attitudes in Western societies move toward individual choice. Cohabitating arrangements are consistent with theories of marriage as a union of give and take, seeking benefit optimization.

Marriage and the Laws

The concept of marriage is a matter of State law. For the exception of a few States (i.e., Georgia, Illinois, and Louisiana), most States recognition some rights for non-married, cohabitating couples under common-law rights (Gordon 1998-1999). However, these rights are generally limited to the division of property accumulated during the tenure of the union and exclude rights of third parties (i.e., rights of inheritance, rights to be covered under companion's medical insurance). Cohabiting couples who have written contract may be afforded rights under contract laws; however, few cohabiting couples executed written contracts (Bowman 2004).

Most statute-based cohabitation laws in the US have been created in response to the pressure of same-sex marriages (Bowman 2004). Vermont passed a statute recognizing an alternative status to marriage called *civil unions*. Couples registering as *civil unions* in the State of Vermont are afford all the benefits and protections of marriage including, but not limited to, property rights, adoption, tax treatment, insurance benefits, and hospital visitation. Massachusetts followed Vermont and was the first State to issue same-sex marriage licenses. However, these rights may not be valid in other State. For example, if a couple married in Massachusetts moves to Georgia, the rights afforded them in Massachusetts are not transportable to Georgia.

Several States have embraced the notion of *domestic partnership*. Hawaii's *Reciprocal Beneficiaries Act of 1997* states that couples that are legally prohibited from marrying may register as *domestic partners* and receives several rights including the right of inheritance, worker's compensation survivorship benefits, health-related benefits, family leave, and the right to make health care decisions for a partner. After the unilateral decision of the San Francisco mayor to issue same-sex marriage license, the California courts were forced to act and passed the *Domestic Partner Registration Act* in 2001. Amending the *Domestic Partner Registration Act* in 2003 and effective in January 2005, the *Domestic Rights and Responsibilities Act* gives the most extensive rights to domestic partners in California behind Massachusetts and Vermont. This act gives *domestic partners* the same rights as married couples for the exception of federal income filing status.

In summary, the notion of non-marital unions is recognized by some States in the US. However, the rights afforded these non-traditional unions varies widely across States with some States specifically denouncing rights for anything except legally sanctioned unions between one man and one women to States providing all rights afforded heterosexual married to same-sex unions.

Personal Income Tax

Before 1948, the US personal federal income tax focused on the individual by taxing each person's "entire net income received" (Revenue Act of 1916, ch. 463, 39). The Revenue Act of 1948, and several subsequent modifications, changed the focus from each person to marital and family affiliations (Neill 1983). This act allowed married couples to file a joint return in which their consolidated income would be equally split, with taxes paid on each half regardless of the actual earnings ratio between the spouses. Creating a situation for a wife,

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contemplating to enter the labor force is faced with tax on her earnings that depended on the level of her husband's earnings. In 1980, for example, a homemaker with two children would face a marginal tax rate of 16% on her first dollar earned if her husband earned $10,000 that year, 22% if he earned $20,000 that year, and 32% if he earned $30,000 that year. Under the system of individual filing that prevailed before 1948, her marginal tax rate was independent of her husband's earnings. This tax regulation allowed for a *marriage bonus* or *single's penalty*, because by marrying someone with little or no income a person could substantially lower his or her tax burden. Conversely, the loss of a spouse could entail a rise in tax liability (Neill 1983).

In 1951 third set of tax rates were introduced for *head of households* effectively providing partial income splitting privileges to non-married persons with dependents. To qualify for the head of household filing status you must be unmarried and paid more than half the cost of a maintaining a home for yourself and another relative who lives with you for over half the year and can be claimed as your dependent. In 1969, Congress enacted a fourth set of rates for single tax payers, ensuring that their rates would generally not be higher than 120% of the joint return schedule. However, married couple choosing to file separately could use the new rates for single taxpayers. As a result, many two-income couples pay a combined tax that is considerably higher than the taxes paid by the two single persons with the same total income. Taxes of these two-income couples would fall if they divorced, and taxes of the two single persons would rise of they married. It is this feature of the tax regulation that is dubbed the *marriage penalty*. However, married, two-income couples were not made worse off as result of the 1969 act (Neill 1983).

A husband and wife may file a *joint return* only if they are not legally separated (i.e., separated under decree of divorce or separate maintenance agreement) on the last day of the year.

Spouses who are separated under an interlocutory decree of divorce are considered husband and wife and are entitled to file a joint return until the decree becomes final. The filing of a joint return will result in a savings of tax in those instances in which differences in the tax rate brackets for joint and separate returns result in higher tax rates for married individuals filing separately. Generally, a husband and wife are generally jointly and individually liable for the entire tax on a joint return. However, relief from this general rule is available under certain circumstances, commonly referred to as *innocent spouse relief.*

In summary, the status of *married,* and all associated benefits under federal income tax law, is reserved for legal unions between heterosexual partners. Therefore, cohabiting couples are not afforded the tax benefits awarded to legally married couples under federal tax acts. Conversely, cohabiting couples are not liable for each other's tax obligations as are legally married couples.

CONCEPTUAL MODEL OF CHANGE IN FAMILY STRUCTURE

The proposed conceptual model (see Figure 1) seeks to portray the decision-making process by which an individual changes (does not change) his or her marital status. The conceptualization begins with a young adult who is capable of making binding, social decisions (e.g., to marry). Social decisions are based on attitudes formed from group associations (e.g., culture, religion, ethnicity, kinship, core values) (Nash 1996) and physical traits such as age and sexual orientation. The antecedents that influence social decisions are not optional or self-selective; all individuals posses physical traits and social attitudes that are embedded through life experiences. Social interaction, and in-turn decisions and the outcomes/consequences of those decisions, form the experiences that continually reshape one's psychological state. These experiences may (may not) initiate a change from one's current marital status. For example, a

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bad personal relationship may result in a decision to remain single, while a good experience may

motive one to marry.

Figure 1: Model of Family Structure Change
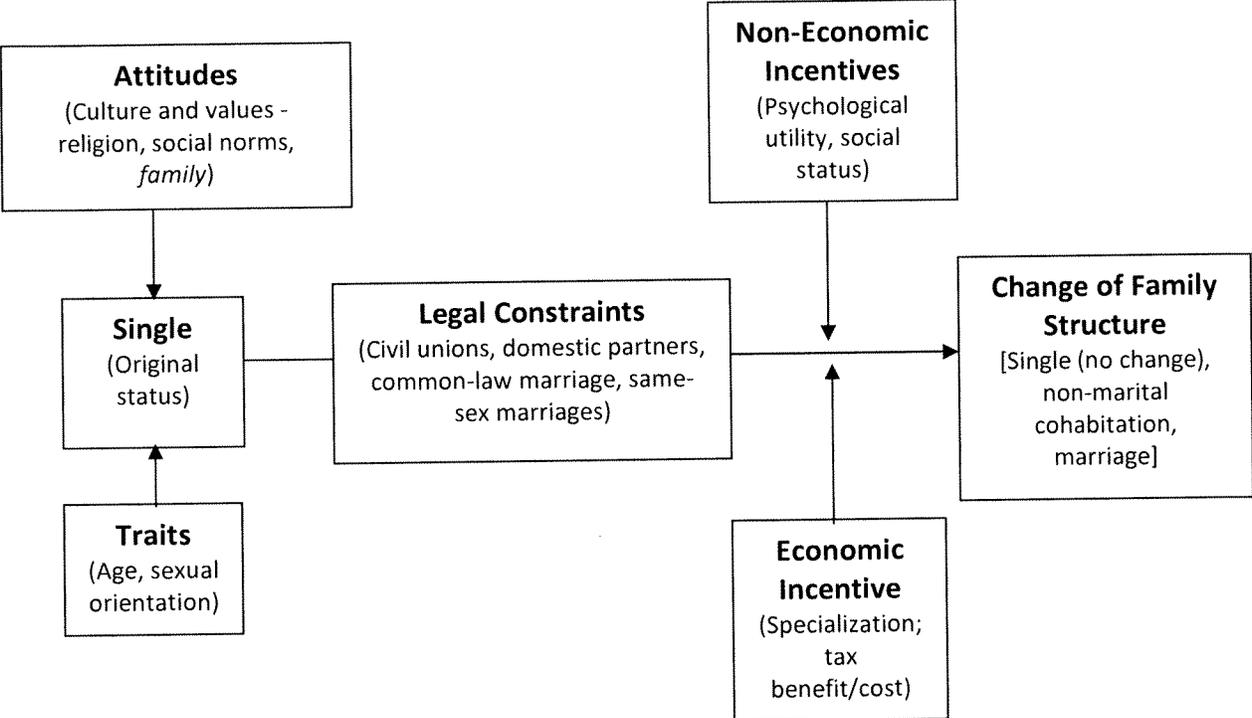
Movement (non-movement) from the original state of single may not be an outcome of

social interaction. The decision to change one's marital status may be a matter of embedded core

values. A woman or man may hold the attitude that the coming of age is a time to marry (i.e.,

societies that practice pre-arranged marriage); social interaction is not necessary to motivate a

change in marital status.

Although an individual may be motivated to change his or her marital status, legal and

social environments may create barriers. For example, once a long honored tradition, common

law marriages (after cohabiting for a period of time couples were legally married under State

laws) are no longer recognized in many States in the USA. Marriage between members of the

same sex is not recognized as a legal union under Federal Income Tax regulations. Therefore, the decision to change one's marital status is mediated by legal and social norms.

If the decision to change (not change) one's marital status from single status, both economic and non-economic factors come into play. Non-economic incentives to change one's marital status may include incentives such as elevating social status through marriage or providing psychological utility (i.e., status of being *married* or validating sexual orientation*)*. Economic incentives, which are the major focus of the current paper, also influence one's decision to move (not move) from the original marital state. Specifically, tax incentives (disincentives) influence the decision-making process of changing (not changing) marital status.

Theories of family argue that individuals choose a *family* structure based on economic benefit. Current tax regulations offer economic benefit for *married filing joint*; however, the ability to take advantage of the tax benefit is not available to all individuals in the US (i.e., same-sex marriage are not recognized as a marriage under federal law). There is also a tax incentive for *unmarried head-of-household* (i.e., single parents), which implies an incentive to divorce for married couples with a qualified dependent.

The only *family* structure not recognized under federal law is non-marital cohabitation. There is no federal tax incentive for individuals to engage in non-marital cohabitation. However, research shows that the rate of non-marital cohabitation is increasing (Clarkberg, Stolzenberg, and Waite 1995). Furthermore, research suggests a causal relationship between non-marital cohabitation and divorce (Axinn and Thornton 1993). This phenomenon supports the complexity of marriage and numerous factors that individuals consider when making a *family* structure decision. Such factors are beyond the scope of this paper.

Family status is a dynamic concept; each decision to move from one's current status is a matter of attitudes, traits, constraints, and incentives. Social interactions and experience change attitudes and traits (i.e., age), while social movements (i.e., legalization of homosexual marriages) and incentives (i.e., change tax regulations) alter the social landscape. Family choice is a continual process as individuals evaluate the value of their current status.

PROPOSITION

The fundamental notion of *family* forms the basis for US taxation. It is proposed that the concept of *family* and other non-marital concepts of human union are a product of, among other things, economic benefit. Individual form *human unions*, because doing so puts them in a better position than without it. This notion is support by various theories of marriage (e.g., Becker 1965, 1973) and is conceptually generalizable to non-marital unions such as same-sex union, heterosexual singles, and single parents. If or when the economic benefit of a *human union* changes, the relationship will also change.

Tax regulations represent an economic benefit. Prior to 1948, tax rates offered no benefit for married couples; all income was based on individual income. After 1948, the *marriage bonus* or *single penalty* was passed. The 1948 act provided an economic incentive to marry. In 1951, the designation of *unmarried head-of-household* was enacted providing a tax incentive (i.e., low tax rate) for unmarried parents. Hence, the following is proposed.

P1: Holding other variables constant, the economic incentive (disincentive) of federal income tax influences one's choice of family structure.

In considering the proposed relationship, other factors that influence the choice of family structure must be considered. First, the natural increase in the US population and the age composition of the population are essential. The US population increased at a decreasing rate between 1950 and 1990 (U. S. Census Bureau 2001c); the 50- to 54-year age group

experienced the largest percentage growth between 1990 and 2000 (U. S. Census Bureau 2001a); and the number of non-family households (i.e., two or more non-relative person in a household) represented 6.1% of all household types (U. S. Census Bureau 2001b).

In considering the behavior of individuals concerning *family* structure, it is also important to consider differences among geographic areas. For example, in 2000, 31% of all households in the US resided in four states (i.e., California, Texas, New York, and Florida) (U. S. Census Bureau 2001b). The effect size for those States might be different from the aggregate population. Similarly, the youngest population resides in the West where the median age is 33.8 years (U. S. Census Bureau 2001a).

DISCUSSION

The current paper is a preliminary attempt to understand the role of federal income tax in family structure choices. Understanding what motivates individuals change their *family* status is pervasive in the study of human behaviors. The current study is a preliminary attempt to identify variable that influence human behavior in the creation of *family* structures. The benefits/costs associated with federal taxes offer an economic incentive (disincentive) to change one's *family* structure. Empirically testing is necessary to assess the intensity of tax incentives (disincentives) to motivate a change.

The notion of *family* is dynamic; it has evolved over time as social movements (i.e., change in social values and norm; trend toward individual choice) reshape US society. What defines a *family* is as complex as the various living arrangements now embraced by individuals. Even the most basic function of what once defined a *family*, child bearing and rearing, has been relegated to a variety of human union. Surrogate mothers take child bearing outside the family; genetically developed embryos can create three-parented children (Mangu-

Ward 2008). It is likely that the notion of *family* will continue to change in the US, as social norms change and evolve.

It is not likely that the federal government will recognize the various *family* structures now present in the US. For example, tax regulations do not recognize same-sex marriages that are now sanctioned by two States; same-sex marriages do not qualify as *married filing joint* for federal tax purposes. The non-recognition by the federal government is not likely to change for several reasons. For example, the federal government has relegated the interpretation of what constitutes a *marriage* to individual States. The division between federal government and the States is a doctrine long recognized and honored in the US. Furthermore, there is no bridge among and between States to provide a uniform meaning, so "marriage" is not transportable between States. Furthermore, the sheer size of the bureaucracy of government makes it difficult to quickly react to changes in the environment. Some progress is evident; in the U. S. Census 2000, the federal government defined and distinguished "household," "family household," and "nonfamily household." However, it is not likely that tax reform will afford non-traditional human unions (e.g., same-sex marriages) the same benefits reserved for legally sanctioned heterosexual marriages.

Direction for Future Research

Future research is necessary to fully understand the process of *family* structure choice and the factors that influence those choices. First, empirical research to test the proposition set forth in this paper is prescribed. The model provided in this paper is an overall, broad conceptualization of *family* structure. Future research should investigation differences between various *family* structures. Each type of "human union" presents a unique set of conceptual and operational challenges. Future research should seek to delineate between the various

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arrangements. For example, tax rates may be a moderator for the choice to move from single

and married, but not a significant element of movement from single to non-marital

cohabitation.

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APPLYING THE PHARMACEUTICAL APPROVAL MODEL TO OVER-THE-COUNTER DERIVATIVES

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SYNOPSIS: The recent global financial turmoil and economic recession has exposed some of the serious shortcomings of current U.S. regulations for over-the-counter (OTC) derivatives. Drawing upon the arbitrage economic theory and the spirit of the U.S. Food and Drug Administration model, we propose a model assuming that the market will not behave rationally and efficiently when investors or consumers do not completely understand the risks associated with the financial products they hold. Therefore, it is essential for the Securities and Exchange Commission (SEC) as a designated regulator to demand full disclosure from issuers of new OTC derivative innovations and to evaluate and approve them before they are released to the market. This suggested model will not only enable efficient risk allocation in the market, but also take a proactive approach in addressing the problem of unregulated OTC derivatives. The suggested model, if successfully implemented, will significantly improve the efficiency and stability of the U.S. financial markets. This commentary should be of interest to investors, regulators, financial institutions, and academicians.

Keywords: Over-the-counter derivatives, Arbitrage economic theory, and U.S. Food and Drug Administration model

INTRODUCTION

Over the past two years, a significant economic downturn has slowed economies around the world. Symptoms of a massive problem appear in the housing crash, equities, commodities prices, and in rising unemployment. Governments around the world continue to grapple with funding massive bailouts of their financial industries, effectively selecting winners and losers with the stroke of a legislative pen. Despite extremely low interest rates and massive cash infusions by central banks, the financial and economic crisis continues to threaten corporations around the globe as credit dries up and companies of every form hold onto cash with a death-grip.

The lack of appropriate regulation for OTC derivatives and the search for high yields in equities, debts, and other investments were major factors causing the financial and economic crisis.[1] Ban Ki-moon, Secretary General of the United Nations, said in a May 2009 letter to the conference on the world financial and economic crisis:

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[1] There are two types of derivatives contracts: Exchange traded and OTC. Exchange traded is generally regulated by the SEC or Commodity Futures Trading Commission (CFTC).

The years prior to the economic crisis were characterized by high global growth and relatively stable and low inflation. This pattern of growth, coupled with *deficient regulation*, eventually led to over-leveraged financial institutions, businesses and households, which proved unsustainable. Persistently low interest rates caused investors to search for higher yields in equities, housing and basic commodities, as well as progressively riskier financial instruments. Asset prices were driven up across a broad range of industrialized and emerging economies, and many developing countries benefited from high commodity prices. In publications such as the World Economic Situation and Prospects and the Trade and Development Report, the UN has warned against mounting household, public sector and financial sector indebtedness in the United States and elsewhere (*emphasis added*).

With the trade of OTC derivatives and the introduction of new OTC derivative innovations to the market (hereafter, we use OTC derivatives to include current and future securities-related OTC derivative), there is a concern that market participants do not understand the risks associated with these recent OTC derivatives as it was evident by the legal cases of Gibson Greetings and Proctor & Gamble (Lucas et al. 2007) and the current financial ructions. There is also the concern that such OTC derivatives could lead to risk misallocation. Specifically, complex OTC derivatives can result in the transfer of the credit risk, market risk or liquidity risk either from one financial institution to another leading to risk concentration within the financial sector, or from a financial institution to a non-financial institution and individuals resulting in risk transfer to parties that can least understand it and bear it. Therefore, the joint Financial Stability Forum of the Basel Committee on Banking Supervision, the International Organization of Securities Commissions, and the International Association of Insurance Supervisors (2008) recommended the need for market participants to enhance risk management capabilities and for regulators to focus on the regulation of risk associated with financial innovations, their transparency, and scrutinizing financial markets. The lack of transparency and oversight enables profit maximizing deceptive market participants to conceal trading activities that would be more easily detected if done in regulated markets (Schapiro, 2009).

The current U.S. OTC derivatives regulatory system is seriously flawed, inherently ineffective and it is also proved to be unsustainable. A systematic improvement in the OTC derivative regulations is needed to develop an improved economic and financial environment, to safeguard investors and employees, and to prevent future crises. Self regulation of OTC derivatives has led to the flow of risk from those who can most efficiently understand it and bear it to those who least understand or can afford it. Investors do not wish to trust hard-earned money to a "wild west" financial environment where the sheriff joins the train robbers and cattle rustlers that take what they will by cunning and deception. It is our belief that a free market is only free when reasonable rules and regulations are enforced. Few in their right mind would advocate abolishing the local police force in the interest of a more free society. Likewise, in the financial world, the police (regulators) must always be on patrol in an effort to protect the public interest in *maintaining* a free market.

In response to the current economic crisis and the lack of regulation of OTC derivatives, the Treasury Department introduced the Act of 2009 to regulate the $450 trillion OTC derivatives market. According to the proposed legislation, the SEC will have the regulatory responsibility for securities-related OTC derivatives, while the Commodity Futures Trading

Commission (CFTC) will have the regulatory responsibility for commodity and other non-securities-related OTC derivatives. In her September 22, 2009 testimony before the U.S. House Committee on Agriculture, Mary Schapiro (the SEC Chairman) indicated that the Treasury-proposed legislation is an important step forward that should be strengthened to further avoid regulatory gaps and regulatory arbitrage in the OTC derivatives market. Currently, the U.S. lawmakers attempt to advance the financial regulation reform bills[2]. Both the Senate and House bills propose to create 1) a consumer protection entity to oversee the products made available to consumers; 2) an Investment Advisory Committee within SEC for identifying areas where investor have significant problems dealing with SEC and provide them with assistance; and 3) a Financial Stability Oversight Council led by the Treasury Secretary to curb the financial system risks. The fact that a noticeable part of financial overhaul bills deals with derivatives and credit rating agencies underscores the importance of appropriate regulatory oversight on OTC derivatives. One way to strengthen the regulation of OTC derivatives is to expand the regulatory authority of the SEC and the CFTC to approve the OTC derivatives before their release into the financial markets. This approval process should include both derivative participating institutions and products.[3] We next discuss this proposal. It should be noted that while we focus the discussion on the SEC and the securities-related OTC derivatives (hereafter, OTC derivatives), the same suggested model could be adapted by the CFTC to regulate the commodity and other non-securities-related OTC derivatives.

Drawing upon the economic arbitrage concept and the spirit of the U.S. Food and Drug Administration (FDA) model for drug approval, this paper suggests a model for evaluating, approving, and monitoring OTC derivatives before during and after release to the market. According to the suggested model, the SEC will be designated as the financial market regulator and will be responsible for protecting investors and the economy by reviewing and approving OTC derivatives before release to the market. The SEC will also be responsible for ensuring the public has access to complete and accurate information for investment in OTC derivatives. Additionally, the SEC will be responsible for establishing reporting, disclosure, and monitoring rules and regulations as well as enforcing them. Further, when monitoring indicates there is change in risk factors and or in the business environment, the SEC will have the right to inspect, or delegate inspection of, these OTC derivatives any time after approving them.

According to the suggested model, the SEC will have the regulatory oversight over all types of securities-related OTC derivatives excluding identified banking products that are subject to the US federal banking oversight as long as they are not repurchased for sale to individuals or pension funds. The Treasury's proposal includes an exclusion from the proposed legislation for the identified banking products that could be extended to foreign banks (or their subsidiaries) that are not subject to federal banking oversight, similar to the US banks (Schapiro, 2009). To

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[2] Senate Bill: Sen. Chris Dodd's bill, to be debated in the Senate. House bill: Rep. Barney Frank's bill, which passed on the House on Nov. 11, 2009.

[3] In his September 22, 2009 testimony before the House Committee on Agriculture, Gary Gensler (the CFTC Chairman) suggested that any comprehensive regulation of the OTC derivatives markets will require two complementary regimes—one for regulation of the derivatives dealers and one for regulation of the derivatives markets.

avoid manipulation of the OTC derivatives market, the suggested model considers all standardized and customized OTC derivatives and all future derivative innovations without restricting it to any specific type of OTC derivatives. The OTC derivatives traded by U.S. traders and entities on foreign markets would also be subject to the same regulatory system. The OTC derivatives originated or traded by non U.S. banks and intermediaries in U.S. would also be subject to the same regulatory system.

A fundamental assumption undergirding this proposal is the asymmetric flaw of material information. When consumers do not entirely understand the risk characteristics of the derivatives they hold and when they have different beliefs than the arbitrageur, this creates additional arbitrage risk and moves market participants away from the optimal Pareto-efficiency.[4] Thus, arbitrage harms the welfare of the society and creates a misallocation of risk (Weyl, 2007). This is particularly relevant given the current economic crisis. Applying the suggested model to OTC derivatives will increase the stability of capital flows and contribute to stable and viable economic growth. In addition, the suggested model will assist correcting the misallocation of risk as well as keep arbitrage more socially beneficial. In addition to promoting efficiency in the OTC derivatives market, the suggested model will increase the transparency of their market and prevent intermediaries and other market participants from marketing OTC derivatives inappropriately to less-sophisticated parties.

The paper proceeds as follows. The next section discusses recent proposals on OTC derivatives regulation. The third section discusses the arbitrage and financial innovation concepts with special focus on collateralized debt obligations and credit default swaps. The fourth section presents the suggested model for evaluating and approving financial innovations. Section five evaluates the suggested model, and section six concludes.

RECENT PROPOSALS ON OTC DERIVATIVE REGULATION

During the last few years there have been few proposals to regulate OTC derivatives. Those proposals do not provide a comprehensive framework to regulate OTC derivatives. The Commodity Futures Modernization Act of 2000 (CFM) created a category of derivatives called a "security-based swap". While security-based swaps are subject to the anti-fraud provisions of the U.S. securities laws, they are not within the jurisdiction of the SEC or the CFTC. The CFM Act provided the legal footing on which the OTC derivative markets grow and allows many OTC derivatives to be traded away from regulated exchanges (Bortz and Rosenberg, 2009).

In another attempt to regulate OTC derivatives, the New York State Insurance Department (NYSID) proposed regulating credit default swap (CDS) contracts as insurance due to their similarities. The NYSID proposal put additional controls on financial guaranty insurance

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[4] Pareto effect refers to the fact that any change to make a person better off is impossible without making other individual worse off. Given a set of alternative risk allocations for market participants, a change from one allocation to another that can reduce the risk of one market participant without increasing the risk of any other market participants is called a Pareto improvement. A risk allocation is defined as Pareto-efficient when no further Pareto improvements can be made.

companies and raises their capital requirements. The NYSID proposal considers the CDS contracts to be the business of insurance and requires providers of credit default swap in New York to become licensed as financial guaranty insurers (Bingham, 2008).

Recently, there has been much debate on whether naked CDS should be banned.[5] Advocates of banning the naked CDS cite its role in the hasting the demise of AIG, Bear Stearns, Lehman Brothers and others (Soros, 2009), while opponents allude to the difficulty to practically differentiate between naked CDS positions and legitimate positions intended to hedge underlying exposures (Bortz and Rosenberg 2009; Geithner, 2009). One of the first attempts to ban naked CDSs came from Section 355 of the American Clean Energy and Security Act of 2009.[6]

The early months of 2009 witnessed two fundamental changes to the way CDSs operate; the introduction of the U.S. and European central clearing houses and the international standardization of CDS contracts. A clearing house acts as the central counterparty to both sides of a CDS transaction, thereby reducing the counterparty risk that both buyer and seller face. International standardization of CDS contracts could prevent legal disputes in ambiguous cases.[7]

The Treasury Department introduced the Act of 2009 to regulate the OTC derivatives market. In his July 10, 2009 testimony before the U.S. House Financial Services and Agriculture Committees, U.S. Treasury Secretary Geithner outlined four broad objectives of the Treasury Act: (1) preventing activities within the OTC derivatives markets from posing risk to the financial system; (2) promoting efficiency and transparency of the OTC derivatives markets; (3) preventing market manipulation, fraud, and other market abuses; and (4) ensuring that OTC derivatives are not marketed inappropriately to unsophisticated parties. Both House and Senate financial reform bills now in Congress, each address a laundry list of problems, have covered similar grounds especially in the areas of strengthening the regulatory oversights over the derivative markets that previously in the dark. Under these proposals, many derivatives and OTC financial products would be required to trade onto organized exchanges and be cleared through central clearing houses like as listed stocks are now. Trading through regulatory platforms would bring greater transparency and provide greater access to information for investors. Additionally, a proposed rule requires companies to hold collateral against their new derivatives trades when they enter such contracts to cover possible losses. Moreover, both bills have proposed to set up an advisory board or an office within SEC to administer credit rating agencies' rules and practices to close the potential loopholes. It is obvious that four objectives put forward by the Treasury Secretary and proposals under both financial reform bills have focused only on the regulatory procedures to prevent future misshapes; they have neither established an approval process of the OTC derivatives before they are released to the market nor provided a process to facilitate the achievement of above objectives. Our proposed model, on the other hand, has essentially addressed these issues.

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[5] Naked position in the CDS occurs when a speculator with no underlying exposure to the credit instrument purchases/sells CDS protecting against the default of that instrument.
[6] The American Clean Energy and Security Act of 2009 stipulates that any future OTC derivatives legislation will supersede the requirements of the energy bill.
[7] MORE DETAILS ABOUT THESE DEVELOPMENTS ARE AVAILABLE AT: HTTP://STHWEB.BU.EDU/INDEX.PHP?OPTION=COM_AWIKI&VIEW=MEDIAWIKI&ARTICLE=CREDIT_DEFAUL T_SWAP&ITEMID=360

ARBITRAGE AND FINANCIAL INNOVATION

The recent financial turmoil has raised concerns that financial innovation created a *confused market* and facilitated the flow of risk to those who least understand it. Financial economists argue that arbitrage and financial innovation promote efficient risk allocation and make investment decisions more rational (Baker et al. 2002; DeLong et al. 1990, Shleifer and Vishny, 1997). The classic economic model assumes that arbitrage, including financial innovation, is beneficial to all market participants when inefficiency in the risk and market misallocation is smoothed through an arbitrageur (e.g. financial institution). However, Weyl (2007) argues that when some market participants are confused or misled (e.g. investors or consumers) and have different beliefs than the arbitrageur, then arbitrage creates additional risk and moves market participants away from the optimal Pareto-efficiency. Thus, arbitrage harms the welfare of the entire society and does not create an efficient risk allocation in the sense typically used by economists. Inefficient risk allocation not only harms individuals who do not completely understand the risk characteristics of the financial products they hold, it also affects macroeconomic stability as the recent uproars in financial markets have proven.

The recent financial meltdown is *partially* caused by financial institutions boring risks to the market that market participants do not fully comprehend. Highly complex and risky poorly structured collateralized debt obligations and credit default swaps were introduced to *confused consumers* by non-risk comprehensible financial institutions. One would expect, when considering the classic economic argument, that financial innovation and arbitrage spread risk evenly over market participants, allocating risk to those best able to bear it; an expectation which did not materialize. When opportunities for arbitrage and financial innovation arise from mispricing caused by the presence of non-calculated risk to confused investors, arbitrage and financial innovation fail to allocate the risk to those who can most efficiently understand it and bear it (Gromb and Vayanos 2002; Weyl, 2007). Arbitrage and financial innovation are socially beneficial according to the standard economic narrative, discussed above, when market participants are not confused and risks of the financial products are measurable. Weyl (2007) raises the question of what, if any, are appropriate regulatory responses to harmful arbitrage or the distortions that give rise to it? In the following sections we try to answer this question.

Collateralized Debt Obligations and Credit Default Swap

OTC credit derivatives known as collateralized debt obligations and credit default swap are partially to blame for the current financial downturn (Gagliano, 2008; Gilani, 2008). These two credit derivatives have made it possible to transfer large amounts of corporate credit risk exposure among banks as well as from the financial sector to the nonfinancial sector (Lucas et al. 2007).

A collateralized debt obligation (CDO) is an investment vehicle that packages various forms of debt for sale to investors. The forms of debt include loans or bonds of different maturity dates and varying credit risk. The CDO is split into tranches which contain the various types of debt. Based on credit risk, each tranche falls under one of four categories: senior, subordinate, mezzanine, or equity (Lucas et al. 2007). The CDO allows a bank or loan company to remove the loans from its balance sheet and free up capital to originate new loans. Risk is shifted to the investors in the CDO. The lender is able to originate loans on a greatly accelerated schedule. The investors gain a liquid asset with diversified risk and continuous cash flows without actually purchasing illiquid debt (Shell, 2006).

A credit default swap (CDS) is a unique type of financial contract designed to transfer credit risk from the investor to a third party. For example, a bond holder may wish to hedge against the risk of default by the debtor. The bond holder buys a CDS with the understanding that if the issuer defaults on coupon payments, the bond holder will be reimbursed the full face amount of the bond (Shanahan and Moses, 2008). A unique feature of the CDS is that a buyer is not required to own the bond named in the contract yet is still able to collect on default as if the bond were owned (Morgensen, 2008).

By introducing CDOs and CDSs, many financial institutions have carried risks to the market that the market did not fully understand. Clearly, one crucial factor that motivated them to hold this high risk was liquidity. In a society where the arbitrageur is less informed about the risk characteristics of the product they introduce and consumers are confused, arbitrage may lead to greater concentration of undiversified risk, rather than greater risk diversification (Weyl, 2007). Arbitrage opportunities that allow such financial institutions to trade high risk OTC derivatives for confused consumers will then harm those market participants. A process that involves the regulation of OTC derivatives will yield more informed and less confused market participants, which in turn will achieve the social benefits from arbitrage and financial innovation.

SUGGESTED MODEL FOR EVALUATING AND APPROVING OTC DERIVATIVES

The working foundation of the suggested model is derived from the current model utilized by the U.S. Food and Drug Administration (FDA) for the approval of new pharmaceutical products. The FDA is a vitally important public health agency that regulates products to protect and advance public health in the United States. It is the nation's watchdog for pharmaceuticals, biologics, medical devices, veterinary medicines, foods and cosmetics, and products that emit radiation. Notwithstanding deficiencies in implementation, the FDA's model is suitable to the OTC derivatives market because of the proactive approach to limiting or preventing harm to the patient rather than attempting to heal or revive the patient after irreparable damaged has been inflicted.

A drug company seeking to market a new product is required by the FDA to test it. These tests are conducted in laboratories with the goal of a) discovering how the drug works and b) ascertaining its probable safety and efficacy when consumed by humans. The next step is to perform controlled testing in humans in order to establish whether it is safe and actually brings about the desired beneficial outcome. Once this testing phase is completed, the sponsoring company sends the test data to the FDA's Center for Drug Evaluation and Research. At the Center, specialists in chemistry, statistics, pharmacology, and medicine evaluate the test data and the company's proposed labeling for the product. If the Center finds that the health benefits of the drug outweigh the health risks, the drug is approved for sale to the public (FDA, 2009). Although the statutory requirements and rules that govern the U. S. drug approval process have grown extremely complex since the early 1900s, they have raised testing standards, assured accuracy in labeling, and provided U. S. consumers with an unparalleled supply of safe and effective medicines and medical devices (Randall, 2001).[8] The FDA does ongoing monitoring of

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[8] The FDA has been criticized for injudicious and excessively rapid approval of new drugs, lack of adequate enforcement authority, lack of drug facts transparency due to proprietary considerations, and approving ads about drugs before the FDA reviews and approves them (Carpenter et al. 2003; Meyers 2005).

approved drugs through the United States Pharmacopoeia (USP) to ensure the quality product in the U.S. marketplace.

The Suggested Model Foundation and Application

To begin applying the FDA's model to the financial world, it is necessary to lay the foundation with several key points. First, the FDA model is not an exact blueprint for the financial industry but rather a general model. Second, the authority of the SEC must be expanded to protect investors in all types of securities-related OTC, not just equities and hedge funds with the number of investors exceeding a certain threshold. Third, the SEC must recruit additional skilled and experienced members of the financial community from academia and government. Additionally, various disciplines should be represented including accountants, actuaries, auditors, bankers, brokers, fund managers, lawyers, mathematicians, accounting and finance professors, software developers, and statisticians. Each discipline brings skills and perspective essential to the success of this far-reaching proposal. Fourth, the Congress should expand the SEC examination authority over intermediaries and institutions trading OTC derivatives. Similar to the second key point, a third party needs to be watching the money trail. Fifth, the SEC should have a direct access to real-time data on OTC derivatives. Real-time data is vital to heading off a crisis before it becomes unmanageable. Finally, the SEC should have an anti-fraud and anti-manipulation authority over the OTC derivatives. The last three regulatory requirements were also emphasized by Schapiro in her testimony.

In practice, the SEC should be vested with the authority to regulate all public and private securities-related OTC derivatives markets. Public issuers, non U.S. banks trading in U.S., private equity firms, mutual fund companies, and brokers would be required to submit financial statements and report on the financial positions of their various investment offerings. The purpose for extending these requirements to private equity firms and others not previously subject to the requirements is to allow investors and regulators to continually assess the impact of the investment vehicles on the financial markets and the economy. Excluding private entities that trade OTC derivatives from the regulatory mechanism would directly impact the regulated securities-related OTC derivatives markets. The unregulated entities would serve as a less regulated alternative for engaging in economically equivalent activity.

To understand how the expansion of the SEC's authority would contribute to the stability of the financial markets and the economy, it is helpful to discuss the overall process of approving the creation and issuance of a CDO (financial derivative). In a hypothetical scenario, a private equity Dark Pool investment company (Knight Investment Group, KIG) hits upon the idea of selling off its portfolio of car loans, credit card debt, and mortgages. The goal of KIG is to gain a cash infusion that allows the company to originate more loans rather than waiting for all the current borrowers to pay up over future years. By doing this, KIG can also offload the risk of borrower defaults.

The payment hierarchy of a CDO is characterized as a waterfall. The senior tranches are the highest priority for payment to the loan holders (Lucas et al. 2007). The subordinate tranches are next in priority with mezzanine and equity tranches being last in line, in that order. A few defaults will not significantly impair cash flows to the investors. If and when increasing numbers of defaults occur, investors in the equity tranches may see payments stop altogether

while mezzanine, subordinate, and senior tranche investors still receive the interest and principle payments. Investor attempts to sell non-performing securities on the market will likely result in significant losses.

Additional complexity is introduced by various flavors of CDOs. A CDO-squared contains tranches like the conventional type but instead of utilizing a package of loans as collateral, a CDO-squared uses tranches from existing CDOs as collateral (Shah, 2007). A CDO-cubed uses CDO-squareds as collateral in its tranches (Investopedia 2008). Synthetic CDOs are comprised of credit default swaps rather than actual loans or other CDOs (Gibson, 2004).

Before selling the first CDO, KIG needs help from its legal firm the Nice Group. A Special Purpose Vehicle (SPV) is created, in the form of a trust, with the purpose of buying the loans from the KIG. The SPV will fund the purchase of the loans by packaging the loans into securities known as CDOs. The lawyers structure the SPV such that it is not allowed to declare bankruptcy. SPVs can be designed as a shell with no employees or managers (Shell, 2006). The SPV is, in accounting parlance, a Special Purpose Entity (Soroosh and Ciesielski, 2004).

KIG also needs help from a ratings agency. Stitch Ratings evaluates data on the credit quality of the loans in each tranche of the CDO and issues a public rating for each tranche. Armed with these ratings, KIG can pitch the advantages of each tranche to aggressive and risk-averse investors. Once the investors have purchased all of the debt, the SPV essentially repays all of the loans to the KIG and for the life of the loans serves as a conduit for interest and principle going back to the investors. The investors are happy with the continuous cash flows while also holding a liquid security, KIG is more than happy to originate new loans while reducing or offloading risk, and the legal firm collects it fees. The ratings agency gains a new revenue stream since it must periodically re-evaluate and update the rating for each tranche in the CDO.

Up until the present time, CDOs have been issued to investors through the SPVs created by the underwriters. In our hypothetical situation, KIG works with Stitch Ratings to determine the rating for each tranche. Stitch utilizes its own statistical models to determine risk of default in each tranche and evaluates the expertise of the CDO manager and team. It also analyzes recoveries, payments structures, timing of cash inflows to outflows and many other variables (Parisi, 2002). Once the initial ratings process is complete, each tranche will be rated in order to reflect perceived risk and reward. The senior tranche will be rated AAA while the equity tranche will be rated BBB- in our hypothetical scenario. The next step is advertising and selling the new CDO to investors.

The SEC Evaluation and Approval Process

The suggested model requires the underwriter to submit the CDO proposal to the SEC OTC Derivatives Office, a new suggested SEC Office, for review and approval before advertising or offering the CDO to investors. The review process would require the SPV to submit a complete proposal in full detail, disclosing the type of investor targeted (risk averse, aggressive growth, etc.), target market (institutional, individual, high net worth, etc.), investment target industries (energy, pharmaceutical, etc. or a mixture), projected returns over the short- and long-term, compensation plan, fee structures, and the projected economic and social effects. This information should justify the stated goals and strategy of the CDO. More importantly, it would allow the SEC's evaluation team to evaluate the effects of the CDO on the economy when

aggregated with other CDOs already on the market. If the idea is new to the market, the SEC OTC Derivatives Office would use this data to project the potential market penetration of the new offering as well as the potential economic risks and rewards of continued growth of the new type of investment.

In return for full disclosure to the SEC, the party submitting the proposal would be guaranteed full confidentiality of the submission and details thereof. Investment firms must be assured that no proprietary information will be leaked to competitors during the evaluation process. Members of the SEC involved with evaluation must sign and adhere to non-disclosure agreements. Investment firms will be guaranteed the right to sue for damages in the event of disclosure by any member of the SEC and immediate termination of the offending individual(s) must be enforced. In the event the SEC grants a trial of a new type of security, the submitting firm will be given exclusive rights to market the security for a given time frame of not more than five years. This limitation would allow the firm to evaluate the new security, propose changes to the SEC for approval, and establish a presence before competitors enter the new market. The relatively short time period would also provide incentive to the firm to create a viable offering sooner rather than later.

The SEC OTC Derivatives Office would evaluate the methodology of the statistical models employed by the SPV firm. The models used by the ratings agency would also be thoroughly scrutinized. Much iteration of these models would be run with various inputs modified in order to understand best- and worst-case scenarios. Learning from past negative experience (Rajan et al. 2008), the SEC team would also remove, change, or add its own inputs and combine models as part of this process. For example, inputs to a CDO model should include the spread between overall growth in housing prices and overall wage growth. A warning flag would be triggered if trends indicate the spread increasing beyond a set figure that economists believe is healthy. Coupled with low interest rates, this should lead evaluators to research and factor in the increased incentive for lenders to originate sub-prime mortgages in light of public government support for increased home ownership (Holmes, 1999). Qualitative considerations, if any, should not be ignored or downplayed in the evaluation process.

A significant requirement for the application process is a detailed disclosure of the accounting treatment the firm proposes to use for the new asset. Specific GAAP authoritative literature utilized as a basis for the treatment proposal should be fully documented.[9] Besides providing a future baseline for auditors, this level of detail would allow the SEC to determine whether its own rules are interpreted in the same spirit the SEC originally intended. A mandatory disclosure of the aggregate data on OTC derivatives trading volumes and positions would promote transparency, market integrity, and increase market participants' level of confidence in the financial regulatory system.

In light of lessons learned from the recent meltdown of the market for CDOs and the overall credit market freeze (Turnbull et al. 2008), a factor that should receive significant weight in the evaluation process is the complexity of the derivatives. A single CDO is highly complex with its many inputs from various types of debt. The many variables introduced create a derivative that is very difficult to value properly, especially in times of rising defaults and

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[9] Government entities that hold derivatives in their portfolio are required to comply with The Government Accounting Standards Board Statement Number 53 (GASB 53) for periods beginning after June 15, 2009.

decreasing investor appetite for CDOs. Stratospheric levels of complexity exist within CDO-squareds and CDO-cubeds. The complexity of these instruments should give the SEC's evaluators serious cause for rejecting the plan or for sending back to the derivative innovator for significant modification with reasons why. The evaluation process serves as a reality check to the aggressive plans of investment firms and as a protection to unsophisticated investors.

In the event that Knight Investment Group's CDO is approved for sale to investors, the SEC would notify KIG in writing and issue a public statement to that effect at the same time the investment firm releases its information to the investing public. Going forward, the SEC would require the Public Company Accounting Oversight Board (PCAOB)-registered auditors to annually audit the firm's compliance with the plan originally approved by the SEC. The SEC would also reserve the right to conduct its own surprise inspections apart from the regular audits. Any material variations from the plan would require explanation to the SEC and could begin enforcement proceedings if not remedied immediately.

The SEC will require the Knight Investment Group, the derivatives dealer, to maintain a minimum capital requirement or a margin requirement for their approved derivatives.[10] The SEC OTC Derivatives Office can establish different regulatory Minimum Capital Tiers to lower the risk of customized and standardize OTC derivatives. In addition, Knight Investment Group and its SPV should comply with business conduct standards established by the OTC Derivatives Office to protect market integrity and lower risk. The Treasury's proposal requires the SEC and other regulators to adopt business conduct rules for dealers and other market participants in the OTC derivatives market (Schapiro, 2009).

Practical Considerations of the Suggested Model

A proposal to regulate private investment firms, hedge funds, or other currently less than fully regulated OTC derivatives will assuredly generate a barrage of resistance by the financial industry. It could be argued that hedge funds targeting high net worth investors should be exempted given that these investors are more sophisticated than the average investor and that the amounts invested in these funds compared with the overall amounts invested in mutual funds, bonds or stocks is marginal. This argument loses its appeal when considering the fact that hedge funds are highly levered while investing billions in derivatives such as CDOs, CDSs and other derivatives as well as the stock market. The complexity of these instruments coupled with the fact that billions were and are invested force the realization that these entities can change the direction of markets. In an extreme example in 1998, the Federal Reserve brokered a deal to keep Long Term Capital Management solvent by persuading 14 banks to provide the liquidity needed to prevent the fund's imminent collapse (Rubin et al. 1999). At the time, the predominant fear was that the collapse of the fund would trigger a domino effect threatening

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[10] This requirement is based on Gary Gensler testimony before the House Committee on Agriculture. Gensler suggested higher capital requirement for customized derivatives compared to standardized derivatives, since customized derivatives are by their nature less standard, less liquid and less transparent. A margin is collateral that the holder of a position in securities has to deposit to cover the credit risk of his counterparty. On U.S. futures exchanges, margin is called performance bond.

global financial stability. The bailout of the financial sector during the current economic crisis is another example.[11]

The SEC has limited ability to influence interest rates set by the Federal Reserve. Therefore, the scope and potential effects of this proposal are limited. However, through expanded powers, the SEC can affect banking operations. For example, Lucas et al. (2007) point out that synthetic CDOs were created by US and European banks to allow them to hold their loans while reducing their regulatory capital requirements. Loan default risk was sold to investors through the synthetic CDOs which are bundles of credit default swaps on the loans the banks originated. The balance sheets appeared healthy through this form of "balance sheet management." The SEC can either forbid or heavily regulate this practice in order to elevate the quality of the financial statements.

EVALUATION OF THE SUGGESTED MODEL

Applying the proposed model to regulating the OTC derivatives markets will strengthen the viability of financial institutions and protect U.S. investors from a repeat of the massive meltdown in structured securitization that we are experiencing today. The benefits of the suggested model include 1) reduced conflicts of interest; 2) transparency in product information; and 3) risk control and management.

First, the suggested model calls for a thorough examination of OTC derivatives by SEC before they can be advertised and sold to investors. The role of SEC would, therefore, expand not only to evaluation of the quality of underlying collateral for derivatives but also to assessment of how appropriate the assigned ratings are for different tranches. Currently, Moody's, Standard and Poor's, and Fitch are three major credit rating organizations (CROs) in the U.S., and the bulk of their revenues come from derivative issuers. Consequently, employees and management of CROs have felt intense pressure (although implicitly) from issuers seeking favorable ratings. Such a revenue structure, coupled with competition from peers as a result of issuers' looking for the best ratings, has created conflicts of interest that could lead to possible manipulation of statistical models (Caprio et al. 2008; Coval et al. 2009). In contrast, as an independent reviewer, the SEC will eliminate these conflicts of interest and reduce the probability of biased opinions.

Second, the suggested model requires issuers to submit detailed information on financial products, along with risk assessments and credit ratings to SEC for evaluation. Such regulatory requirements are expected to have immediate positive influences on how issuers conduct due diligence related to these OTC derivatives and how CROs assign their ratings because both financial institutions and CROs understand that their work will be subject to expert scrutiny and constant inquiries from the SEC; the quality of their work will directly affect the outcome of the product evaluation. Since these products may have the potential to generate hundreds of millions of dollars in revenue, there is an incentive for issuers and CROs alike to perform at a self-

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[11] AIG was bailed out with approximately $180 billion. The AIG Financial Products, AIG subsidiary that dealt in derivatives, was not regulated and was considered an extremely low risk counterparty because it was a guaranteed subsidiary of AIG (AAA rated counterparty). Derivatives dealers affiliated with Bear Stearns and Lehman Brothers were not subject to any serious federal regulation.

imposed higher standard. Obviously, information transparency will continue during the review process and after the derivative is released into the market.

Finally, the essence of the suggested model offers necessary risk control and management mechanisms to prevent shoddy OTC derivatives from entering the market place under the guise of good credit ratings. The degree of transparency surrounding new OTC derivatives is strengthened through the SEC's mandatory disclosure requirement. As a result, both investors and market players are able to access the related information necessary to make informed investment decisions. Therefore, the suggested model will help confused market participants by correcting their mistaken beliefs caused by the asymmetric information regarding new OTC derivatives. This facilitates the flow of risk to those who can most efficiently absorb it, thus moving the market toward the optimal state of Pareto-efficiency.

While the benefits of implementing the suggested model for OTC derivatives are easy to understand, questions remain. The SEC has acknowledged that it lacks technical know-how and knowledgeable staffs to keep up with rapid technology advancements and cutting-edge trading tactics on Wall Street; it has relied on self-regulatory organizations, such as the NYSE and the Financial Industry Regulatory Authority, to monitor daily trading activities (McGinty and Scannell, 2009). Many believe that the inability of the SEC to act played a significant role in the recent financial crisis. Therefore, the SEC will need a substantial increase in funding to hire staff and attract experts to review and approve OTC derivatives and to effectively respond to the technology advancements and cutting-edge trading tactics on Wall Street. As an alternative approach, the SEC could delegate the responsibility of reviewing and approving new OTC derivative to a body in the private sector. The private sector would possess the needed professional talents, without undue political pressures that could pollute the process. Additionally, the private sector is more likely to have flexible rules and would be more responsive to investors' needs. This delegation would be similar to the SEC delegation to Financial Accounting Standards Board (FASB) to make the Generally Accepted Accounting Principles. The relation between FASB and the SEC is a fruitful and successful relationship (Beresford, 2006; Magill et al. 1997).

Moreover, even if we assume that the required personnel can be assembled into a desirable evaluation team and that proper statistical tools are adjusted to include parameters previously omitted by CROs to reflect the real risks presented, the review process itself may take a long time to complete. In some cases, such delays in pushing these derivatives to market may cause permanent damage to the issuers. In the process of revamping the financial system, one needs to take into consideration that the proposed regulatory measures should not have unintended consequences, such as discouraging financial institutions from engaging in the derivative market and hampering their abilities to raise cash liquidity necessary for further growth. A suggested solution to this problem is to evaluate the performance of the SEC suggested office by its speed in reviewing and approving new financial products. This office needs to balance the time allotted to review and approve new financial products versus obstructing issuer abilities to raise necessary capital for further growth.

There are direct costs and benefits involved with the suggested model. While it is hard for us to assess theses costs, we believe that the SEC can make a reasonable attempt to quantify these costs. Notwithstanding, these costs include the cost of the OTC Derivatives Office which typically contains the cost of hiring new staff, consultants, technology, educating the public

about the regulated OTC derivatives, and the cost of policing the OTC derivative market. Short of additional resources to establish the OTC Derivatives Office, the SEC can pass significant part of these regulatory compliance costs to OTC derivatives innovators through some regulatory fees associated with the approval process. While we believe that adopting the suggested model demonstrates many benefits to the economy, investors, financial institutions, and the broader society, it is almost impossible to quantify these benefits.

CONCLUSION

Drawing upon the arbitrage theory and the spirit of the U.S. Food and Drug Administration model, this commentary suggests a model for evaluating and approving over-the-counter OTC derivatives before they are released to market. The suggested model will decrease risk, promote greater market integrity and improve market transparency. The simple model proposed by this paper is only a beginning toward a more refined and workable model that will result in greater stability of the financial markets. It provides a strong framework for looking forward at new OTC derivatives rather than a purely reactionary approach to regulation. Implementation will ultimately promote greater investor protection and efficient risk allocation, reduced information asymmetry, and a more robust economy. The suggested model cannot protect investors from bad decisions but can reduce the probability of poor decisions being made.

Throughout the process of crafting and implementing this regulatory approach, policymakers must strive to keep investor protection at the highest priority. Transparency and impartiality are critical elements of successful implementation. Objective criticism and sound research must also be employed in this effort to enact and enforce policies that will contribute to a stable economic foundation upon which society as a whole can thrive.

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DO VENTURE-BACKED COMPANIES HAVE BETTER DISCLOSURE QUALITY?[1]

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ABSTRACT: This study examines the role venture capitalists (VCs) play in shaping their portfolio companies' disclosure quality. By comparing a sample of venture-backed IPO companies with a sample of non-venture-backed IPO companies in their first a few post-IPO years, I isolate out the effect of VCs' influence on disclosure. Prior literature documents that VCs have both a positive (the VC monitoring hypothesis) and a negative (the VC moral hazard hypothesis) impact on portfolio companies' accounting choices. The purpose of this study is to differentiate between the two competing theories by evaluating VC's impact on multiple facets of corporate disclosure. In particular, I use ten measures that tend to capture portfolio companies' disclosure quality, including earnings relevance, earnings reliability, earnings' predictability of future cash flows, earnings persistence, earnings warning, analyst following, forecast dispersion, forecast accuracy, forecast revision and bid-ask spread. These measures focus on both GAAP earnings and management earnings forecasts. In addition, these measures capture the results of disclosure quality by examining information intermediation and stock liquidity. The findings will contribute to the emerging and limited literature examining the relationship between ownership structure and disclosure.

Keywords: venture capital, earnings quality, disclosure quality, analysts, management earnings forecasts, VC incentives, monitoring and moral hazard.

1. Introduction

Venture capitalists (VCs) are significant capital market players in the U.S.[2] They are believed to be extensively involved in the companies they finance (i.e., portfolio companies), closely monitoring their activities and providing valuable support and governance (Lerner 1995, Gompers and Lerner 2002, Hellman and Puri 2002, Hochberg 2003). This belief is consistent with the argument that VCs preserve shareholder value. However, criticisms of the venture capital industry abound: conflict of interests with other pre- or post-IPO stakeholders, accounting irregularities, or excessive tax benefits (Stross 2000, Healy 2002, Tunick 2003). For example, VC firms allegedly exerted influence over management to artificially inflate IPO firm stock prices during the internet bubble period (Buckman 2001, Mills 2001). The proponents of the venture capital industry suggest that VCs positively affect financial reporting practices while the opponents suggest that VCs have a negative effect. The purpose of this study is to examine the influence of VCs in shaping portfolio companies' disclosure quality. I focus on three aspects of disclosure by the portfolio companies, i.e. GAAP earnings, management earnings forecasts and resulted market consequence of disclosure. Specifically, I examine the following three research questions. Relative to non-venture-backed companies,

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[2] Over the past 20 years, more than one-third of all IPOs in the U.S. have been Venture-backed (Morsfield and Tan 2006). Well-known venture-backed companies are Digital Equipment Corporation, Apple, Federal Express, Compaq, Sun Microsystems, Cisco, Intel, Microsoft, eBay, Google, and Genentech (Source: National Venture Capital Association website, http://www. nvca.org, accessed January 22, 2009.)

1) do venture-backed companies have better earnings quality?
2) do venture-backed companies have better management earnings forecast quality?
3) do venture-backed companies have any capital market benefits for having higher-quality disclosure?

This study is important for two reasons. First, it reveals the impact of a type of influential inside investors on the quality of information companies communicate to the capital market. Quality information is important for the efficient allocation of resources in a capital market and companies' disclosure plays an important role in reducing the information asymmetry between insiders and investors (Healy and Palepu 2001, Verrecchia 2001). Second, given the prevalence and influence of VCs in the U. S., VCs have become the subject of numerous prior studies in finance and management which focus on the impact of VCs on governance and firm performance. Little is known about VC's impact on corporate disclosure and financial reporting choices. This study contributes to limited accounting literature that evaluates the role of VCs in shaping disclosure quality using comprehensive and multiple measures. As far as I am aware, the examination of VCs in accounting has only been limited to abnormal accruals, ERC and earnings restatement (Morsfield and Tan 2006, Cohen and Langberg 2006, Wongsunwai 2008, Agrawal and Coopers 2008). No study has ever been dedicated to examining VCs' impact on the distributional properties of earnings, on management earnings forecasts and on analysts' behavior. This study will shed new light on related literature by evaluating multiple perspectives of disclosure quality of venture-backed companies.

In this study, I compare the difference in disclosure quality between venture-backed and non-venture-backed companies during the first three years after an IPO. I measure disclosure quality by using earnings quality and management earnings forecast quality. Earnings quality is defined as relevance, reliability, persistence and earnings predictability of future cash flows. Management earnings forecast quality is defined as propensity to issue earnings warnings. Further, to evaluate the benefits of disclosing high quality information, I examine the resulting difference in information intermediation and stock liquidity between these two groups of companies using analyst following, analyst coverage, analyst forecast accuracy and revision, as well as bid-ask spreads.

The rest of the paper is organized as follows. Section 2 reviews prior literature and develops the hypothesis; Section 3 describes the sample and research design; Section 4 concludes.

2. Related Research and Hypothesis Development
2.1 VC background
A VC firm operates a few VC funds which are raised from institutional investors such as pension funds, insurance companies and university endowments. There is a partnership contract between the contributors of the funds (i.e. limited partners) and venture capitalists (i.e. general partners). The partnership contracts have extensive details intended to protect the interests and tax reporting needs of the passive investors. Each VC fund is structured to have 10 year limited life with the possibility to be extended to 3 years, after which the fund is completely dissolved and the original capital plus any contractual returns on the investments are repatriated to the limited partners (Gompers and Lerner 2002). General partners charge a 2-4% annual management fees and 20% of the profits. A VC firm may have several funds under its management at any given time, and its long-run success is driven in part by its maintained ability to raise new investment funds from limited partners (Morsfiled and Tan 2006). The fundraising success rests on the VC's reputation for returning profits to its passive investors that are higher than in the open market (Gompers and Lerner 2002, p242). VCs are highly motivated to be associated only with successful and credible IPOs due to the excessive scrutiny and public attention at IPO. This may motive VCs to use their proximity to and influence over management to impact the portfolio company's financial reporting choices (Heesen 2002). VCs also cite the profitable companies they have brought public in their marketing documents distributed to the potential limited partners (Gompers and Lerner 1997). A successfully backed IPO can increase VCs' chance of future fundraising

and improve their ability to take firms public in future (Gompers 1995). The venture capital industry has its life cycle as following stages: 1) pre-screening of business plans and company selection; 2) nurturing and monitoring their investments; and 3) harvesting the investment through either IPOs or mergers and acquisitions (Gompers and Lerner 2002). VC firms eventually want to liquidate their ownership position. As VC firms' comparative advantage lies in their ability to oversee young companies, delayed exit incurs opportunity costs (DeAngelo and DeAngelo 1987). Among several different ways to exit, the most frequent exit method is an initial public offering and the second most frequent method is mergers and acquisitions (Barry, Muscarella, Peavy and Vetsuypens 1990). This suggests that an IPO is usually the most profitable way for VC firms to exit. In this form of exit, VC firms distribute the shares they hold in the IPO companies to their limited partners.[3] VC firms start to distribute those shares when the lockup agreement between the underwriters and the insiders expires. Each venture capital fund usually distributes all of its holdings at one time. However, if multiple VC funds have invested in the same portfolio company, these funds may have different distribution dates. According to Gompers and Lerner (1998), the mean (median) holding period is 1.78 (1.02) years from the IPO date. Most of the VC funds exit the portfolio companies within two years after IPO. Figure 1 demonstrates the typical structure of a VC firm. Figure 2 shows the supply of venture capital to a startup company at various stages.

FIGURE 1
The structure of a VC firm
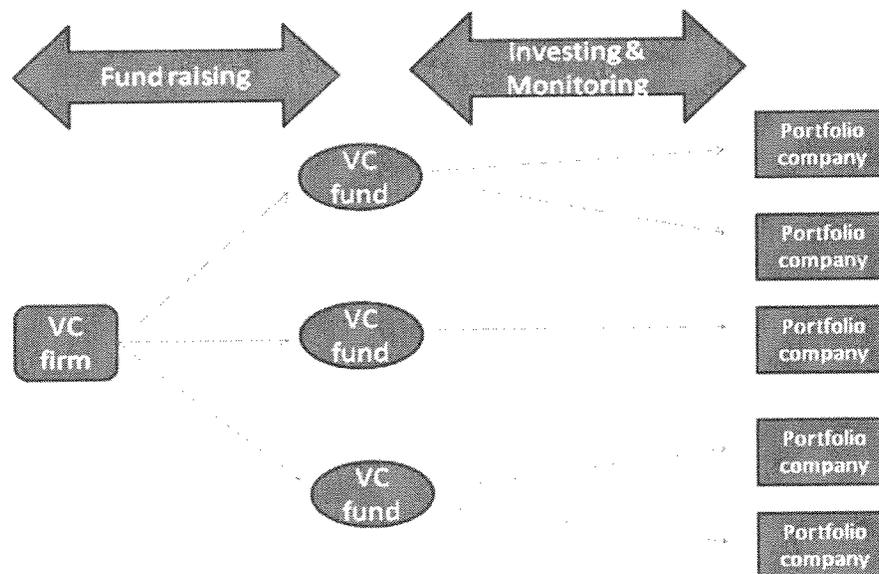
Source: Adapted from the National Venture Capital Association website, http://www.nvca.org, accessed January 22, 2009.

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[3] According to Gompers and Lerner (1998), VC firms usually avoid selling their shares in the public market because doing so incurs tax expenses for both VC firms and limited partners. In addition, selling shares in the public market is subject to the SEC's insider trading rule (SEC Rule 144), which restricts the amount of shares VC firms can sell at one time. Rule 144 requires a at least six months holding period on shares to be sold and a trading volume during any three-month period below 1% of outstanding same class shares. The insider trading law prevents VC firms from exiting in a quick manner. However, distribution to the VC firms' limited partners is exempt from the insider-trading rule.

FIGURE 2
The venture capital supply chain
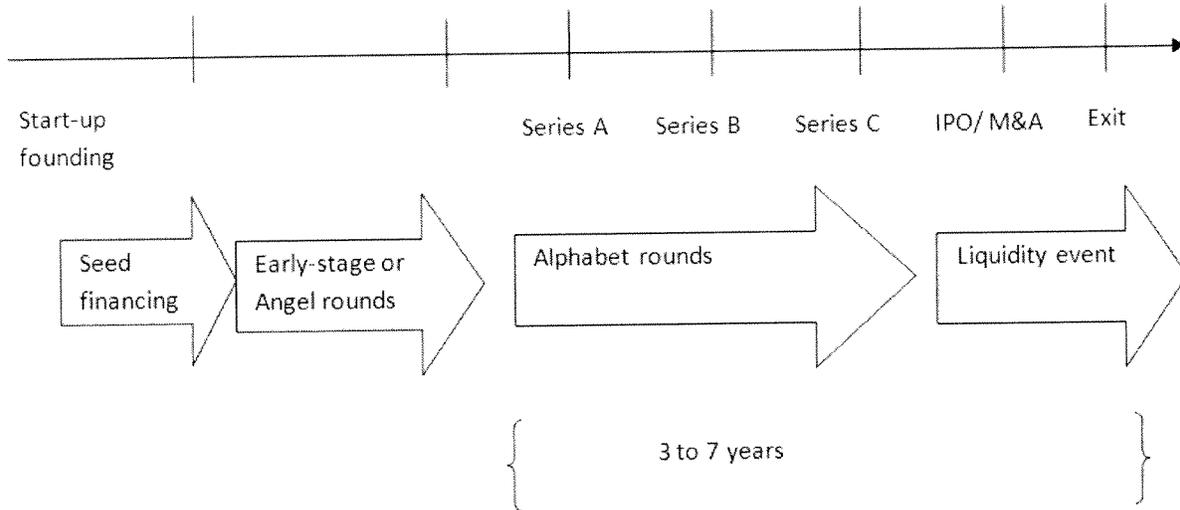
Source: Adapted from the National Venture Capital Association website, http://www.nvca.org, accessed January 22, 2009.

2.2 VC-related research in accounting

Prior findings regarding the impact of VCs on financial reporting are mixed. Consistent with the VC monitoring hypothesis, Hochberg (2003) and Morsfield and Tan (2006) find that VC presence is associated with lower abnormal accruals at IPO. Wongsunwai (2008) finds that companies backed by high quality VCs have lower abnormal accruals at lockup expiration and they have lower probability of income-decreasing restatements during 6 years post-IPO. Agrawal and Cooper (2008) find that VC presence is significantly related to the probability of income-decreasing restatement during three years post-IPO. All these studies attribute the higher reporting quality to better governance of venture-backed companies.

However, consistent with the VC moral hazard hypothesis, Cohen and Langberg (2006) find that venture-backed firms have lower ERCs than non-venture-backed firms (in both long-window and short-window tests). This is consistent with the argument that VCs have incentives to manage earnings and information flow to the public capital markets due to their short investment horizon. They argue that venture-backing incurs information risk for investors. Ertimur, Sletten and Sunder (2007) find that market reaction to management earnings forecasts made by venture-backed companies are significantly lower than that of non-venture-backed companies after controlling for the magnitude of surprise. This is consistent with the argument that VCs are perceived to reduce the credibility of management forecasts.

2.3 Theories and hypotheses development

There are two competing theories on the role of venture capitalists in finance literature. On one hand, prior literature shows that VCs, as inside investors, provide intensive oversight over the portfolio companies (Lerner 1995, Gompers 1995). The VC monitoring hypothesis suggests that VCs have strong incentives to monitor because they tend to protect their investment in highly risky startups and try to establish a reputation of success. Reputation in the VC industry is a priced commodity according to Hsu (2004). They also have strong ability to monitor because they possess in-depth industry knowledge and are deeply involved in the operation of their portfolio companies. The deep involvement includes service on the boards, setting up human resource policies, designing stock-based compensation scheme, frequent informal visits, meeting with customers and suppliers, providing consulting and active involvement in key personnel and strategic decisions (Gladstone and Gladstone 2004, Barry et al. 1990, Lerner 1995,

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Gompers and Lerner 1996, Hellman and Puri 2002). VCs usually remain their seats on the board years after distributions of shares to limited partners (Lerner 1995, Brav and Gompers 1997, Wongsunwai 2008). Different from traditional financial intermediaries, VCs have both incentives and ability to monitor managers. Empirical evidence shows that venture-backed firms have boards of directors, audit committees and compensation committees that are more independent from management than those of similar non-venture backed firms, and are more likely to separate the roles of CEO and chairman (Hochberg 2003, Morsfield and Tan 2006, Wongsunwai 2008). To the extent that VCs effectively constrain opportunistic financial reporting by managers, venture backing is supposed to improve portfolio companies' disclosure quality.

Specifically, there are three reasons that venture-backed portfolio companies may disclose higher quality information than non-venture-backed companies. First, as VCs play a direct monitoring role, managerial performance is less likely to be based on financial measures such as earnings (Engle, Gorden and Hayes 2002). Thus managers in the venture-backed companies have less incentive to manipulate earnings (Healy and Palepu 2001, Fields, Lys and Vincent 2001). Second, deep involvement of VCs and their in-depth knowledge of the companies' business are additional reasons why managers' opportunistic behavior is less likely to affect earnings of portfolio firms. For example, through relationship with suppliers and customers, VCs are more likely to detect whether goods have been shipped early to inflate revenues. Third, VCs rely on financial statement measures to evaluate investment performance which creates demand for high quality financial information. About 73% of venture capital financing agreements include contingency on observable accounting measures of financial and non-financial performance (Kaplan and Stromberg 2002). Armstrong, Davila and Foster (2006) find that financial statement information explains a sizable component of the levels and changes in both pre-IPO and post-IPO venture capital valuation. If VCs demand higher quality financial information, I expect venture-backed portfolio companies to have better disclosure quality than non-venture-backed companies.

On the other hand, prior literature also shows that VCs, as controlling insiders with a limited holding period, may opportunistically maximize their own interests on the expense of other investors. The VC moral hazard hypothesis suggests that VCs' short holding period post-IPO may create incentives for them to strategically influence stock price upon exit (Lee and Masulis 2008). The internal rate of return of a VC fund is calculated based on the share price on the distribution day. VCs may have incentives to influence stock price through opportunistic financial reporting or disclosure. The exit incentives may incur costs for other investors. Also, there is evidence that VCs use inside information to time stock distributions to the limited partners, which causes substantial negative price reactions (Gompers and Lerner 1998). Further, the grandstanding theory suggests that low quality VCs may prematurely bring portfolio firms to IPOs in order to establish a track record for subsequent fundraising (Gompers 1996). Grandstanding incurs costs for existing shareholders by causing larger IPO underpricing and reducing future growth prospects. To the extent that VCs have a short-run focus, they may manipulate financial reporting and thus produce low quality information.

Ultimately, it is an empirical question whether venture-backed companies have better disclosure quality relative to non-venture-backed companies after IPO. The question lies in to what extent the two competing theories dominate each other.

First, I measure earnings quality as: 1) Accrual quality by Dechow and Dichev (2002) and Francis, LaFond, Olsson and Schipper (2005); 2) Predictability of future cash flows by Dechow et al. (1998) and Barth, Cram and Nelson (2001); and 3) Persistence. I hypothesize that

H1a: Reported GAAP earnings of venture-backed firms are likely to be of better quality than those of non-venture-backed firms if the VC monitoring hypothesis dominates the VC moral hazard hypothesis. H1b: Reported GAAP earnings of non-venture-backed firms are likely to be of better quality than those of venture-backed firms if the VC moral hazard hypothesis dominates the VC monitoring hypothesis.

Second, Skinner (1994) finds that firms may incur legal liability and reputation costs if they fail to provide earnings warnings prior to an earnings report containing bad news. Disclosing bad news helps reduce litigation risk and establish a reputation for providing timely and accurate information in the market (Graham et al. 2005). Reputation costs affect VCs' ability to launch subsequent IPOs and raise subsequent funds from limited partners (Gompers 1995). Kasznik and Lev (1995) show that the likelihood of management earnings forecasts increases in the magnitude of bad news. Agency theory suggests that managers of all companies may withhold bad news to maximize their equity-based compensation or to facilitate entrenchment. If VCs play a monitoring role, they will effectively constrain managers from withholding bad news. However, if VCs tend to inflate stock price upon exit, they may have incentives themselves to withhold bad news. I hypothesize that

H2a: The likelihood of issuing earnings warnings in management forecasts is higher for venture-backed firms than for non-venture-backed firms if the VC monitoring hypothesis dominates the VC moral hazard hypothesis.
H2b: The likelihood of issuing earnings warnings in management forecasts is higher for non-venture-backed firms than for venture-backed firms if the VC moral hazard hypothesis dominates the VC monitoring hypothesis.

Next, I examine the consequence of communicating high quality information to investors. Disclosure quality has been shown to be related to capital market benefits such as improved stock liquidity, reduced cost of capital and increased information intermediation (Healy and Palepu 2001). Theoretical research shows that the benefits of high quality disclosure include increased investors following (Merton 1987), reduced estimation risk (Barry and Brown 1985), and reduced information asymmetry (Glosten and Milgrom 1985). Bhushan (1987) and Lang and Lundholm (1993) argue that voluntary disclosure lowers the cost of information acquisition for analysts and hence increases their supply. Welker (1995), Lang and Lundholm (1996), and Healy, Hutton and Palepu (1999) find that firms with more informative disclosures (measured using analyst's ratings) have larger analyst following, lower dispersion of analysts' earnings forecasts, smaller forecast errors, less volatile forecast revisions, and smaller bid-ask spreads. If venture-backed companies disclose higher quality information, I expect greater disclosure-related benefits for them. Vice versa, if non-venture-backed companies disclose higher quality information, I expect greater disclosure-related benefits for them for them. I hypothesize that

H3a: Relative to non-venture-backed firms, venture-backed firms are more likely to have a larger analyst following, lower dispersion of analysts' forecasts, smaller forecast errors, less volatile forecast revisions, and smaller bid-ask spreads, if these firms disclose better quality information.
H3b: Relative to venture-backed firms, non-venture-backed firms are more likely to have a larger analyst following, lower dispersion of analysts' forecasts, smaller forecast errors, less volatile forecast revisions, and smaller bid-ask spreads, if these firms disclose better quality information.

3. Sample and Research Design
3.1 Sample
I obtain all IPO firms between 1986 and 2007 from Securities Data Corporation's (SDC) database. Among them, I identify IPO companies with venture-backing and detailed information about the VC firms from Thompson Venture Expert database. Financial statement information is obtained from COMPUSTAT. Stock returns data are obtained from CRSP. Management issued earnings guidance and analyst earnings forecasts information is from Thompson First Call database. Consistent with Teoh, Welch and Wong (1998), I restrict my sample to companies whose financial data one year prior to IPO are included in COMPUSTAT in order to calculate the lagged variables used in the test. I also define the

IPO year as the fiscal year in which the IPO happens. In conducting the test, I examine a research window covering the period 3 years after IPO, including the IPO year, one year after IPO and two years after IPO.

3.2 Measures and regression models

1. Earnings relevance. Relevance may be considered to be the extent to which earnings explain change in the value of the firm (Collins, Maydew and Weiss 1997, Francis and Schipper 1999). Assuming stock market is efficient in processing publicly available information which includes more than just accounting information; share prices then reflect the perceived economic value of the company (Barth 2000). The contemporaneous association between returns and earnings reflects the extent to which earnings capture economic value of the firm. High relevance implies high earnings quality. If companies manipulate earnings, earnings relevance will be low. I measure relevance as the explanatory power of regressing returns on levels and changes in earnings.

$$RET_{i,t} = \alpha + \beta_1 NIBE_{i,t} + \beta_2 \Delta NIBE_{i,t} + \varepsilon_{i,t} \qquad (1)$$

Where:

$RET_{i,t}$ is the 15 month return ending three months after fiscal year t for firm i

$NIBE_{i,t}$ is the income before extraordinary items in fiscal year t, scaled by market value at the end of fiscal year t-1

$\Delta NIBE_{i,t}$ is the change in NIBE in fiscal year t, scaled by market value at the end of fiscal year t-1

I run pooled firm-year regressions separately for the sample of venture-backed companies and the sample of non-venture-backed companies. Relevance is measured as the explanatory power of the regression (R^2). A Cramer test is used to test the difference between the two R^2.

2. Earnings reliability. Assuming cash flows proxy for underlying economic performance, the extent to which accruals map with cash flows reflects the representational faithfulness of earnings (Shipper and Vincent 2003). Earnings with accruals that map closely into the operating cash flows may be considered reliable earnings. Consistent with Dechow and Dichev (2002) and Francis et al. (2005), I measure accrual quality (AQ) as the standard deviation of residuals from the following regression:

$$TCA_{i,t} = \alpha + \beta_1 CFO_{i,t-1} + \beta_2 CFO_{i,t} + \beta_3 CFO_{i,t-1} + \beta_4 \Delta REV_{i,t} + \beta_5 PPE_{i,t} + \varepsilon_{i,t} \qquad (2)$$

Where:

$TCA_{i,t}$ is total current accruals and defined as $\Delta CA_{i,t} - \Delta CL_{i,t} - \Delta Cash_{i,t} + \Delta STDebt_{i,t} - DEPN_{i,t}$

$CFO_{i,t}$ is cash flow from operations and defined as $NIBE_{i,t} - TCA_{i,t}$

$NIBE_{i,t}$ is the income before extraordinary items in fiscal year t, scaled by market value at the end of fiscal year t-1

$\Delta CA_{i,t}$ is change in current assets

$\Delta CL_{i,t}$ is change in current liabilities

$DEPN_{i,t}$ is depreciation and amortization expense

$\Delta REV_{i,t}$ is change in revenues

$PPE_{i,t}$ is gross value of plant, property, and equipment

I run the above cross-sectional regression for each of 48 Fama and French (1997) industries with at least 10 firms in fiscal year t. As my sampling period is 3 years post-IPO, I use all 3 years residuals for each firm to obtain its standard deviation.

3. Predictability of future cash flows. The quality of reported earnings can be inferred by the ability of its components to predict future cash flows. Earnings that communicate more information about future cash flow prospects are of higher quality. Consistent with Dechow et al. (1998), Barth et al. (2001), I measure current earnings' predictability of future cash flows as absolute value of the residuals from the following regression:

$$CFO_{i,t+1} = \alpha + \beta_1 CFO_{i,t} + \beta_2 \Delta AR_{i,t} + \beta_3 \Delta INV_{i,t} + \beta_4 \Delta AP_{i,t} + \beta_5 DEPR_{i,t} + \beta_6 OTHER_{i,t} + \varepsilon_{i,t+1} \quad (3)$$

Where:

$CFO_{i,t}$ is cash flow from operations for firm i in year t minus the accrual portion of extraordinary items and discontinued operations

$\Delta AR_{i,t}$ is change in accounts receivable

$\Delta INV_{i,t}$ is change in inventory

$\Delta AP_{i,t}$ is change in accounts payable and accrued liabilities

$DEPN_{i,t}$ is depreciation and amortization expense

$OTHER_{i,t}$ is net of all other accruals and defined as $(EARN_{i,t} - (CFO_{i,t} + \Delta AR_{i,t} - \Delta AP_{i,t} - DEPN_{i,t}))$ where EAEN is income before extraordinary items and discontinued operations.

I run this cross-sectional regression for each two-digit SIC code industry with at least 10 observations for each fiscal year. I use the estimated coefficients to calculate firm-specific residuals which reflect the magnitude of future operating cash flows unrelated to current disaggregated earnings. A lower absolute value of residuals indicates higher earnings quality. I then examine the association between earnings quality and VC presence using the following logistic regression with control variables from Cohen (2006):

$$QUALITY\ (0,\ 1)_{i,t} = \alpha + \beta_1 VC_{i,t} + \beta_2 OWNER_{i,t} + \beta_3 CAPITAL_{i,t} + \beta_4 HERFINDEX_{i,t} + \beta_5 SALESGROW_{i,t} + \beta_6 MARGIN_{i,t} + \beta_7 LEVERAGE_{i,t} + \beta_8 OC_{i,t} + \beta_9 ROA_{i,t} + \beta_{10} SEGMENT_{i,t} + \beta_{11} SIZE_{i,t} + \beta_{12} ROA_{i,t} + \sum r_i INDUSTRY_{i,t} + \varepsilon_{i,t} \quad (4)$$

Where:

$QUALITY_{i,t}$ is a binary variable which equals 1 if firm i's absolute value of residual is less than the median value of all residuals for that year

$VC_{i,t}$ is a binary variable which equals 1 if the firm has venture capital backing

$OWNER_{i,t}$ is the natural log of the number of shareholders of a firm minus the natural log of median number of shareholders for the same two-digit SIC industry

$CAPITAL_{i,t}$ is net plant, property and equipment divided by total assets

$HERFINDEX_{i,t}$ is the Herfindahl Index and calculated as the sum of squares of market shares of the firms in the two-digit SIC industry

$SALEGROW_{i,t}$ is current year's growth in sales

$MARGIN_{i,t}$ is gorses margin percentage

$LEVERAGE_{i,t}$ is long term debt plus debt in current liabilities divided by total assets

$OC_{i,t}$ is operating cycle (in days) and calculated as $[(AR_{t-1} + AR_t)/(2(SALES/360))] + [(INV_{t-1} + INV_t)/(2(COGS/360))]$ where AR is the firm's accounts receivable, INV is inventory, and COGS is cost of goods sold

$SEGMENT_{i,t}$ is the number of two-digit SIC industry codes the firm operates in

$SIZE_{i,t}$ is natural log of market capitalization at the end of the fiscal year

$ROA_{i,t}$ is current year's returns on assets

$INDUSTRY_{i,t}$ is a dummy variable for industry membership from the 12 industry groups in Fama and French (1997).

Cohen (2006) argues that OWNER $_{i,t}$ and LEVERAGE $_{i,t}$ control for the higher demand for firm-specific information. CAPITAL $_{i,t}$, HERFINDEX $_{i,t}$, SALESGROW $_{i,t}$ and MARGIN $_{i,t}$ control for proprietary costs of disclosures. OC $_{i,t}$ controls for the predictability of future cash flows resulting from the length of operating cycle. SEGMENT $_{i,t}$ controls for the effect of the complexity of the firm's operating environment on information quality. SIZE $_{i,t}$ controls for the difference in firm's information environment along with other aspects. ROA $_{i,t}$ controls for the effect of profitability.

4. Earnings persistence: Earnings that are more persistent may be viewed as being of higher quality because these earnings are more likely to reflect the core or sustainable income generation processes of a firm (Schipper and Vincent 2003). In many cases, the non-persistent portion of earnings may be due to reversals of excessive or insufficient allowance for doubtful accounts, aggressive revenue recognition or deferment practices, and excessive or insufficient provisions for obsolete inventory (Richardson 2003). I measure persistence for firm i as the autocorrelation coefficient between current earnings per share and prior year's earnings per share:

$$\Delta EPS_t = \alpha + \beta_1 \Delta EPS_{t-1} + \varepsilon_t \qquad\qquad (5)$$
Where:

ΔEPS_t is the change of earnings before extraordinary items divided by the number of outstanding shares.

I run this time series regression model over the three-year window post-IPO. The slope coefficient, β_1, represents firms-specific persistence of earnings.

Next, I examine whether PERSISTENCE differs across venture-backed and non-venture-backed portfolio companies using the following cross sectional model.

$$PERSISTENCE_i = \alpha + \beta_1 VC_i + \beta_2 SIZE_i + \beta_3 ROA_i + \sum r_i INDUSTRY_i + \varepsilon_i \qquad\qquad (6)$$

The control variables are from Lev (1983). He finds that earnings persistence is associated with firm size and various industry characteristics, such as type of products, degree of competition, and operating leverage. I use 12 industry groups as in Fama and French (1997) to proxy for industry characteristics. ROA $_i$, defined earlier, controls for the effect of profitability on PERSISTENCE $_i$. I use the average value during the 3 years' window for size and ROA for firm i.

5. Earnings Warning. Following Kasznik and Lev (1995) and Ali, Chen and Radhakrishnan (2007), I measure the association between earnings surprises and management's propensity to issue earnings forecasts using the following model:

$$MGMT\_FORECAST\ (0,\ 1)_{i,t} = \alpha + \beta_1 \Delta EPS_{i,t} + \beta_2 VC_{i,t} + \beta_3 \Delta EPS_{i,t} \times VC_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 BM_{i,t} +$$
$$\beta_6 HIGHTECH_{i,t} + \beta_7 REGULATION_{i,t} + \beta_8 ROA_{i,t} + \beta_9 ROA_{i,t} + PROA_{i,t} + \varepsilon_{i,t} \qquad\qquad (7)$$
Where:

MGMT_FORECAST $_{i,t}$ is an indicator variable equal to one if the company issues an earnings forecast of quarterly earnings, and zero otherwise

$\Delta EPS_{i,t}$ is the change in earnings per share from that of the same quarter in the previous fiscal year, deflated by stock price at the beginning of the quarter

VC $_{i,t}$ is an indicator variable equal to one if the company has VC-backing, zero otherwise

SIZE $_{i,t}$ is the natural log of market capitalization at the beginning of the fiscal quarter

BM $_{i,t}$ is the natural log of the book-to-market ratio at the beginning of the quarter

HIGHTECH $_{i,t}$ is an indicator variable equal to one if the company operates in the following industries: drugs, computers, electronics, programming, R&D services, and is zero otherwise

REGULATION $_{i,t}$ is an indicator variable equal to one if the company operates in any of the following industries: telephone, TV, cable, communications, gas, electricity, water, and is zero otherwise
ROA $_{i,t}$ is current year's return on assets
PROA $_{i,t}$ is prior year's return on assets

I estimate this model separately for good news (positive ΔEPS) and bad news (negative ΔEPS) firms. As managers have natural incentives to withhold bad news, I expect to observe a significant negative coefficient on ΔEPS for bad news firms but not for good news firms. Further, as I predict that the strength of relation between the likelihood of management forecast and the magnitude of bad news would differ across venture-backed and non-venture-backed companies, I expect a significant coefficient for the interaction term VC x ΔEPS in the sub-sample of bad news. However, the sign of the coefficient can be either negative (as in H2a) or positive (as in H2b).

The control variables are from Kasznik and Lev (1995). SIZE is supposed to be positively related to the propensity to issue management forecasts because of economics of scale (Lang and Lundholm 1993). BM controls for risk and growth. HIGHTECH controls for exposure to litigation risk of shareholder law suits due to large price fluctuations. REGULATION controls for the smaller demand for management forecasts because companies in regulated industry report directly to their regulatory body. ROA and PROA controls for effect of profitability on the propensity to issue management forecast.

6. Analyst Following. Lung and Lundholm (1996) indicate that the informativeness of company-provided disclosure is an important determinant of analyst following and the characteristics of their forecasts. I measure whether analyst following differs across venture-backed and non-venture-backed companies using the following model.

$$COVERAGE_{i,t} = \alpha + \beta_1 VC_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 CORR_{i,t} + \beta_4 INVPRICE_{i,t} + \beta_5 RETVAR_{i,t} + \beta_6 RD_{i,t} + \beta_7 ROA_{i,t} + \beta_8 PROA_{i,t} + \varepsilon_{i,t} \quad (8)$$

Where:

COVERAGE $_{i,t}$ is defined as the 12-month average number of analysts who issued annual earnings forecasts for firm i
VC $_i$ is an indicator variable equal to one if the company has VC-backing, zero otherwise
SIZE $_{i,t}$ is defined as the natural log of market value of equity at the beginning of the fiscal year
CORR $_{i,t}$ is defined as the Pearson correlation between quarterly ROE and quarterly stock returns during the two-year period including previous and current year.
INVPRICE is defined as the inverse of stock price at the beginning of the year
RETVAR $_{i,t}$ is defined as daily stock return variance estimated over the last 200 days prior to fiscal year end
RD $_{i,t}$ is defined as the annual research and development expense divided by total assets at the beginning of the fiscal year
ROA $_{i,t}$ is current year's return on assets
PROA $_{i,t}$ is prior year's return on assets

I expect to observe a significant coefficient for VC though the sign can be either positive (as in H3a) or negative (as in H3b). SIZE is expected to have a positive coefficient because larger companies are more widely held with more potential transaction business for analysts' brokerage houses (Bhushan 1989). CORR is expected to have a positive coefficient because it is easier for analysts to estimate future stock price for companies that have higher return-earnings correlations. Following Ali et al. (2007), I predict that INVPRICE to have a positive coefficient because it proxies for the rate of brokerage commission and incentive for analysts to follow a company. RETVAR is predicted to have a positive coefficient because expected trading benefits based on private information are higher for a company with

higher return variability as it increases the conditional expected returns (Bhushan 1989).RD is expected to have a positive coefficient because unrecognized intangible assets make financial statement less informative and thus creates incentives for analysts to follow. ROA and PROA control for the effect of profitability on analyst coverage.

7. Forecast dispersion, forecast accuracy and forecast revision. Following Lang and Lundholm (1996), I examine whether venture-backed and non-venture-backed companies differ in terms of dispersion in analysts' earnings forecasts, forecast accuracy, and volatility in forecast revision using the following three models. Each dependent variable is based on forecast of annual earnings made during the fiscal year to which the forecasts pertain.

$$DISP_{i,t} = \alpha + \beta_1 VC_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 RD_{i,t} + \beta_4 CORR_{i,t} + \beta_5 A\Delta EPS_{i,t} + \beta_6 ROA_{i,t} + \beta_7 PROA_{i,t} + \varepsilon_{i,t}$$
$$(9)$$
$$FERROR_{i,t} = \alpha + \beta_1 VC_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 RD_{i,t} + \beta_4 CORR_{i,t} + \beta_5 A\Delta EPS_{i,t} + \beta_6 ROA_{i,t} + \beta_7 PROA_{i,t} + \varepsilon_{i,t}$$
$$(10)$$
$$REVISION_{i,t} = \alpha + \beta_1 VC_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 RD_{i,t} + \beta_4 CORR_{i,t} + \beta_5 A\Delta EPS_{i,t} + \beta_6 ROA_{i,t} + \beta_7 PROA_{i,t} + \varepsilon_{i,t}$$
$$(11)$$
Where:

$DISP_{i,t}$ is dispersion in individual analyst earnings forecasts and defined as 12-month average of the standard deviation of analysts' forecasts, deflated by beginning of year stock price.
$FERROR_{i,t}$ is the absolute value of 12-month average analyst forecast error computed as actual earnings minus the median analysts forecast, deflated by beginning of year stock price.
$REVISION_{i,t}$ is volatility in forecast revisions, defined as the standard deviation of monthly forecast revisions over the fiscal year, deflated by the beginning of fiscal year price, where forecast revisions is defined as current month median forecast minus previous month median forecast.
$A\Delta EPS_{i,t}$ is the absolute value of annual change in earnings per share, deflated by the beginning of fiscal year price.

The purpose of including control variables such as SIZE, CORR, RD, ROA, PROA are as discussed above. I also control for $A\Delta EPS$ because dispersion, forecast errors and revision volatility are likely to increase with the magnitude of the forthcoming earnings information.

8. Bid-ask spread. Consistent with Healy et al. (1999), I measure the difference in bid-ask spread using the following model.

$$SPREAD_{i,t} = \alpha + \beta_1 VC_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LTURNOVER_{i,t} + \beta_4 LPRICE_{i,t} + \beta_5 ROA_{i,t} + \varepsilon_{i,t}$$
$$(12)$$
Where:

$SPREAD_{i,t}$ is defined as the annual average of the daily closing bid-ask spread as a percentage of daily closing price
$SIZE_{i,t}$ is defined as natural log of total assets
$LTURNOVER_{i,t}$ is defined as natural log of the annual median trading volume divided by total shares outstanding
$LPRICE_{i,t}$ is defined as the natural log of the beginning of year stock price

In the above regression, SIZE and LTURNOVER control for the possibility that bid-ask spread is narrower for larger firms whose shares are traded more often. LPRICE controls for the fact that fixed order costs are spread across more dollars in stocks that have a higher price and consequently the

percentage spread is lower for these stocks (Stoll, 1978). ROA and PROA control for the effect of profitability on bid-ask spreads.

4. Conclusion

This paper stops without processing the empirical data. This is due to my limited access to data. Interested researchers who have access to the above data may further pursue the findings. The empirical results can support either the VC monitoring hypothesis or the moral hazard hypothesis. The results depend on which theory dominates the other in the case of corporate disclosure in reality. I believe the findings are of great value in understanding the impact of VC on disclosure quality. It will add new evidence to the research stream that examines the relationship between ownership structure and disclosure quality.

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