Keeping with the Joneses: A model and a test of how collective accounting fraud varies with aggregate economic performance

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Abstract

To mantain their reputation in the managerial labor market, managers faced with poor firm performance are prone to artificially inflate earnings if they expect most of their peers to report high earnings. When the performance of the aggregate economy has a pervasive effect on the performance of all firms, this desire of managers to keep up with their peers entails a relationship of a particular pattern between the incidence of accounting fraud and macro conditions. Specifically, the fraction of firms artificially overreporting earnings is positively related to expected economic performance and negatively related to realized economic performance.

These two macro effects on collective fraud are examined empirically by relating proxies for the aggregate incidence of accounting fraud to expected and realized real GDP growth rates. The results support the predicted influence of macroeconomic performance.

I. Introduction

The surge in corporate fraud in the late 90s has spawned a new literature that investigates the incidence of misrepresentation of financial statements at the collective level generated by the decisions of individual firms to inflate earnings.[1] One goal of this research is to explain the ebb and flow of accounting fraud over time and its variation across economic settings.

A common belief about accounting fraud is that it is more pervasive in economic expansions. Kedia and Phillipon (2005) argue that managers are more prone to artificially inflate earnings when PE ratios are high because the attendant impact on the share price is bigger, thus increasing the profits from selling their own shares of the company. Another explanation for the greater incidence of fraud in economic expansions is provided by Hertzberg (2005). His explanation is that in expansions incentive contracts optimally emphasize short-term performance which is easily manipulated by managers.

These models, however, fail to distinguish between the roles played by the expected level and the realized level of economic activity or, in other words, between an economy that is expected to do well versus an economy that is actually doing well. This level of detail in the economic environment is important if one wants to account for more fine-grained linkages between the incidence of fraud and macro conditions. For example, one stylized observation about the incidence of fraud is that it peaks in the last stages of an economic boom just before the economy unexpectedly swings into a downturn, which begs an explanation based on some sort of interplay between expected and realized economic activity.

[1] The evidence on indirect measures of accounting fraud, such as earnings restatements (see Wu (2002)), the gap between aggregate earnings and taxable corporate income (see Desai (2002)) and the proportion of firms who beat analysts' earnings expectations (see Matsumoto (2000)) all point to an increase in the incidence of fraud during the 90s.

The current paper offers two innovations to the aforementioned literature. The first innovation is that it presents a simple and parsimonious model of earnings management that generates sharp hypotheses about the influence of (1) expected economic activity and (2) realized economic activity on the collective misrepresentation of accounting performance; namely, that the number of firms overstating performance is positively related to the former and negatively related to the latter. The expected level of economic activity influences the *incentive* to distort earnings upward held by poorly performing firms, whereas the realized level of economic activity determines the fraction of firms that actually perform poorly (thereby facing the *need* to inflate earnings). The observable aggregate amount of fraud in the economy therefore is a combination of an “incentive effect” and a “need effect”.

The second innovation in our paper is that it examines empirically for the first time the distinct effects of expected and realized economic activity on accounting fraud. Kedia and Phillipon (2005) study the connection between the number of enforcement actions launched by the SEC (i.e., civil injunctive actions and administrative proceedings) and the ratio of the aggregate market value of listed firms to realized GDP, finding a strong positive relationship between the two variables. However, they do not distinguish between the effects of expected and realized economic activity on accounting fraud.

Concerning the theoretical contribution of our paper, Povel, Singh and Winton (2005) also present a model of collective accounting fraud that assigns distinct roles to expected and realized economic activity. In their model, managers have the opportunity to manipulate a public signal of project quality before seeking outside financing. When deciding on whether to commit funds, investors may either rely on the public signal of project quality alone or supplement it with a costly private signal. The amount of collective fraud is determined by the prior distribution of investors vis-à-vis project quality and the actual distribution for that drives the decision on whether to acquire the private signal. The authors argue that the interplay of these two distributions generates a pattern of fraud consistent with the stylized observation referred above.

In contrast with Povel et al. (2005), our model generates very simple predictions about the influence of expected and realized economic performance on aggregate fraud. The model of Povel et al. (2005) yields a multiplicity of equilibria, each one featuring a different role for expected and realized economic performance. As a consequence, the relationship between these variables and the incidence of fraud is a complex one. For example, expected economic performance affects either positively or negatively the aggregate level of fraud whereas realized economic performance has either a negative effect of no effect at all, depending on the prevailing equilibrium.

We consider a set up in which firms' performance is determined by managerial talent and a common economic shock. Managers compete in a labor market and are dismissed if their perceived quality falls below a threshold. Firms privately observe their true earnings and then simultaneously issue an earnings report. Managers of poorly performing firms may manipulate earnings upward by incurring a firm-specific cost. The decision to distort earnings, in this set-up, trades-off the benefit of signaling higher managerial talent against the cost of manipulating earnings. The trade-off depends on the expectations held about the common economic shock. If the economy is expected to be strong, the incentive to misrepresent earnings is bigger because a low earnings report is viewed in the labor market as stronger evidence of poor managerial talent, as opposed to the case in which the economy is expected to be weak. Hence, the "incentive effect" referred to earlier. On the other hand, the number of firms who observe their true earnings to be low and, consequently, are under the need to manipulate earnings, depends on the realization of the economic shock. Hence, the "need effect" referred earlier.

Our empirical analysis uses different approaches to measure the magnitude of accounting manipulation. First, we use the number of SEC enforcement actions. Second, we use two proxies for earnings manipulation based on companies' disclosed financial data. The first is the mean (or median) level of discretionary accruals taken by firms, which is used as a proxy for the incidence of accounting fraud in the economy. Also, we use the ratio of small positive earnings' reports to small negative reports, which has been shown to capture the reluctance of managers to report losses (Burgstahler and Dichev (1997)). We empirically validate the model using these three proxies for earnings manipulation. We find that all three proxies are related to expected and realized GDP growth rates, and provide support for the "incentive effect" and the "need effect" predicted by the model.

The remainder of the paper is organized as follows. Section II provides a literature review on recent related works. Section III presents our model and the dynamics of the equilibrium it generates. Section IV details the data. Section V presents the empirical evidence on the linkages between accounting manipulation and macro conditions. Finally, Section VI offers some concluding remarks.

II. Literature review

The literature on rational accounting fraud typically assumes that managers are faced with a cost-benefit tradeoff when distorting financial results, often in the context of an incentive contract designed by a principal who maximizes his own welfare. A prominent illustration of this approach is Goldman and Slezak (2005). In their model, the optimal contract offered to the manager balances incentives to exert effort against incentives to commit fraud. As a result, economic environments – such as the late 90s – in which corporate performance hinges to a greater extent on the effort of managers, inevitably lead to a greater amount of fraud at the aggregate level.

Another model that ties the incidence of fraud to the economic environment is that of Kedia and Phillipon (2005). They assume that managers hold company shares which they are able to trade in the market. In economic settings featuring high "fundamental" PE ratios, a greater fraction of managers will inflate earnings and subsequently sell their shares in the market at an artificially high price, because the "bang-for-the-buck" from such fraudulent behavior is bigger. The model thus predicts that accounting misrepresentation is more pervasive when the PE ratio in the economy is high, which is likely to occur when the economy is doing well.

A related contribution is that of Hertzberg (2005). In his model the long-term performance of the firm is a poor indicator of managerial effort. Thus, to achieve a greater inducement of managerial effort the incentive contract offered by the principal to the manager needs to encompass short-term performance as well, even though the latter is susceptible of being manipulated by the manager. In economic expansions, few firms find their performance to be poor and thus feel the urge to manipulate short-term performance. Accordingly, the benefits of short-term incentives outweigh their costs in expansions. The reverse holds in economic recessions. The author concludes that firms will use more short-term incentives and managers will manipulate earnings to greater extent in economic booms.

The paper that is closer to ours is Povel, Singh and Winton (2005). The driver of their model is the decision of investors –when advancing funds for a project – on whether to invest in a costly but unbiased private signal of project quality or to rely solely on a free public signal that is subject to manipulation by the manager. In equilibrium, the choices of investors vis-à-vis the private signal and the choices of managers vis-à-vis the distortion of the public signal are simultaneously determined. The model yields various equilibria depending on the expected level of project quality. Going from the upper limit of the range of expected project quality to the lower one, the equilibria are the following: (1) a *fund-everything* regime in which investors immediately advance funds regardless of the public signal; (2) an *optimistic* regime in which investors immediately advance funds if the public signal is favorable and purchase the private signal otherwise; (3) a *skeptical* regime in which investors advance funds only after purchasing the private signal; and finally (4) a *no-trust regime* in which investors never advance funds. Fraud only occurs in the intermediate regimes. As a consequence, the model predicts a non-monotonic relationship between the incidence of fraud and expected economic performance. Realized project quality, on the other hand, has a negative effect on the incidence of fraud in the intermediate regimes and no effect in the extreme regimes. Hence, the impact of realized economic performance on the incidence of fraud depends on the level of expected economic performance. In sum, the influence of expected and realized economic performance on the incidence of fraud is complex, admitting non-monotonicities and regime switches that turn on and off depending on variable thresholds. That contrasts with the model presented in this paper which unambiguously predicts a positive role for expected economic performance and a negative role for the realized performance.

III. Model

III.A. Assumptions

Consider a setting with a set of atomistic and risk-neutral managers competing to survive in a labor market. Each manager privately observes a signal we call economic earnings, e_i (h,l), and then issues an earnings report, r_i (h,l), simultaneously with every other manager. The probability of e_i=h is a function of managerial talent, q_i, and a shock, s, such as

$$P(e_i = h) = 1 - \exp(-q_{is}) \text{ , where } (q_i \geq 0, s_i \geq 0) \quad (1)$$

The value of managerial talent, q_i, is either Good (*g*) or Bad (*b*), where *g>b 0*. The intuition for this specification is that the probability of having high economic earnings is higher when the manager is endowed with a high managerial talent. Conversely, managers with lower managerial talents have a lower probability of achieving high economic earnings. Neither the market nor the managers know the quality parameter of any single manager (including their own), but all believe that the proportion of managers of type $q_i=b$ in the population is equal to . The value of s, which is a systemic economic shock to all managers' earnings, is a realization of a random variable with an exponential distribution, i.e., *s* has the density function

$$f(s) = \frac{1}{q}\exp(-\frac{s}{q}) \quad \text{where s 0 and E(s)=} \quad (2)$$

When managers make their reporting decision, they don't know the realization of *s*. What they know about the value of *s* comes solely from the observation of their own economic earnings. Managerial talent and the economic shock are mutually independent.

Each manager has some costly reporting discretion, which allows him to report a value different than that observed. They can report $r_i=e_i$ at no cost or report r_i e_i at cost c_i *0*. The cost of reporting discretion is manager specific and the distribution of costs across managers is a uniform distribution with support between 0 and c^{max}. The cost for a particular manager is independent of managerial talent and systematic shock. We may interpret the cost of reporting discretion variously as a cost of stretching accounting rules (i.e., of cooking the books), a cost associated with the expected punishment from committing fraudulent behavior (i.e., probability of being caught times the disutility of the penalty suffered upon being caught) or, yet, a subjective cost from violating intrinsic ethical values of conduct. After the managers have reported, the market reassesses each manager's fitness and dismisses a manager when the probability he is of type *b* rises above a critical threshold . We assume that > because all the managers should be dismissed ex-ante if . Finally, a manager receives a benefit *w>0* if he survives and he receives zero if he is dismissed. To insure that reports of *l* and *h* occur with positive probability in equilibrium, we assume that the upper bound for the support of *c* weakly exceeds *w* and the lower bound is 0.

III.B. Analysis of Equilibrium

In the following discussion we assume that the market doesn't directly observe the realization of the economics shock (even after firms have reported their earnings), but infers it from the observed distribution of reported earnings. The results, however, don't change if we assume that *s* becomes public information after earnings are reported. Because managers are atomistic and act independently from each other given their type, q, and the common economic shock, *s*, the market is able to perfectly infer the realization of *s* from the proportion of managers reporting *h*, provided its conjecture about the aggregate amount of accounting fraud is right (which must be true in any self-fulfilling equilibrium).

Managers observing *e=h* report *r=h* in any equilibrium, regardless of their cost of misreporting, since they have nothing to gain from understating earnings. This is not true for managers observing *e=l*. In this case, managers can rationally choose to misreport, if their expected gains from this activity are higher than their costs. Let represent the market's conjecture regarding the proportion of managers that observe *e=l* who report *r=h*. Additionally, let denote the realized proportion of managers reporting *r=h*. In equilibrium, the conjecture must be fulfilled and so we should observe the following relationship between and :

$$p = g + (1-g)\left\{(1-b)\left[1-\exp(-gs)\right] + b\left[1-\exp(-bs)\right]\right\} \tag{3}$$

entailing a function s(,) that represents the realization of the common shock inferred by the market.

The market assesses the probability that a manager reporting *r=l* is of type *b* as

$$\Pr(q_i = b \mid r_i = l, r_j \forall j \neq i) = \frac{b}{b + (1-b)R(p,g)} \tag{4}$$

where

$$R(p,g) = \frac{1-\Pr\left[e_i = h \mid q_i = g, s(p,g)\right]}{1-\Pr\left[e_i = h \mid q_i = b, s(p,g)\right]} = \frac{\exp\left[-gs(p,g)\right]}{\exp\left[-bs(p,g)\right]} = \exp\left[(b-g)s(p,g)\right] \tag{5}$$

The posterior probability (4) is always greater than . This is because a low value of report earnings is more likely to come from a manager of type *b* than of type *g*.

A manager reporting *r=l* is dismissed if the posterior probability rises above the critical threshold or equivalently if

$$\exp\left[(b-g)s(p,g)\right] < \frac{b(1-t)}{(1-b)t} \tag{6}$$

Based upon this observation, the market response in any equilibrium can be expressed as a function of beliefs about the realization of *s*. In particular, because the left-hand-side of (6) is decreasing is *s*, it follows that any equilibrium is characterized by a threshold *s*, s^*, such that a report of $r_i=l$ when the inferred s, s(,), exceeds s^* results in dismissal. In any equilibrium, the threshold s^* satisfies:

$$\exp\left[(b-g)s^*\right]=\frac{b(1-t)}{(1-b)t} \tag{7}$$

whose solution is

$$s^*=\left(\frac{1}{b-g}\right)\ln\left[\frac{b(1-t)}{(1-b)t}\right] \tag{8}$$

*s** is the level of economic activity at which an *r=l* report is interpreted as evidence of a manager being of borderline quality (τ).

Having demonstrated that the market response in any equilibrium is characterized by the unique s^* given by expression (8), an individual manager *i* who observes $e_i=l$ reports $r_i=l$ if and only if

$$w\left[1-F(s^*\,|\,e_i=l)\right]-c_i\leq 0 \tag{9}$$

where $F(s^*|e_i=l)$ represents the cumulative distribution of the economic signal conditional upon a draw $e_i=l$, evaluated at point s^*. Using the cumulative distribution of s conditional on $e_i=l$ derived in the appendix yields:

$$w\left\{\frac{bq^b\exp\left[-\frac{s^*}{q^b}\right]+(1-b)q^g\exp\left[-\frac{s^*}{q^g}\right]}{bq^b+(1-b)q^g}\right\}-c_i\leq 0 \tag{10}$$

where ^{g} = /(1+ g) and ^{b} = /(1+ g).

Equation (10) implies that, given threshold s^*, there exists a threshold c^* such that all managers with c_i c^* report l when l is observed and all with $c_i < c^*$ report h when l is observed. The intuition for this result is simple: For managers who observe low economic earnings, the benefit from overreporting earnings – which consists of sending a signal of higher managerial talent – is constant whereas the cost (reporting discretion) is manager specific. Consequently, there exist a critical threshold in the cost level at which managers are indifferent between overreporting and reporting truthfully. Analytically, the threshold c^* is the value of c_i that makes (10) hold as an equality.

Substituting the threshold s^* from (8) and solving for the threshold c^* yields:

$$c^* = w\left\{ \frac{bq^b \left[\frac{b(1-t)}{(1-b)t}\right]^{-\left(\frac{1}{q^b(b-g)}\right)} + (1-b)q^g \left[\frac{b(1-t)}{(1-b)t}\right]^{-\left(\frac{1}{q^g(b-g)}\right)}}{bq^b + (1-b)q^g} \right\} \tag{11}$$

We may therefore conclude that there exists a unique equilibrium characterized by two thresholds, s^* and a c^*, which are solely a function of the exogenous parameters of the model. In this equilibrium, managers report $r_i=l$ when observing $e_i=l$ if and only if c_i c^* and the market dismisses a manager reporting $r_i=l$ if and only if $s> s^*$.

We can now determine , i.e., the self-fulfilling conjecture of the market regarding the proportion of managers that observe $e_i=l$ who report $r_i=h$. In equilibrium:

$$g = \frac{c^*}{c^{\max}} \qquad (12)$$

where the threshold c* is given by expression (11).

III.C. Incidence of earnings inflation

By incidence of earnings inflation we refer to the proportion of managers overreporting earnings. Replacing (11) into (12) provides the expression for incidence of earnings inflation:

$$\frac{w}{c^{\max}}\left\{\frac{bq^{b}\left[\frac{b(1-t)}{(1-b)t}\right]^{-\left(\frac{1}{q^{b}(b-g)}\right)}+(1-b)q^{g}\left[\frac{b(1-t)}{(1-b)t}\right]^{-\left(\frac{1}{q^{g}(b-g)}\right)}}{bq^{b}+(1-b)q^{g}}\right\}\left[b\exp(-bs)+(1-b)\exp(-gs)\right] \qquad (13)$$

Comparative statics of (13) indicate that the incidence of earnings inflation goes up with:

(i) the expected value of the economic shock ( );

An increase in raises the critical threshold c^* (i.e., the partial derivative of (10) with respect to is positive). With a higher threshold, more managers find it advantageous to report r_i=*h* upon observing e_i=*l*. The intuition is that a report of low economic earnings sends a more negative message about managerial talent when the economy is expected to do well, so that more managers are willing to bear the cost of reporting discretion to avoid being viewed as incompetent.

(ii) the proportion of bad managers in the labor market ( );

An increase in reduces the threshold s^*, thus increasing the probability of dismissal when reporting r_i=*l.* That in turn pushes up the threshold c^*, inducing more managers observing e_i=*l* to inflate earnings. Since has also a positive effect on the proportion of managers observing *e*=*l*, the overall effect of on the incidence of earnings inflation is positive;

(iii) the quality differential between good and bad managers (*g*-*b*);

An increase in *g*-*b* raises the likelihood that a manager reporting e_i=*l* is of the bad type. That in turn causes the threshold s^* to decline, raising the proportion of managers reporting r_i=*h* after observing e_i=*l*. Since g-b has no effect on the proportion of managers observing *e*=*l*, the overall effect of *g*-*b* on the incidence of earnings inflation is positive;

(iv) the premium for keeping a job (w);

Conversely, the incidence of earnings inflation goes down with:

(i) The realization of the economic shock (s);

A higher value of s reduces the number of managers observing e_i =l; given that the proportion of managers reporting r_i=h when observing e_i=l doesn't depend on s, the incidence of earnings inflation declines simply because under good economic conditions, fewer managers draw low earnings observations;

(ii) The labor market dismissal threshold ( )

An increase in increases the threshold s^*, thus reducing the probability of dismissal upon reporting r_i=l.

III.D. Earnings inflation across economic settings

Although the model yields a set of predictions related to the operation of the managerial labor market, our focus in the empirical part of the paper is on the hypotheses pertaining to the role of the aggregate economy. The common economic shock, s, in the model represents the overall level of activity in the economy, which has a pervasive and systematic influence on the economic earnings generated by firms. The model predicts that:

(1) the expected level of economic activity affects positively the incidence of earnings inflation; and

(2) the realized level of economic activity affects negatively the incidence of earnings inflation.

This is a very important feature of the model. It joins totally opposite interpretations of economic activity. Economic agents behave in totally different ways given a certain expected evolution of the economy, or given a certain realized level of the economy. A high <u>expected</u> level of economic activity exacerbates the incentives of "bad" firms to commit accounting fraud. Since they expect high economic activity, their expectation is that most other managers will report high earnings. Therefore, they have the incentive not to be seen as bad managers. We call this the "incentive effect". On the other hand, a high level of <u>realized</u> economic activity reduces the number of firms which turn out to be of the "bad" type and thus face a need to commit fraud. We call this the "need effect". Consequently, the realized amount of financial fraud is a joint reflection of the "incentive" and "need" of firms to look better then what they really are.

The two hypotheses formulated above, however, don't allow us to draw general conclusions about the pattern of earnings inflation across the economic cycle. Although expression (13) could be used to derive the average incidence of earnings inflation across different levels of economic activity (one would just set *s*= and compute the partial derivative with respect to), the result from such exercise would change qualitatively under different distributional assumptions. Indeed, depending on the distributions assumed for the economic shock, managerial talent, earnings and cost of managerial discretion, the average incidence of earnings inflation can either be greater in booms or in recessions. For instance, in booms the expected and the realized level of economic activity tend both to be higher, which yields opposite effects on the incidence of financial fraud. On the one hand, fundamentals in the economy translate into better firm level earnings, and thus less need to misreport. On the other hand, high economic conditions generate a peer pressure that may lead managers to misreport. Thus depending on the relative magnitude of the two effects, the "need" effect may either dominate or be dominated by the "incentive" effect. The particular parametric specification of the model determines which effect will prevail.

IV. Empirical analysis

IV.A. Sample and data

IV.A.1. Data on aggregate economic activity

The observational unit in the empirical analysis is the annual earnings' report released by companies at the beginning of every year. To test the model, each year of annual earnings' data is matched with corresponding measurements of expected and realized economic performance – which we proxy by real GDP growth rates. A correct matching is critical to achieve a close fit with the conceptual framework. Recall that in the model, companies issue earnings' reports simultaneously, based on the expected level of the economy-wide shock; the realized level economic shock only becomes known ex-post after earnings have been announced.

Take first the expected level of GDP growth. The annual report of year t is announced in the first quarter of year t+1, jointly with the quarterly report for the last quarter of year t. At the time of this announcement, however, the degree of discretion available to firms vis-à-vis their annual earnings is limited, since they have already issued three quarterly reports for the year. Indeed, the annual earnings' figure for year t released by firms at the beginning of year t+1 is built, quarter by quarter, during year t, thus reflecting the accumulated effects of successive quarterly earnings' reports. At the beginning of year t+1, all that is left to be decided upon about the level of earnings in year t is the component associated with the last quarter of year t.

We conclude that the annual earnings' figure for year t is a result of four distinct quarterly earnings' decisions taken successively in the second, third and fourth quarters of year t and first quarter of year t+1. In light of the model, annual earnings' observations should therefore be matched with an expected economic shock consisting of an average of the shocks expected at the four corresponding quarterly decision periods.

We implement this idea by computing the expected economic shock associated with the annual earnings for year t as a simple average of the expected real GDP growth rate for year t prevailing at the beginning of year t and the realized real GDP growth rate for year t (the latter only becomes known in the second quarter of year t+1). In theory, as we move from the first quarterly earnings' decision to the fourth, the expected GDP growth rate for the year converges to the realized growth rate. Hence, our measure of expected GDP growth captures in a rough fashion the "average" GDP growth forecast over the four quarterly earnings' decision periods.

As for realized value of the economic shock, we use the realized real GDP growth rate for year t (published in the second quarter of year t+1), since it captures the actual level of economic activity underlying the annual earnings' figure reported for year t.

From the Survey of Professional Forecasters[2] we obtain quarterly and annual observations of one-period-ahead expected real GDP growth rates. From the Bureau of Labor and Statistics we collect quarterly and annual realized real GDP growth rates.

[2] The Survey of Professional Forecasters is a quarterly survey of private-sector economists who produce regular forecasts of economic variables, conducted by the Federal Reserve Bank of Philadelphia.

IV.A.2. Data on the incidence of earnings inflation

i. Data on SEC enforcement actions

One line of empirical analysis relies on the enforcement actions initiated by the SEC from 1978 through 2004 under the accounting provisions enacted by the 1977 Foreign Corrupt Practices Act (FCPA).[3] Our sample is the universe of federal enforcement actions for books and records, taking as time reference for each observation the first legal or administrative charge against the firm. As pointed by Karpoff et al (2006), other possible indicators of financial misrepresentation such as Accounting and Auditing Enforcement Releases (AAEA) or private class action suits capture only a subset of all federal enforcement actions for books and records (see Karpoff et al (2006) for further details).

The time-series decomposition of sample data on enforcement actions is summarized in Figure 1. It shows a significant increase of enforcement actions during the sample period. To purge the data from the effect of the secular growth in the economy and the attending increase in the universe of firms under the scrutiny of the SEC, we detrended the enforcement actions. We explored two detrending approaches: linear detrending and exponential detrending. As might be expected, the observed growth in enforcement actions fits better an exponential pattern than a linear one, as indicated by the R-squared (85% versus 78%). Our results, however, are not affected by the choice of detrending method. Accordingly, we use in the empirical analysis the residuals from the exponential growth model as the dependent variable.

ii. Data on discretionary accruals

A second line of investigation screens earnings inflation behavior by the amount of discretionary accruals taken by firms, as measured by the Jones model (1991). This model assumes that normal accruals (non-discretionary) are a function of firms' fundamentals. In particular, Jones (1991) models

[3] Before 1977, federal powers to prosecute financial misrepresentation relied primarily on the fraud statues of the 1933 and 1934 Securities Acts, which required proof of intent. The 1977 law granted the power to prosecute financial misrepresentation without demonstrating intent, which made it considerably easier to enforce the law.

accruals as a function of the change in revenues and property, plant and equipment (PPE). Total accruals (*TA*) are measured for firm i in each year t as:

$$TA_{i,t} = (\Delta CA_{i,t} - \Delta CL_{i,t} - \Delta Cash_{i,t} + \Delta STDEBT_{i,t} - DEP_{i,t}) \qquad (14)$$

where TA_t is total accruals, $?CA_t$ is the change in total current assets, $?Cash_t$ is the change in cash and cash equivalents, $?CL_t$ is the change in total current liabilities, $?STDEBT_t$ is the change in short-term debt included in current liabilities, and DEP_t are the depreciation and amortization expenses.

Discretionary accruals for each firm in each year are then estimated by the difference between reported total accruals (TA_t) and the fitted value from a regression model of non-discretionary accruals. The model used to generate non-discretionary accruals has the following specification:

$$\frac{\mathrm{TA}_t}{\mathrm{A}_{t-1}} = a_0 + a_1\left(\frac{1}{\mathrm{A}_{t-1}}\right) + a_2\left(\frac{\Delta \mathrm{Rev}_t}{\mathrm{A}_{t-1}}\right) + a_3\left(\frac{PPE_t}{\mathrm{A}_{t-1}}\right) + e_t \qquad (15)$$

where TA_t is total accruals, $?Rev_t$ is the revenues in year t less revenues in year t – 1, PPE_t is gross property plant and equipment at the end of year t, A_{t-1} is the total assets at the end of year t – 1.

We estimate equation (15) individually for each firm in the sample, using the time series of accruals, revenues and PPE for the years 1980 to 2004, with financial information drawn from Worldscope.

The economy-wide incidence of firms manipulating earnings upward in a given period is then computed as, respectively, the mean and median levels of discretionary accruals (as a proportion of firms' assets) in that period.

iii. Data on small positive and small negative earnings

Managers have incentives to avoid losses of any magnitude. However, they have limited reporting discretion and are consequently unable to report profits in the presence of large losses. Small losses, however, lie within the bounds of insiders' reporting discretion.

We compute a measure of Discretion in Reported Earnings, which is equal to the ratio of the number of firms reporting small profits to the number of firms reporting small losses in a certain year. Following Burgstahler and Dichev (1997), the ratio of ''small profits'' to ''small losses'' is computed, using earnings scaled by total assets. Small losses are defined to be in the range [0.01, 0.00) and small profits are defined to be in the range [0.00, 0.01]. The above measure is another indicator of the incidence of earnings' management at the aggregate level. Higher values of this variable thus reflect the extent to which, on aggregate, insiders manage earnings to avoid reporting losses.

Table 1 reports summary data on discretionary accruals and on the aggregate Discretion in Reported Earnings.

V. Results

V.A. Analysis based on SEC enforcement actions

Table 2 reports the results from regressing the exponentially detrended SEC enforcement actions on expected real GDP growth and realized real GDP growth. Since there is a natural lag between the occurrence of a financial misrepresentation by a firm and the subsequent launch of an enforcement action by the SEC, the dependent variable in the regression is lagged vis-à-vis the independent variables. Specifically, we consider the specification:

$$EA_{[t:t+2]} = b_0 + b_1 \cdot E(GDP_t) + b_2 \cdot GDP_t \tag{16}$$

where $EA_{[t:t+2]}$ is the average annual number of enforcement actions in years t, t+1 and t+2, $E(GDP_t)$ is the expected real GDP growth rate for year t and GDP_t is the realized real GDP growth rate in year t.

As explained in section IV.A.1., the expected real GDP growth rate for year *t* is computed as a simple average of the real GDP growth rate for year *t* expected at the beginning of the year and the actual realized growth rate.

Table 2 shows results that are in line with the predictions of the model, i.e., it shows a positive and significant "incentive" effect and a negative and significant "need" effect. Higher realized GDP growth leads to lower number of firms inflating earnings, but higher expected GDP growth has the opposite effect. When managers expect high economic growth, they do not want to be left behind, and tend to inflate the reported earnings to avoid being seen as a bad manager.

V.B. Analysis based on discretionary accruals

Panel A of Table 3 reports the results from the regression

$$DA_t = b_0 + b_1 \cdot E(GDP_t) + b_2 \cdot GDP_t \tag{17}$$

where DA_t is the average level of discretionary accruals in years t, $E(GDP_t)$ is the expected real GDP growth rate for year t and GDP_t is the realized real GDP growth rate in year t. Panel B of Table 3 reports the results from the same regression using the median level of discretionary accruals as the dependent variable.

In each case, the expected real GDP growth rate for year *t* is computed as a simple average of the real GDP growth rate for year *t* expected at the beginning of the year and the actual realized growth rate.

Overall, Table 3 shows marginally significant coefficients for the “incentive” and “need” effects with the predicted signs.

V.C. Analysis based on ratio of small positive earnings to small negative earnings

Table 4 reports the results from the regression:

$$SE_t = b_0 + b_1 \cdot E(GDP_t) + b_2 \cdot GDP_t \qquad (18)$$

where SE_t is the ratio of nº of firms reporting small positive annual earnings to nº of firms reporting small negative annual earnings in year *t*, $E(GDP_t)$ is the expected real GDP growth rate for year t and GDP_t is the realized real GDP growth rate in year t.

Table 4 further supports the model, showing significant “incentive” and “need” effects with the theoretically correct signs.

V. Conclusions

We have presented a theory and a test on the influence of macro conditions on the incidence of accounting fraud. The theory argues that (1) managers confronted with poor firm performance face a more powerful incentive to distort earnings upward when the economy is expected to do well and (2) fewer managers are tempted to artificially inflate earnings when the economy is actually doing well, since few firms are performing poorly. These two effects – which we label the "incentive" and the "need" effect – jointly determine the incidence of collective accounting fraud.

The two effects are tested empirically by examining the relationship between different proxies of collective accounting fraud and expected and realized real GDP growth rates. Using the number of SEC enforcement actions, the average (and median) level of discretionary accruals in the economy and the ratio of the number of firms reporting small positive earnings to the number of firms reporting small negative earnings, we find a consistent positive influence of expected GDP growth evidence and a consistent negative influence of realized GDP growth, as predicted by the theory.

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Table 1 – Descriptive Statistics on the Accounting Misrepresentation measures

	mean	median	min	max	observations
Mean Discretionary Accruals	0,00006	-0,0005	-0,0076	0,0064	25
Median Discretionary Accruals	-0,00006	0	-0,0036	0,003	25
Nº Small Positive Earnings / Nº of Small Negative Earnings	5	4,5	3,3	10,4	25

Table 2 – Incidence of accounting misrepresentation in the economy using SEC enforcement actions (see equation 16)

$ß_0$	$ß_1$	$ß_2$	Nº observations	R^2
-0,149 (-1,92)	13,7 (2,5)	-8,5 (-2,3)	25	22%

t-statistics in parenthesis

Table 3 – Incidence of accounting misrepresentation in the economy using discretionary accruals (see equations 17 and 18)

Panel A – using the mean level of discretionary accruals				
ß$_0$	ß$_1$	ß$_2$	Nº observations	R^2
-0,004 (-1,5)	0,35 (1,83)	-0,21 (-1,76)	24	14%
Panel B – using the median level of discretionary accruals				
ß$_0$	ß$_1$	ß$_2$	Nº observations	R^2
-0,0009 (-0,84)	0,12 (1,62)	-0,09 (-1,92)	24	16%

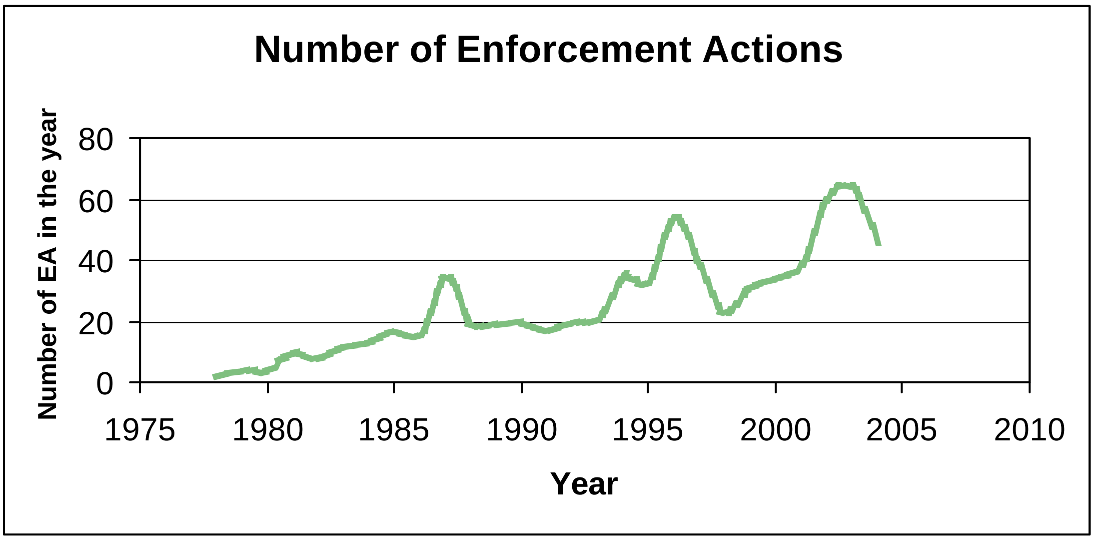
t-statistics in parenthesis

Table 4 – Incidence of accounting misrepresentation in the economy using the ratio of small positive earnings to small negative earnings (see equation 19)

ß$_0$	ß$_1$	ß$_2$	Nº observations	R^2
2,4 (2,47)	185,4 (2,75)	-92,9 (-2,26)	24	28%

t-statistics in parenthesis

Figure 1



Appendix

Let economic earnings, e, be a binary variable with the following distribution:

e = h with probability 1-exp(-qs);
e = l with probability exp(-qs)

where q (0) represents managerial talent and s (0) represents an economic shock common to all firms. Let the economic shock, s, be distributed exponentially, i.e., with density function

$f(s) = \frac{1}{q}\exp(-\frac{s}{q})$ with s 0 and E(s)= .

Finally, let managerial talent, q, be a binary variable independent from the economic shock, s, and with the following distribution:

q = g with probability 1 -
q = b with probability

We now compute some useful distributions.

a. Distribution of economic earnings, e, conditional on the economic shock, s:

$$\Pr(e = h \mid s) = b\,[1 - \exp(-bs)] + (1 - b)[1 - \exp(-gs)]$$
$$\Pr(e = l \mid s) = b\,\exp(-bs) + (1 - b)\exp(-gs)$$

b. Joint density of economic earnings, e, and economic shock, s:

$$f(e = h, s) = \frac{1}{q}\exp(-\frac{s}{q})\{b\,[1 - \exp(-bs)] + (1 - b)[1 - \exp(-gs)]\}$$
$$f(e = l, s) = \frac{1}{q}\exp(-\frac{s}{q})\{b\,\exp(-bs) + (1 - b)\exp(-gs)\}$$

c. Marginal density of economic earnings

$$\Pr(e=h)=\int_0^{+\infty}\frac{1}{q}\exp(-\frac{s}{q})\left\{b\left[1-\exp(-bs)\right]+(1-b)\left[1-\exp(-gs)\right]\right\}ds=1-\frac{b}{1+bq}-\frac{1-b}{1+gq}$$

$$\Pr(e=l)=\int_0^{+\infty}\frac{1}{q}\exp(-\frac{s}{q})\left\{b\exp(-bs)+(1-b)\exp(-gs)\right\}=\frac{b}{1+bq}+\frac{1-b}{1+gq}$$

d. Density of the economic shock, s, conditional on low economic earnings, i.e., on e=l:

$$f(s\,|\,e=l)=\frac{f(s,e=l)}{\Pr(e=l)}=\frac{b\exp\left[-\left(\dfrac{1+bq}{q}\right)s\right]+(1-b)\exp\left[-\left(\dfrac{1+gq}{q}\right)s\right]}{b\left(\dfrac{q}{1+bq}\right)+(1-b)\left(\dfrac{q}{1+gq}\right)}$$

substituting

$$q^g=\frac{q}{1+gq}$$

$$q^b=\frac{q}{1+bq}$$

yields

$$f(s\,|\,e=l)=\frac{b\exp\left[-\dfrac{s}{q^b}\right]+(1-b)\exp\left[-\dfrac{s}{q^g}\right]}{bq^b+(1-b)q^g}$$

so that the cumulative distribution Pr(s s^* e=l) is equal to

$$\Pr(s\le s^*\,|\,e=l)=\int_0^{s^*}\frac{b\exp\left[-\dfrac{s}{q^b}\right]+(1-b)\exp\left[-\dfrac{s}{q^g}\right]}{bq^b+(1-b)q^g}ds=1-\frac{bq^b\exp\left[-\dfrac{s^*}{q^b}\right]+(1-b)q^g\exp\left[-\dfrac{s^*}{q^g}\right]}{bq^b+(1-b)q^g}$$