Explaining the changing properties of GAAP earnings: Insights from comparing GAAP to NIPA earnings

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Abstract: The U.S. Bureau of Economic Analysis produces a measure of aggregate corporate profits (NIPA earnings), which is an integral component of the accounting for GDP. The key advantage of NIPA earnings is rigorous determination with no earnings management and no political meddling; other advantages include double-checks from independent sources and consistent rules over time. Thus, NIPA earnings provide a useful benchmark for corporate profitability, especially in examining the reasons for the great temporal increase in volatility and decrease in persistence of GAAP earnings. Using a sample of aggregate GAAP and NIPA earnings over 1950-2010, the main findings are as follows. GAAP and NIPA earnings are in remarkable sync in the early years, with similar means and standard deviations, and with earnings changes correlating at 0.89 during 1950-1980. This close relation substantially deteriorates, however, during the second half of the sample, 1981-2010. While the behavior of NIPA earnings remains roughly the same, the volatility of GAAP earnings increases ten-fold, and the correlation between GAAP and NIPA earnings changes falls to 0.35. Additional tests reveal that the increase in the volatility of GAAP earnings is mostly due to rapid earnings reversals, and especially the effect of large transient items during economic downturns. The frequency and severity of such downturns, however, are roughly the same across the two examined periods. Overall, this evidence points to little change in economic fundamentals over time, and suggests that changing GAAP rules and perhaps changing managerial behavior are significant factors in the changing properties of GAAP earnings.

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1. Introduction

Earnings is the most important output of the accounting system, and is widely considered a key driver in the economic decisions of investors, managers, and other stakeholders. Thus, the question of what constitutes quality earnings goes to the heart of the utility of financial reporting. This question has also assumed some urgency because recent trends in the characteristics of reported GAAP earnings indicate significant deviations from both historical experience, and from what key stakeholders consider quality earnings. For example, earnings have become considerably more volatile and less persistent over the last 20 to 30 years (Givoly and Hayn 2000), while survey evidence indicates that investors and managers abhor volatility (Graham, Harvey and Rajgopal 2005), and consider persistence and predictability the hallmarks of quality earnings (Dichev, Graham, Harvey and Rajgopal 2013, hereafter DGHR).

There is less agreement, however, on the interpretation of these recent developments. Some sources suggest that there has been a secular increase in the fundamental uncertainty of the economy, driven by rapid technological innovation and increased competition, and accounting earnings merely registers the unavoidable choppiness from these upheavals. Others have pointed to the role of accounting rules, where the balance sheet orientation of FASB standard setting, and especially the sustained push for more fair value accounting trigger various asset and liability revaluations, which increase the volatility and reduce the persistence of earnings.

A key difficulty in these debates is "the counterfactual problem." In other words, we observe that GAAP earnings displays certain properties, and that these properties evolve through time – but it is hard to assess what these changes mean given that there is only one observable economic reality, and only one observable financial reporting system (and both changing over time). Ideally, we would like to answer questions like "How would the evolution of earnings

look like if accounting rules stayed the same over time?" and "Would using accounting system A vs. accounting system B produce better earnings?" Such questions are hard to answer without clean counterfactual benchmarks.

This study confronts the counterfactual problem by comparing GAAP to NIPA earnings. National Income and Product Accounts (NIPA) earnings are produced by the Bureau of Economic Analysis as an integral component of the comprehensive system of government accounting that produces Gross Domestic Product (GDP). The use of NIPA earnings as the counterfactual to GAAP earnings offers several key advantages. First, NIPA earnings are not subject to earnings management. The reason is that NIPA earnings are calculated with close to zero managerial discretion, and are reported in the aggregate (see background on determination later), so managers have no motivation or ability to manipulate them. Second, NIPA accounting rules are immune to the type of political meddling that plagues GAAP standard setting. Third, NIPA estimates have extensive double-checks from independent sources, and the rules of NIPA accounting are consistent over time, both in concept and implementation. This consistency is in contrast to the considerable temporal changes in GAAP rules, especially the move away from the principles of historical cost and matching, and the rise of fair value accounting. Summarizing, a consideration of NIPA earnings offers several decisive advantages as a counterpoint and benchmark for GAAP earnings.

The empirical specifications rely on comparing the properties of NIPA aggregate after-tax corporate profits and GAAP aggregate Net Income over two long periods, 1951-1980 and 1981-2010. Consistent with existing research, GAAP earnings has become dramatically more volatile and less persistent over time; specifically, the volatility of GAAP aggregate earnings changes has increased from 4.5% to 64.2% over the two sample periods. In contrast, the

volatility of NIPA earnings changes is nearly the same over time, at 5.1% and 6.2% over the same periods. There has also been an accompanying substantial deterioration in the correlation between NIPA and GAAP earnings, from a near lock-step of 0.89 during 1951-1980 to only 0.35 during 1981-2010. Further tests reveal that GAAP earnings are not only very volatile during 1981-2010 but that this volatility is highly transient, with most earnings changes reversing within five years, mostly due to the effect of transient items during economic downturns. Finally, using NBER data and definition of recessions, there is little difference between the magnitude and severity of downturns over the two examined periods. The main conclusion from these findings is that economic fundamentals are unlikely to be the chief driver of the well-documented changing properties of GAAP earnings. Changing GAAP rules seem the more likely contributor, especially those that mandate or allow frequent asset revisions and the associated transient items in earnings, perhaps enabled and magnified by evolving managerial application of these rules.

2. **Background on GAAP and NIPA earnings**

GAAP earnings are generally better known and widely used, so their discussion here is limited to relevant highlights. GAAP earnings are produced by public companies filing financial reports with the Securities and Exchange Commission (SEC) to maintain their stock exchange listing. The SEC mostly defers to the Financial Accounting Standards Board (FASB) to develop financial reporting standards. FASB develops the rules in an elaborate open process, which is designed to reflect the opinion of expert accountants but is also influenced by the broader interests of various stakeholders like preparers, auditors, investors, and government. Since these competing interests are often at odds, the standard setting process can become contentious and politicized, and thus the resulting financial reporting rules are often compromised. A hallmark of

GAAP reporting is the considerable managerial discretion in applying the accounting rules. There is a long-run debate about the pros and cons of discretion in financial reporting; proponents maintain that discretion allows managers to optimally fit the accounting to the nature of the business, while detractors point to apparently wide-spread earnings management and other opportunistic distortions, which diminish the utility of earnings as a measure of firm performance (e.g., Bowen, Rajgopal, and Venkatachalam 2008). GAAP earnings are extensively disseminated and used, and are a key factor in most firm stakeholders' economic decisions. A major development in financial reporting over the last 20 years has been FASB's push for "fair value accounting", essentially more reliance on asset values and especially market prices in the determination of financial results, including earnings.

The determination of NIPA earnings is quite different from GAAP earnings on several dimensions, highlights summarized in Table 1. Most importantly, NIPA earnings are free of earnings management and political meddling. The reason is that NIPA earnings are produced by experts in the Bureau of Economic Analysis (BEA, a government agency within the U.S. Department of Commerce) as an integral part of the comprehensive economic and statistical framework that produces GDP, and various associated metrics. As an illustration, Table A1 in the Appendix provides an overview of how individual components, including employee compensation, proprietors' income and corporate profits, stack up to Gross Domestic Income (GDI), which is an accounting equivalent to GDP. The elements in the table that include the effect of corporate profits are bolded.

The concept and derivation of NIPA earnings also differ from GAAP accounting. The formal definition of NIPA earnings is "Profits from current production;" summarizing, and perhaps oversimplifying the specifics from the NIPA handbook and BEA papers, what that

means is profits designed to reflect operating performance, and neutralizing the effect of changing prices on inputs and outputs, including the elimination of unrealized and realized gains and losses on investments and long-term assets. NIPA accounting also eschews discretionary charges like provisions for restructurings, and discretionary changes in assets and liabilities.

Operationally, NIPA earnings are derived from tax earnings after considerable adjustments to conform to the BEA concepts of national income and its components. The primary source for the determination of annual NIPA earnings is the tax accounting measures published by the Internal Revenue Service (IRS) in *Statistics of Income (SOI): Corporate Income Tax Returns*. Note that these tax data are only available annually, and with a 2-year lag. The estimation of NIPA profits for the most recent quarters and years is based on a different procedure, mostly cross-linking and extrapolating data from the Census Bureau, the Federal Deposit Insurance Corporation, financial accounting reports, and others to provide preliminary estimates, which are later revised as more reliable tax data becomes available.

Table A2 in the Appendix presents a reconciliation of IRS earnings and taxes to NIPA earnings and taxes for 2007-2009, information is from NIPA Table 7.16. Key earnings lines are bolded, including the top-line IRS "Total receipts less total deductions" and bottom-line NIPA "Profits after tax." An examination of Table A2 reveals a number of adjustments between tax and NIPA earnings, with the more material ones including an adjustment for the misreporting of tax income, bad debt expense, the effect of foreign operations, and the exclusion of gains and losses from sale of property. Note that the top-line IRS item is close to but not the same as "Taxable Income," see *Statistics of Income* for definitions and comparison. Note also that NIPA adjustments include not only pre-tax but tax expense items as well, i.e., NIPA tax expense differs from IRS tax payable.

A possible concern with NIPA earnings is whether they are materially different from IRS income. A pragmatic way to evaluate this concern is to compute the empirical correlations between IRS income from NIPA Table 7.16 and the two key NIPA measures of earnings examined in this study. Consistent with the specification later in the paper, I use after-tax measures, and compute the correlations in earnings changes because earnings levels are non-stationary over time. The correlation between IRS income and NIPA "Profits after tax" is 0.77 over 1950-2009, while the correlation between IRS income and NIPA "Profits after tax with IVA and CCAdj" (see explanation on page 11) is 0.51. As an alternative specification used in existing research, I also adapted the method from Hanlon, Laplante, and Shevlin (2005) by estimating Taxable Income at the firm level, and then aggregating it across firms; due to data limitations this measure is only available since 1975. The corresponding correlations between the Hanlon, Laplante and Shevlin construct and the two measures of NIPA earnings are 0.81 and 0.53, respectively. Overall, the resulting impression is that NIPA earnings seem distinct from IRS income.

The nature and derivation of NIPA earnings identified above explain why they are immune to earnings management. Essentially, NIPA earnings are derived from aggregate tax data with numerous BEA adjustments. Thus, firm managers have neither the incentive nor the ability to manipulate NIPA numbers.[1] In addition, BEA is free to set its own accounting and statistical rules, and is governed strictly by expert considerations rather than political oversight or

[1] One caveat is that NIPA earnings are derived from IRS data, and firms have an incentive to reduce taxable income to minimize tax payments. Note, however, that BEA makes a large positive adjustment to IRS income for "misreporting income" (see table A2), counteracting this effect. The double-checks from independent sources (see description on pages 8-9) provides some confidence that indeed these adjustments do a fairly good job. Note also that a lot of tax minimization revolves around tax credits, and the IRS definition of income used by NIPA is not affected by tax credits.

meddling. Thus, perhaps the two most important impediments to quality GAAP financial reporting are absent in NIPA earnings.

Another advantage of NIPA earnings is rigorous determination and double-checks from independent sources. To illustrate, consider the bottom line in Table A1 called "Statistical discrepancy." This discrepancy appears because GDP is estimated in two independent ways, and there is some statistical or economic error in the resulting estimates. One approach estimates Gross Domestic Income (GDI), which shows the incomes that all economic agents derive during the current period; the other approach estimates Gross Domestic Product, which is what this income is spent on, including current consumption and business and government investment. By definition, these two approaches should produce the same estimate since the two sides of GDI/GDP reflect an accounting identity. But since the two sides of GDI/GDP are estimated independently and from different sources, there appears a modest discrepancy, e.g., the -12.0 number for 2007 indicates that the estimate for 2007 GDI was $12 billion higher than the corresponding estimate for GDP.[2] One important takeaway from Table A1 is that the statistical discrepancy seems small compared to the magnitude of GDI/GDP. Turning to more systematic evidence, for the 1950-2010 sample of this study the average "Statistical discrepancy" as a percentage of GDI is 0.48%. Such statistical or economic slippage in the NIPA estimates seems rather small compared to the confidence intervals that likely prevail for GAAP numbers.[3]

The upshot from the independent determination of GDI and GDP, and the small magnitude of the statistical discrepancy between them is that NIPA numbers have strong internal

[2] GDP data are generally considered more reliable because they are mostly from consistent business surveys conducted by the Census Bureau, while GDI data are from a variety of sources including financial statements and data collected by regulatory and tax authorities (NIPA Handbook 2012).

[3] Specific estimates of errors or earnings management for GAAP earnings are rare. But even using a conservative definition, DGHR finds that 20% of the firms misrepresent earnings to the tune of 10% of EPS; note that this is just the intentional manipulation, not including performance signaling management or the potentially much larger category of unintentional errors of estimation.

checks and balances to ensure that they are "correct." Some internal discipline exists in GAAP as well but is probably weaker. For example, suppose that a company boosts GAAP income by overstating depreciable lives of PPE and understating depreciation. The articulation between the income statement and the balance sheet implies that at some point this misreporting will result in clearly overstated PPE, and auditors or analysts or investors may raise an alarm about it. But the existing literature leaves little doubt that the tolerance bands around such activities are rather wide in GAAP accounting because there are often powerful incentives and considerable ability to manage earnings, e.g., Benston and Hartgraves (2002). In contrast, there is little ability or incentive for managers and BEA experts to tweak NIPA earnings, and the resulting tolerance bands seem tight.

Another key advantage of NIPA earnings is consistent determination over time. One aspect of this consistency is that the determination of GDP (and GNP in earlier years) has been conceptually roughly consistent since the early efforts to establish the accounting for national income in the 1930s. Of course, there have been numerous changes and improvements over the years but these have been more on the levels of developing and fine-tuning the implementation rather than from radical revisions in the concepts (Landefeld 2000). The other aspect of consistency is that when material changes are made, the entire time-series of NIPA numbers is retroactively revised to reflect the new definition or measure. Thus, NIPA earnings are internally consistent over time, as a true benchmark should be. This is also a critical difference from GAAP numbers, where the very notion of income has changed over time from one that is mostly "revenues minus matched expenses" to one that includes numerous balance sheet adjustments, including from the recent push for fair values. In addition, GAAP numbers are never revised retroactively except in rare cases like restatements due to errors or improper accounting. .

Finally, there is one other important difference between NIPA and GAAP earnings. GAAP earnings are anchored on realized cash flows because GAAP accruals are designed to true up to the associated cash flows.[4] For example, a firm can temporarily increase earnings by understating warranty expense. But by the nature of GAAP accruals, eventually there will be a catch-up effect, and long-run warranty expense converges to long-run warranty expenditure.[5] This truing-up to cash flows is absent in NIPA earnings, which often include or exclude items that have clear cash flow consequences, e.g., NIPA earnings exclude gains and losses on sales of property and securities.[6]

Further reflection reveals that the absence of truing-up to cash flows in NIPA earnings is not necessarily a hindrance, and in fact whether it is considered an advantage or disadvantage partly depends on the decision setting and the level of aggregation. Recall that NIPA earnings are defined as "profits from current production," where the idea is that from the whole economy's perspective value is added in real operations rather than in the re-shuffling of profits in transactions involving capital assets. The so-called "round-trip" transactions in capital assets provide an instructive illustration about this important distinction (e.g., the well-publicized swaps of telecom capacity between Qwest and Global Crossing). For example, assume that telecom firm A sells some PPE to telecom firm B, and soon after buys a nearly identical type and amount of PPE from the same firm B, where transaction prices on both sides exceed the cost basis. From the point of view of GAAP accounting, narrowly interpreted, both firms record a profit, and the

[4] There are some narrow exceptions to this general intuition for GAAP accruals. For example, stock option expense does not true up to the ultimate cost of issuing options, i.e., to the difference between stock price and exercise price at exercise.

[5] Of course, when a firm is growing, there could be a large and growing disparity between cash spent and recognized expense. For example, cash spent on PPE will differ from PPE depreciation by the amount of PPE on the balance sheet, and this disparity will continue to grow for as long as the firm is growing.

[6] In that sense, NIPA earnings can be thought of as akin to "pro forma earnings", which often exclude items considered "non-operating" or "unusual", although they can have real cash flow effects. Unlike pro forma earnings, however, whose determination can be opportunistic and also inconsistent over firms and time (Doyle, Lundholm and Soliman 2003), NIPA earnings are crisply defined and temporally consistent.

profit is “real” because it is backed by actual cash flows. But from the point of view of the whole economy these two transactions are a wash, and there is no profit or really any change in the firms’ condition before and after the transactions (and eventually, GAAP accounting has also taken a dim view of such transactions).

The more general point is that while obvious round-trip transactions are more of an oddity at the level of identifiable firm-pairs, variations of them are common in more complicated multi-firm interactions. For example, when the stock market is booming, there is often a flurry of capital gains realizations, which makes it seem that firms are more profitable. But from the point of view of the whole economy these profits are illusory in the sense that they do not change the output and profits from continuing real operations (and become even more questionable when market prices can deviate from fundamental values). In that sense, aggregate NIPA profits correctly discount the effect of transactions in capital assets on reported profits. A more subtle point is that even at the level of the individual firm, while realized capital gains and losses are “real” in terms of cash flow realizations, they are typically transient and “illusory” in terms of the continuing productive capacity of the firm, and it is this continuing earning power that investors typically seek to find.

Turning now to the empirical specification of NIPA earnings, the bottom-line in Table A2 named “Profits after tax”, is the first of the two key measures of NIPA after-tax earnings. Deriving the second measure involves two additional adjustments, the Inventory Valuation Adjustment (IVA), and the Capital Consumption Adjustment (CCAdj). The inventory valuation adjustment removes inventory holding gains from reported income to conform to the NIPA concept of “Profits from current production,” i.e., profits from current operations without holding

gains and losses.[7] The capital consumption adjustment is also included to conform to the notion of earnings from current production, adjusting depreciation to a current cost basis by removing the effect of the historical cost of assets.[8] The resulting measure of "Profits after tax with IVA and CCAdj" is the NIPA earnings included in the calculation of GDP, as illustrated in Table A1. The links between "Profits after tax" and "Profits after tax with IVA and CCAdj" are provided in Table A3, where the two key measures of NIPA after-tax profit are bolded. Conceptually and empirically, NIPA "Profits after tax" is closer to GAAP earnings (Hodge 2011), and therefore I adopt it for the main specifications in the paper. The properties of "Profits after tax with IVA and CCAdj" are explored later in the extensions and robustness checks.

Summarizing, GAAP and NIPA earnings determination differ in important ways. NIPA earnings are determined more reliably and consistently, aiming to reflect the effect of current operations, and mostly rely on a "revenues minus relevant expenses" framework. GAAP earnings are more timely, they are subject to managerial discretion and politicized rule-making, and include a lot of asset revaluations. Thus, NIPA earnings provide an interesting benchmark for the properties and utility of GAAP earnings.

3. Research design and main results

[7] In other words, NIPA accounting uses current cost of inventory to derive earnings as opposed to tax and financial accounting, which use historical cost. Thus, NIPA accounting for inventory profits is essentially LIFO accounting for all inventories, assuming that LIFO cost is close to current cost.

[8] To be more precise, the capital consumption adjustment is a two-step process. First, tax-code depreciable lives and patterns are converted to uniform service life and empirically-based depreciation patterns. Specifically, depreciation patterns are based on actual prices of used equipment, and thus approximate the "true" diminution of value of long-term assets; empirically, the patterns of depreciation indicate a geometric decline in asset value (i.e., similar to double-declining balance or sum-of-the-years' digits methods of depreciation). Note also that this adjustment removes the inconsistent and somewhat capricious nature of tax depreciation rules. For example, as part of the Job Creation and Worker Assistance Act of 2002, businesses were allowed to depreciate a "bonus" amount during the first year of depreciable lives, over and above regular tax depreciation, which leads to overstated tax depreciation in the first year, and understated tax depreciation in subsequent years. The CCAdj unravels such effects of bonus depreciation or other deprecation-distorting rules. Second, the CCAdj removes from profits capital gain or loss-like elements resulting from using equipment at historical cost vs. current cost.

Data for GAAP earnings is from Net Income for U.S. firms on Compustat. Since NIPA earnings are aggregate, GAAP earnings are aggregated as well, where earnings at the firm-year level are summed up across firms to produce one earnings observation at the year level. Aiming to maximize the time-series, I use all available data in the interval 1950-2010. One issue to keep in mind is that the GAAP sample coverage varies considerably over time, starting with only around 600 firms in the early 1950s, climbing to 4,000 in 1970 and 6,000 in 1980, hitting highs of over 9,000 firms in the 1990s, and subsiding to about 6,000 firms in the late 2000s. Since I use aggregate earnings, however, and the largest and earliest-covered firms are so much larger than the rest, this uneven coverage is less of a problem than one might expect. Specifically, to provide some feel for the effect of thin coverage in the early years, for each year I calculate the ratio of aggregate Net Income for the largest 500 firms (by Sales) to aggregate Net Income for all available firms. The average of this ratio over the years is 82%, and the ratio falls below 70% in only one year, which suggests that uneven sample coverage is not overly influential.[9] Robustness tests later in the paper provide further evidence on the effect of sample coverage in GAAP earnings.

One point that is also useful to keep in mind is that GAAP earnings are designed to reflect individual firm performance, and therefore aggregating them and comparing them to economy-wide NIPA earnings necessarily has some limitations. Nevertheless, there is a variety of sources that use aggregate GAAP earnings information, and apparently such aggregation is useful. For example, analysts commonly discuss industry earnings, and the S&P 500 earnings metric is a widely watched gauge of corporate profitability. In addition, a number of recent studies use aggregate GAAP earnings, and document considerable information content for such

[9] There are several years in which this ratio exceeds one, with an extreme of 11 in 2001 because the earnings of small firms drop off so much more during recessions. To eliminate the effect of such skewness, ratios of more than one are set to one in this calculation.

specifications. For example, Konchitchki and Patatoukas (2013) use aggregate GAAP earnings to forecast GDP growth, Kothari, Shivakumar, and Urcan (2013) find that aggregate earnings surprises predict future inflation, and Gallo, Hahn, and Li (2013) document that the Fed's monetary policy reacts to aggregate earnings. Thus, existing research and practice suggest that aggregate GAAP earnings is a meaningful summary of corporate profitability.

Data for NIPA earnings is from the BEA website, http://www.bea.gov/iTable, using the definition of NIPA earnings for U.S. companies that includes the effect of foreign operations, to allow for apples-to-apples comparisons with Net Income for U.S. firms. Since NIPA earnings are based on tax returns, sample coverage is much broader than that of Compustat, including a vastly greater number of smaller and private corporations, e.g., from 5.9 million corporate tax returns filed in 2007 (Hodge 2011). As explained earlier, NIPA earnings are estimated on a different and temporary basis for the most recent two years, and therefore the sample finishes in 2010. Sample coverage for NIPA earnings also changes over time but since tax return coverage is by nature comprehensive and mandatory, the changes are mostly driven by real changes in the business environment and tax treatment, for example the rise in the number of S corporations (Mead, Moulton, and Petrick 2004).

Figure 1 provides a graphical view of the data, with aggregate NIPA and GAAP earnings plotted over time. An inspection of Figure 1 reveals that differences in sample coverage do not seem to be overly important, at least as first-order effects. The lines depicting NIPA and GAAP earnings indicate comparable empirical magnitudes for these measures, although NIPA earnings tend to be higher (as would be expected by the much more comprehensive NIPA coverage). There is a decisive difference, however, between the two earnings series in the second part of the sample period. While the two lines track each other closely until about the late 1980s, GAAP

earnings becomes much more volatile than NIPA earnings thereafter. Note that even in the latter period GAAP and NIPA earnings seem to move together. But the swings in GAAP earnings are much more pronounced, with amplitudes that are times larger than those for NIPA earnings.

One shortcoming of Figure 1 is that it plots raw aggregate earnings, and due to the effect of compound growth over a long sample period, meaningful differences in early periods may fail to appear because of scaling. Since earnings growth is exponential, one way to handle this issue is to plot the same time series with a log10 Y-axis, as depicted in Figure 2. An inspection of Figure 2 indeed reveals some insights, which are not apparent from the specification in Figure 1. One impression is that NIPA earnings (and to a lesser extent GAAP earnings) is reasonably close to a straight line, which indicates that the rate of long-run earnings growth has been relatively stable. Another insight is that GAAP earnings is lower than NIPA earnings during the early years but the gap steadily decreases and nearly disappears by about 1970. The most likely reason for this early difference is that, as discussed earlier, Compustat covers only about 600 firms in the 1950's but coverage greatly expands to about 4,000 firms in 1970. Note that while there is some difference in early magnitude, the two series closely track the same fluctuations until about the late 1980s. Finally, the message that GAAP income had become much more volatile than NIPA income in the latter half of the sample is emphatically confirmed in Figure 2.

While the graphical presentations in Figures 1 and 2 provide an intuitive feel for the data, a disadvantage of working with aggregate raw earnings in a long time-series is that the variable is clearly non-stationary, which creates problems in interpretation, comparison, and statistical testing. One common way to deal with great differences in magnitudes across firms and time is to use scaled earnings, e.g., accounting researchers typically use earnings scaled by equity or assets. These scalars, however, are not available for NIPA earnings, and the few reasonable

candidates in the NIPA system (e.g., GDP) do not have a natural equivalent in GAAP accounting. I deal with this issue by using log earnings changes, specifically I define:

$$\Delta Earnings_t = log10(Earnings_t/Earnings_{t-1})$$

where the logging takes care of the scale issue plus imparts some useful properties used in later tests.[10]

The resulting earnings changes are graphed in Figure 3. An examination of Figure 3 reveals that the earnings change variable is much more stationary, and generally allows more comparability over time. The principal insights from the levels specifications in Figures 1 and 2 are confirmed, however, and are arguably even clearer here. NIPA and GAAP earnings changes closely track each other until about the late 1980s but there is a dramatic divergence of behavior thereafter. Note that there is hardly any visible change in the behavior of changes in NIPA earnings in the late years as opposed to early years. In contrast, GAAP earnings changes become much more volatile in the second half of the sample period, both with respect to their NIPA contemporaries, and with respect to GAAP earnings in the early years of the sample.

To confirm and expand on the preceding graphical representations, following are more formal analyses of the data. Table 2 presents descriptive statistics for NIPA and GAAP earnings changes, and the correlations between them. Given the dramatically different behavior of GAAP earnings since about the late 1980's, the sample is split into two equal-sized time periods, 1951-1980 and 1981-2010, to explore and test these differences. An examination of the descriptive statistics in Panel A of Table 2 largely confirms the impressions from the Figures. NIPA and GAAP earnings changes have similar properties during 1951-1980, with nearly identical

[10] Using change in earnings scaled by beginning earnings or scaled by the average of beginning and ending earnings produces similar results. The major difference is much bigger outliers in these alternative specifications.

standard deviations, and extremes of the empirical distributions. GAAP earnings changes have somewhat higher mean but the difference is not statistically significant.[11]

The behavior of NIPA and GAAP earnings changes sharply diverges in the latter half of the sample, however. While means are nearly the same, the standard deviation of GAAP earnings changes at 0.642 is more than 10 times the value of 0.062 in the early years, and this difference is highly statistically significant (p-value < 0.001). Note that while the standard deviation of NIPA earnings changes has increased in 1981-2010 as compared to 1951-1980, this difference is rather small (0.062 vs. 0.051), and is not statistically significant. Thus, if one considers NIPA earnings the benchmark for corporate profitability, the message is that the empirical properties of corporate earnings have been relatively stable over the last 60 years. The signal from GAAP earnings is quite different, however, indicating a sea-change in the volatility of corporate earnings in the last 20 to 30 years. Thus, the decision which earnings signal to rely on is rather consequential.

Panel B of Table 2 presents the Pearson correlations of NIPA and GAAP earnings changes over the two sample periods.[12] The results in Panel B confirm the impressions from Figure 3, with starkly different measures of co-movement over the two periods. The correlation over 1951-1980 is remarkably high at 0.894, indicating a nearly lock-step evolution of earnings across the two accounting systems. But this correlation tumbles to 0.353 over 1981-2010, reflecting much diminished agreement about the underlying changes in recent corporate profitability. Not surprisingly, the difference in the correlations across the two sample periods is highly statistically significant (p-value < 0.001).

[11] The higher mean for GAAP earnings changes captures the fact that GAAP earnings start considerably lower than NIPA earnings in 1950 but nearly catch up in magnitude by 1970. As previously discussed, the main explanation is likely the substantial expansion of Compustat coverage from 600 to 4,000 firms over these 20 years.
[12] Results for Spearman correlations are similar but the identified differences are less pronounced.

Turning back to Figure 3, note that it is not just that GAAP earnings are becoming very volatile in the later years; the point is that this volatility is driven by rapid reversals, where great dips in earnings are immediately followed by opposing and offsetting spikes, especially in the two economic downturns in the early and late 2000s. This rapid reversibility is essentially the signature of transient effects, which in this case is most likely due to the effect of deep write-offs and other asset devaluations during recessions, closely followed by earnings recoveries to normal levels. This observation motivates the tests in Table 3, which explore for predictable reversals in earnings changes, i.e., for negative autocorrelations in earnings changes.

Specifically, Panel A in Table 3 presents the results of a regression of current earnings changes on the five preceding earnings changes, for NIPA and GAAP earnings, and for both sample periods. Results in the panel reveal no evidence of reversibility during 1951-1980, for either NIPA or GAAP earnings; the coefficients on past earnings changes are small in absolute magnitude, and none of them is close to statistical significance. The evidence for NIPA earnings changes during 1981-2010 reveals no reliable signs of reversibility either. The results for GAAP earnings changes during 1981-2010, however, reveal clear evidence of earnings reversibility. All five regression coefficients are negative and large, and all except one are strongly statistically significant, with the fifth one significant at the 0.10 level. In addition, the adjusted R^2 is 0.51, indicating that about half of the earnings changes reverse within 5 years.

To further assess the reversibility of earnings changes, Panel B in Table 3 presents the results from an actual-to-implied variance specification. The inspiration for this specification is from French and Roll (1986), based on the observation that stock returns should be serially independent in efficient markets, i.e., stock prices should behave as random walks and have persistence of one. The implication is that if stocks follow a random walk the variance of stock

returns should grow linearly over the length of the return horizon, e.g., the implied variance of weekly returns is seven times the variance of daily returns. The implied variance of stock returns can then be compared to the actual variance as a test of the random walk hypothesis, e.g., if the actual variance of weekly returns is lower than the variance in weekly returns implied by the variance in daily returns, the conclusion is that daily stock returns are negatively autocorrelated within the weekly horizon.

This intuition is useful here because perfectly persistent earnings are random walks, and therefore the ratio of actual-to-implied variances of earnings changes can be used to gauge the deviation from perfect persistence. The advantage of this specification is that it succinctly captures reversibility at various horizons, and indicates not only direction but also the magnitude of reversibility. For example, if the actual-to-implied earnings variance ratio is 0.75, this indicates that earnings are reversible, and about 25% of earnings variance is transient (since the expectation for this ratio is 1 under the null of perfect persistence). The specification in Panel B of Table 3 uses five-year horizons, so the results are to be interpreted as capturing earnings reversibility within five years (untabulated results for three-year horizons have the same tenor). Since the sample is rather short, I use overlapping five-year observations, which allows me to retain a total of 55 observations, split between 25 observations for the 1951-1980 period, and 30 observations for the 1981-2010 period.

An inspection of the results in Panel B of Table 3 reveals that NIPA earnings are highly persistent, consistent with the evidence of absence of autocorrelations in NIPA earnings changes in Panel A. The actual-to-implied ratio for NIPA earnings is 0.88 and 0.87 in the two periods, respectively, which indicates that only about 12-13% of NIPA earnings changes reverse over five-year horizons. The actual-to-implied ratio is also remarkably stable over the two periods,

consistent with earlier evidence that the properties of NIPA earnings are largely the same over time. In contrast, GAAP earnings changes have a larger reversibility component, and the reversibility is much larger during 1981-2010. The actual-to-implied ratio is only 0.27 during 1981-2010, which indicates that nearly three-quarters of GAAP earnings changes is transitory noise that dissipates over five-year horizons. This evidence is consistent with the strong evidence of reversibility of GAAP earnings changes in Panel A, and with existing research that has documented a large decrease in the persistence of GAAP earnings over time (Dichev and Tang 2008). The novelty here is better calibrations of magnitude, and most importantly, the complete lack of such deterioration of persistence in the benchmark NIPA earnings.

Finally, a consideration of the combined results in Tables 2 and 3, together with the visual evidence in Figures 1 and 2, reveals that that the great increase in volatility and reversibility of GAAP earnings during 1981-2010 is mostly due to pronounced dips and recoveries during and around recessionary periods (1990-1992, 2000-2002, and 2008-2010). This pattern of results suggests that the increased volatility is likely due to the effect of massive write-offs, write-downs and other one-time charges during such periods, and more evidence later in the paper is consistent with this conjecture. Just having economic downturns is not enough of an explanation, however, considering that the 1981-2010 period has about the same incidence and severity of recessions as 1950-1980. Specifically, Table 4 presents NBER data on recession frequency and duration; the first period has 6 recessions and a total of 61 recessionary months vs. 4 recessions and 50 recessionary months in the second period. Thus, the effect of recessions *per se* cannot explain the temporal patterns in GAAP earnings. The question really is - why have GAAP earnings become so much more sensitive to the effect of recessions during the last 20-30 years?

4. Robustness check and extensions

In this section, the main results are extended on three dimensions. One extension is exploring the effect of changing sample composition in Compustat because, as discussed earlier, the sample varies between 600 and 9,000 firms over 1950-2010. Specifically, I check whether the tenor of the results changes by using a more consistent sample of the 500 largest firms (by Sales) as compared to all available firms in the main tests. Another extension is to check the results for the use of Operating Income (Compustat item OIADP) instead of Net Income. The motivation is that Compustat Operating Income excludes most one-time items, which possibly account for the increase in volatility and reversibility of Net Income changes during 1981-2010. The third extension is to explore the use of the other major measure of NIPA earnings, "Profits after tax with IVA and CCAdj." As discussed earlier, this measure essentially revalues depreciation and inventory expenses to current costs. The advantage of using this measure is that it is the bottom-line NIPA metric included in the actual computation of GDP; a disadvantage is that it is by design less comparable to GAAP earnings (Hodge 2011).

These three additional measures of corporate profits are combined with the original two for a comprehensive consideration. For parsimony, the presented results are limited to the most relevant specifications, i.e., the consideration of volatility and correlations of logged changes. The rest of the results are either implied or can be inferred from other findings, e.g., the means for all measures of corporate profits are of comparable magnitude. The results are included in Table 5, with Panel A presenting the standard deviation for all five measures across the two sample periods, and Panel B presenting the Pearson correlations among them. An examination of the results in the two panels yields the following conclusions.

First, the changing sample composition in Compustat has little effect on the results. GAAP Earnings (the variable for all firms) and GAAP 500 Earnings (the variable for the largest 500 firms) are very highly correlated, at 0.99 and 0.94 in the two halves of the sample. Correspondingly, they have almost identical correlations with NIPA earnings over the two sample periods. About the only notable difference is that GAAP 500 earnings have lower volatility than GAAP Earnings during 1981-2010, which implies that smaller firms have been more prone to transient income and especially losses, consistent with earlier findings in Hayn (1995) and Fama and French (1995). In any case, it is probably clear that the inclusion of more small firms later in the Compustat sample cannot account for the documented differences between the volatility of NIPA and GAAP income because, as discussed above, the NIPA sample includes a vastly greater number of smaller firms than any year of GAAP earnings on Compustat.

The second impression from the two panels of Table 5 is that the empirical behavior of GAAP Operating Income is quite different from that of GAAP Earnings (Net Income), and is actually more in line with the behavior of NIPA Earnings during 1981-2010. Notice that the standard deviation of GAAP Operating Income stays roughly the same across the two sample periods, in contrast to the great increase for GAAP Earnings, and in line with the stability for both NIPA measures. While the correlation of GAAP Operating Income with GAAP Earnings decreases from 0.75 to 0.45 over the two sample periods, the correlation between GAAP Operating Income and NIPA Earnings decreases much less, from 0.68 to 0.59. The totality of these results implies that one-time items have grown to exert a dramatic influence on GAAP Net Income, and GAAP operating earnings and NIPA earnings are now a more stable and reliable guide to corporate profits than bottom-line GAAP income.

The third impression from Table 5 is that NIPA Earnings (used in the main tests) and NIPA Adjusted Earnings (including the inventory and capital consumption adjustments) are distinct measures of corporate profits, and NIPA Earnings is indeed closer to GAAP earnings. The correlation between NIPA Earnings and NIPA Adjusted Earnings is 0.66 and 0.77 over the two sample periods, implying that the inventory and capital consumption adjustments make a material difference in the resulting measure of profits. Notice, however, that the standard deviations of earnings changes are roughly the same over the two NIPA measures and over the two sample periods, spanning a tight interval between 4.7% and 6.2%. The implication is that while the two NIPA measures are materially different, there is a certain stability in their relation, both in correlations and volatility, which is mostly lacking in the comparisons among GAAP measures considered here. Of the two NIPA measures, NIPA Earnings is closer to GAAP measures of earnings, with much higher correlations to GAAP Earnings, GAAP 500 Earnings, and GAAP Operating Income in the first period, in line with expectations and existing research (Hodge 2011); this distinction, however, significantly deteriorates in the second half of the sample. Thus, the choice of NIPA Earnings as the NIPA variable for the main tests seems appropriate. Whether NIPA Adjusted Earnings offers some advantages over NIPA Earnings, especially in light of the interesting inventory and capital consumption accruals, is a possible venue for future research.

5. Discussion of the results

The most important message of this study is simply the broad utility of NIPA earnings as a benchmark for GAAP earnings. Both NIPA and GAAP earnings reflect corporate profitability, but in quite different ways, which allows for a variety of potentially useful investigations. This

study is one take on these differences, using the empirical properties under the two systems to draw conclusions about the changing nature of GAAP earnings. But the possible interactions of NIPA and GAAP earnings comprise a much broader landscape, which remains largely unexplored. To my knowledge, existing efforts in this direction are mostly limited to BEA economists, primarily documenting short-term levels and trends of NIPA earnings vs. S&P 500 corporate profits (Petrick 2001, Mead, Moulton, and Petrick 2004; Hodge 2011). A notable recent exception in the accounting literature is Crawley (2013), which examines the effect of conservatism in NIPA earnings and GDP.

This paucity of research presents potentially significant opportunities. Some can be relatively straightforward extensions into the cross-sectional and temporal dimensions of NIPA data, e.g., NIPA data are available not only as annual aggregates but also at the NAICS industry level and at quarterly intervals, which allows for shaper investigation of relevant hypotheses. Other possibilities include investigating the relative timeliness and possible lead-lag relations of NIPA and GAAP earnings. Another broad direction is the study of the absolute and relative information content of NIPA with respect to security prices, especially given the long-standing experience and results of such investigations with GAAP earnings (Kothari 2001); a difficulty is that NIPA includes the earnings of both public and private corporations. In addition, NIPA contains unique data about the practical implementation of alternative accounting methods, which could offer lessons for GAAP financial reporting. For example, accounting textbooks often discuss the disadvantages of using historical cost in inventory and PPE accounting, and present analytical adjustments to eliminate the effect of such distortions (e.g., p. 453 in Kieso et al. 2012, and pp. 554-558 in Revsine et al. 2009); as discussed earlier, NIPA offers measures of earnings which actually implement such adjustments in practice.

Turning to more specific implications, the main message of this study is that economic fundamentals are unlikely to be the main driver behind the well-documented temporal changes in GAAP earnings (greatly increased volatility and decreased persistence). NIPA earnings, which are derived under consistent accounting rules, show little change in behavior over the two examined periods, 1950-1980 and 1981-201. In contrast, GAAP rules have dramatically changed during this time span, from "generally-accepted" norms favoring historical costs and matching to a much more formal and structured FASB-led standard setting, which favors balance sheet orientation, and the associated frequent changes in asset values manifesting as transient items in earnings. Note that the evidence in this study points specifically to such items as the biggest factor that explains the increased volatility in GAAP earnings, and their decreased correlation with NIPA earnings over the second half of the sample. In addition, the recent dissonance between GAAP and NIPA earnings is mostly concentrated during economic downturns, while as shown in Table 4 there is little difference between the frequency and severity of downturns during the two sample periods. This pattern seems telling because the GAAP asset revaluation rules have the most bite during recessions, producing the transient items that increase GAAP earnings volatility and decrease persistence. Thus, the evolution of GAAP rules seems to be a significant factor in the changing properties of GAAP earnings.

Of course, whether the evolution of GAAP accounting has been a net positive or negative is not clear from these results, and is ultimately beyond the confines of a single study. There are good reasons to believe that the evolution of GAAP has brought some benefits, for example more timeliness in earnings, and perhaps more uniformity and credibility in the application of the rules. What is also not clear is the role of managerial behavior as likely enabling and magnifying the effect of the changing accounting rules favoring frequent asset revaluations. But with these

qualifications in mind, the overall impression is that there has been a deterioration in the information content of GAAP earnings as a reliable sign of corporate profitability, especially in its role as a guide to future recurring income, and this deterioration is mostly due to the rise of one-time and non-operating items.

Note that the heuristic solution of eliminating one-time items from GAAP earnings is not satisfying. Existing research provides solid evidence that "one-time items" are often a re-packaging or re-shuffling of regular expenses within or across periods (Burgstahler, Jiambalvo, and Shevlin 2002, Doyle, Lundholm, and Soliman 2003, McVay 2006). Thus, the presence of one-time items obscures the assessment of not only current but also past and future profitability. For example, consider the great write-downs of assets during the recessions of 2000-2002 and 2008-2009. Were these write-downs a proper revaluation of assets due to currently changed economic circumstances? Or were these write-downs driven by insufficient depreciation or biased projections in the preceding boom years? Or perhaps inflating these write-downs and the related reduction in future expenses are at least partly the explanation for the strong recovery in GAAP profits in the following years? And, given all these considerations, *what* is the real long-run profitability of U.S. companies during the last 20 years? It is just hard to say, and that is the trouble with GAAP earnings.

In any case, the more important question is what can be done about the deterioration in the informativeness of GAAP earnings, especially as a guide to long-run profitability. There can be, of course, more far-reaching solutions to this problem, which involve changing the nature of GAAP standards and changing managerial incentives but such solutions are beyond the scope of this paper. The main interest here is on fairly low-cost changes, which fall in the proper domain of accounting, and provide minimal disruption to existing institutional arrangements.

One direction for such improvement is to provide better information about the critical difference between operating and asset-revaluation accruals. The point is that operating accruals that result from the normal and ongoing operations of the company (e.g., depreciation, and changes in accounts receivable, inventories, and accounts payable) are quite different in nature and in their implications for the volatility and persistence of earnings from asset-revaluation accruals, which result from external price changes, and are to a large extent accidental to company operations (fair value changes, asset write-offs, actuarial pension accruals). And perhaps this is precisely the lesson from NIPA accounting because NIPA profits are squarely about "profits from current production", i.e., profits from real operations, discounting the effect of changing prices and asset re-valuations either by ignoring them (gains and losses on disposals of PPE) or specifically adjusting for them (the inventory and capital consumption accrual). The good news is that GAAP can provide such information simply by better presentation on the income statement or better disclosure, without really changing the existing accounting rules.

Another possible direction for improvement could be more clear delineation and quantification of the role of discretion in financial reporting. Managerial discretion is a key difference in the determination of NIPA and GAAP earnings, so it is probably related to the difference in reported numbers as well. The first step in identifying such discretion already exists. Since the early 2000s the SEC has required a discussion of "critical accounting estimates" as part of the MD&A. A way to enhance and empower such disclosures is to ask for a quantification of critical accruals, including a reconciliation of estimates and their eventual realizations. For short-term estimates, such reconciliation would bring into sharp focus possible aggressive accounting, for example, reversals of aggressive estimates of M&A integration costs will be clearly flagged as different from operating earnings. Longer-term estimates are more

problematic because the resolution of estimates takes a while, and the distinction between aggressive accounting and unforeseen circumstances is murkier. But a reconciliation of long-term estimates can be still helpful because it will highlight the very nature of long-term accruals and the fact that certain estimates (and components of earnings) are "softer" than others.

6. Conclusion

This study investigates the use of NIPA earnings as a benchmark for GAAP earnings over 1950-2010. NIPA earnings offers several unique advantages as a measure of corporate profits, including rigorous and consistent determination, and absence of earnings management and political meddling. The main finding is that NIPA and GAAP profits closely track each other over the early years in the sample but this relation dramatically weakens during the most recent 20 to 30 years. While the properties of NIPA earnings remain largely the same over time, GAAP volatility increases tenfold, mostly due to the effects of transient items during economic downturns. Additional results indicate that the frequency and severity of recessions is roughly the same across the two examined periods. The resulting impression is that changing economic fundamentals are unlikely to be the primary driver of the changing secular properties of GAAP earnings. The more likely explanation is changing GAAP rules, especially those that allow or mandate various assets revaluations, which in turn manifest as transient items in earnings. Evolving associated managerial incentives and behavior is also a possible contributor.

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Appendix

Table A1: Excerpt from NIPA Table 2.10, illustrating how the NIPA measure of corporate profits fits in within the derivation of total Gross Domestic Income, amounts in $ billion

		2007	2008	2009
1	**Gross domestic income**	**14,040.7**	**14,294.0**	**13,855.4**
2	Compensation of employees, paid	7,863.0	8,079.1	7,807.2
3	Wage and salary accruals	6,422.6	6,556.6	6,283.2
4	Disbursements	6,428.8	6,561.6	6,278.2
5	To persons	6,418.8	6,545.7	6,264.9
6	To the rest of the world	10.1	15.9	13.3
7	Wage accruals less disbursements	-6.3	-5.0	5.0
8	Supplements to wages and salaries	1,440.4	1,522.5	1,524.0
9	Taxes on production and imports	1,027.2	1,038.6	1,023.2
10	Less: Subsidies	54.6	52.9	59.7
11	Net operating surplus	3,437.5	3,375.1	3,218.4
12	Private enterprises	3,449.3	3,391.1	3,233.9
13	Net interest and miscellaneous payments, domestic industries	952.1	1,096.8	841.9
14	Business current transfer payments (net)	103.3	123.0	133.4
15	Proprietors' income with inventory valuation and capital consumption adjustments	1,090.4	1,097.9	979.4
16	Rental income of persons with capital consumption adjustment	143.7	231.6	289.7
17	**Corporate profits with inventory valuation and capital consumption adjustments, domestic industries**	**1,159.8**	**841.8**	**989.5**
18	**Taxes on corporate income**	**445.5**	**309.0**	**269.4**
19	**Profits after tax with inventory valuation and capital consumption adjustments**	**714.3**	**532.8**	**720.2**
20	Net dividends	649.7	606.3	442.3
21	Undistributed corporate profits with inventory valuation and capital consumption adjustments	64.6	-73.6	277.9
22	Current surplus of government enterprises	-11.8	-16.0	-15.6
23	Consumption of fixed capital	1,767.5	1,854.1	1,866.3
24	Private	1,476.2	1,542.9	1,542.8
25	Government	291.3	311.2	323.5
	Addendum:			
26	**Statistical discrepancy**	**-12.0**	**-2.4**	**118.3**

Please see NIPA Table 2.10 at http://www.bea.gov/iTable/ for full details and legend.

Table A2: Excerpt from NIPA Table 7.16, illustrating the derivation of NIPA profits and taxes from corresponding IRS measures, amounts in $ billion

Line		2007	2008	2009
1	**Total receipts less total deductions, IRS**	**1,788.7**	**903**	**828.8**
2	Plus: Adjustment for misreporting on income tax returns	287.5	286.8	313.5
3	Posttabulation amendments and revisions 1	74.2	84.4	91.6
4	Income of organizations not filing corporation income tax returns	47.9	46	59.5
5	Federal Reserve banks	36.5	35.4	47.6
6	Federally sponsored credit agencies 2	5.8	6.7	8.3
7	Other 3	5.6	3.9	3.6
8	Depletion on domestic minerals	14.4	16.3	16.1
9	Adjustment to depreciate expenditures for mining exploration, shafts, and wells	41.3	48.9	23.4
10	State and local taxes on corporate income	57.8	47.4	45.5
11	Interest payments of regulated investment companies	-205.8	-176.8	-120.4
12	Bad debt expense	130	253.9	379.4
13	Disaster adjustments (net) 4	0	7.3	0
	Less: Tax-return measures of:			
14	Gains, net of losses, from sale of property	324.5	69.4	59.3
15	Dividends received from domestic corporations	197	206.7	155.4
16	Income on equities in foreign corporations and branches (to U.S. corporations)	286.3	288	282.9
17	Costs of trading or issuing corporate securities 5	40.8	-0.1	52.1
18	Plus: Income received from equities in foreign corporations and branches by all U.S. residents, net of corresponding payments	350.9	406.6	352.8
19	**Equals: Profits before taxes, NIPAs**	**1,738.4**	**1,359.9**	**1,440.5**
20	Federal income and excess profits taxes, IRS	437.1	342.4	313.5
21	Plus: Posttabulation amendments and revisions, including results of audit and renegotiation and carryback refunds	-3.1	-26.7	-52.1
22	Amounts paid to U.S. Treasury by Federal Reserve banks	34.6	31.7	47.4
23	State and local taxes on corporate income	57.8	47.4	45.5
24	Taxes paid by domestic corporations to foreign governments on income earned abroad	24.8	28	23.5
25	Less: U.S. tax credits claimed for foreign taxes paid	86.6	100.4	93.6
26	Investment tax credit 6	---	---	---
27	Other tax credits 6	19.1	13.2	14.9
28	**Equals: Taxes on corporate income, NIPAs**	**445.5**	**309**	**269.4**
29	**Profits after tax, NIPAs (19-28)**	**1,292.9**	**1,050.9**	**1,171.1**

Please see NIPA Table 7.16 at http://www.bea.gov/iTable/ for full details and legend.

Table A3: Excerpts from NIPA Table 2.12, illustrating the effect of the inventory and capital consumption adjustments on NIPA earnings, amounts in $ billion

Line		2007	2008	2009
1-12	*omitted*			
13	Corporate profits with IVA and CCAdj	1,510.6	1,248.4	1,342.3
14	Taxes on corporate income	445.5	309	269.4
15	**Profits after tax with IVA and CCAdj**	**1,065.2**	**939.4**	**1,073**
16-40	*omitted*			
41	Corporate profits with IVA and CCAdj	1,510.6	1,248.4	1,342.3
42	Corporate profits with IVA	1,691.1	1,315.5	1,443.6
43	Profits before tax (without IVA and CCAdj)	1,738.4	1,359.9	1,440.5
44	Taxes on corporate income	445.5	309	269.4
45	**Profits after tax (without IVA and CCAdj)**	**1,292.9**	**1,050.9**	**1,171.1**
47-48	*omitted*			
48	Inventory valuation adjustment	-47.2	-44.5	3.2
49	Capital consumption adjustment	-180.5	-67.1	-101.3

Please see NIPA Table 2.12 at http://www.bea.gov/iTable/ for full details and legend.

Table 1
Key differences between GAAP and NIPA Earnings

Differences	**GAAP Earnings**	**NIPA Earnings**
Prepared by	Firm managers	BEA experts
Reporting rules set by	FASB	BEA
Managerial discretion in determination	Considerable	Close to none
Political meddling in setting reporting rules	Some	None
Concept of Income	Mixed, Revenues – Expenses, adjusted for net asset changes	"Profits from current production", mostly Revenues – Expenses. Eliminates the effects of gains and losses on PPE and investments and most asset revaluations like asset write-downs.
Timeliness	Typically produced within 4-8 weeks of reporting period	Final estimates 2 years after reporting period. First estimates a month after the end of the reporting period, increasingly more precise estimates thereafter.
Revisions	Only by exception, in restatements	Routine, several revisions until finalized amounts. Whenever possible, all amounts retroactively adjusted when BEA rules change.
Reliability	Moderate	High
Coverage	Publicly-traded companies	All corporations, including private
Audited	Yes, by public accountants	No
Internal cross-checks	Some, articulation between the balance sheet and the income statement	Extensive, as national income amounts are estimated from independent data sources on the output and income side
Earnings true up to cash flows	Yes (with rare exceptions)	Mostly yes but with considerable exceptions. Most importantly, since NIPA earnings is "profits from current production", capital assets gains and losses are not included in income.

Table 2
Descriptive statistics and correlations between NIPA and GAAP earnings changes over 1950-1980 and 1981-2010

Panel A: Descriptive statistics for NIPA and GAAP earnings changes, by period.

Period 1: 1951-1980

ΔE_t	N	Mean	Std Dev	Minimum	Maximum
NIPA	30	0.027	0.051	-0.062	0.111
GAAP	30	0.043	0.045	-0.053	0.128
p-value on difference		*0.221*	*0.506*		

Period 2: 1981-2010

ΔE_t	N	Mean	Std Dev	Minimum	Maximum
NIPA	30	0.031	0.062	-0.090	0.150
GAAP	30	0.025	0.642	-1.818	1.873
p-value on difference		*0.955*	*<0.001*		

Earnings changes for time t (ΔE_t) are defined as $\log10(E_t/E_{t-1})$.

Panel B: Correlations between NIPA and GAAP earnings changes, by period.

Period	Corr(NIPA ΔE, GAAP ΔE)
1951-1980	0.894***
1981-2000	0.353*
p-value on difference in correlations across periods	*<0.001*

***, **, * denote significance at the 0.001, 0.01, and the 0.1 level, respectively. P-values on differences in means (standard deviations, correlations) are from t-tests (folded F-statistics, z-scores using Fisher's r-to-z transformation).

Table 3
Reversibility of NIPA and GAAP earnings changes

Panel A: Regressions of earnings changes on lagged changes over 5-year windows
$\Delta E_t = b_0 + b_1*\Delta E_{t-1} + b_2*\Delta E_{t-2} + b_3*\Delta E_{t-3} + b_4*\Delta E_{t-4} + b_5*\Delta E_{t-5}$

Period: 1950-1980

Earnings		ΔE_{t-1}	ΔE_{t-2}	ΔE_{t-3}	ΔE_{t-4}	ΔE_{t-5}	Adj R^2
NIPA	Coefficient	0.105	-0.101	-0.085	-0.038	0.033	-0.22
	(t-stat)	*(0.46)*	*(-0.45)*	*(-0.37)*	*(-0.17)*	*(0.15)*	
GAAP	Coefficient	-0.038	-0.024	-0.253	-0.016	0.067	-0.16
	(t-stat)	*(-0.17)*	*(-0.11)*	*(-1.19)*	*(-0.08)*	*(0.31)*	

Period: 1981-2010

Earnings		ΔE_{t-1}	ΔE_{t-2}	ΔE_{t-3}	ΔE_{t-4}	ΔE_{t-5}	Adj R^2
NIPA	Coefficient	0.232	-0.263	-0.148	-0.022	-0.153	
	t-stat	*(1.16)*	*(-1.29)*	*(-0.67)*	*(-0.10)*	*(-0.73)*	-0.01
GAAP	Coefficient	-0.560	-0.631	-0.714	-0.338	-0.990	0.51
	t-stat	*(-3.72)*	*(-3.74)*	*(-3.05)*	*(-1.66)*	*(-4.54)*	

Regressions are run with an intercept but results on intercepts omitted here.

Panel B: Ratios of Actual/Implied Variance for NIPA and GAAP earnings changes over 5-year windows

Period	NIPA 5-year ΔEarnings	GAAP 5-year ΔEarnings
1951-1980	0.879	0.639
1981-2010	0.873	0.265

Panel B contains the ratios of actual to implied variances for 5-year earnings changes. Under the null of no serial correlation, implied 5-year variance is computed as five times the variance of annual earnings changes. The actual variance for five-year changes in earnings is computed as the variance of $\log(E_t/E_{t-5})$. Panel B contains the results for all possible 55 5-year windows, i.e., the windows are overlapping rather than independent. The 1951-1980 period contains 25 observations, and the 1981-2010 period contains 30 observations.

Table 4
NBER data on U.S. business cycle expansions and contractions, 1950-2010

Peak month	Trough month	Duration in months, peak to trough
July 1953	May 1954	10
August 1957	April 1958	8
April 1960	February 1961	10
December 1969	November 1970	11
November 1973	March 1975	16
January 1980	July 1980	6
July 1981	November 1982	16
July 1990	March 1991	8
March 2001	November 2001	8
December 2007	June 2009	18

Period	Number of recessions	Total number of recessionary months
1950-1980	6	61
1981-2010	4	50

NBER is National Bureau of Economics Research. Data is from the NBER website, http://www.nber.org/cycles.html

Table 5
Volatility and correlations for changes in select NIPA and GAAP measures of earnings

Panel A: Standard deviations of changes for select NIPA and GAAP measures of earnings

Period	GAAP Earnings	GAAP 500 Earnings	GAAP Operating Income	NIPA Earnings	NIPA Adjusted Earnings
1951-1980	0.045	0.045	0.050	0.051	0.054
1981-2010	0.642	0.307	0.059	0.062	0.047
p-value on difference	*< 0.001*	*< 0.001*	*0.439*	*0.290*	*0.445*

Panel B: Correlations between select NIPA and GAAP earnings changes

Period: 1951-1980

	GAAP 500 Earnings	GAAP Operating Income	NIPA Earnings	NIPA Adjusted Earnings
GAAP Earnings	0.99***	0.75***	0.89***	0.54**
GAAP 500 Earnings		0.71***	0.90***	0.51**
GAAP Operating Income			0.68***	0.40**
NIPA Earnings				0.66***

Period: 1981-2010

	GAAP 500 Earnings	GAAP Operating Income	NIPA Earnings	NIPA Adjusted Earnings
GAAP Earnings	0.94***σ	0.45*	0.35*σ	0.30
GAAP 500 Earnings		0.48**	0.36*σ	0.31*
GAAP Operating Income			0.59***	0.56**
NIPA Earnings				0.77***

Earnings changes for time t (ΔE_t) are defined as $\log10(E_t/E_{t-1})$. For any given year, GAAP Earnings is aggregate GAAP Net Income across firms for that year. GAAP 500 Earnings is aggregate GAP Net Income for the largest 500 firms in the economy by Sales. GAAP Operating Income is aggregate GAAP Operating Income After Depreciation (using Compustat's definition). NIPA Earnings is aggregate NIPA corporate profits after tax (excluding the inventory and capital consumption adjustment InvAdj. ***, **, * in Panel B denote significant difference from 0 at the 0.001, 0.01, and the 0.1 level, respectively. P-values on differences in standard deviations (correlations) are from folded F-statistics (z-scores using Fisher's r-to-z transformation). P-values for differences across the two tables in Panel B are indicated in the second table with σ representing significance at the 5% level.

Figure 1
Aggregate NIPA and GAAP Earnings over 1950-2010, amounts in $ billion

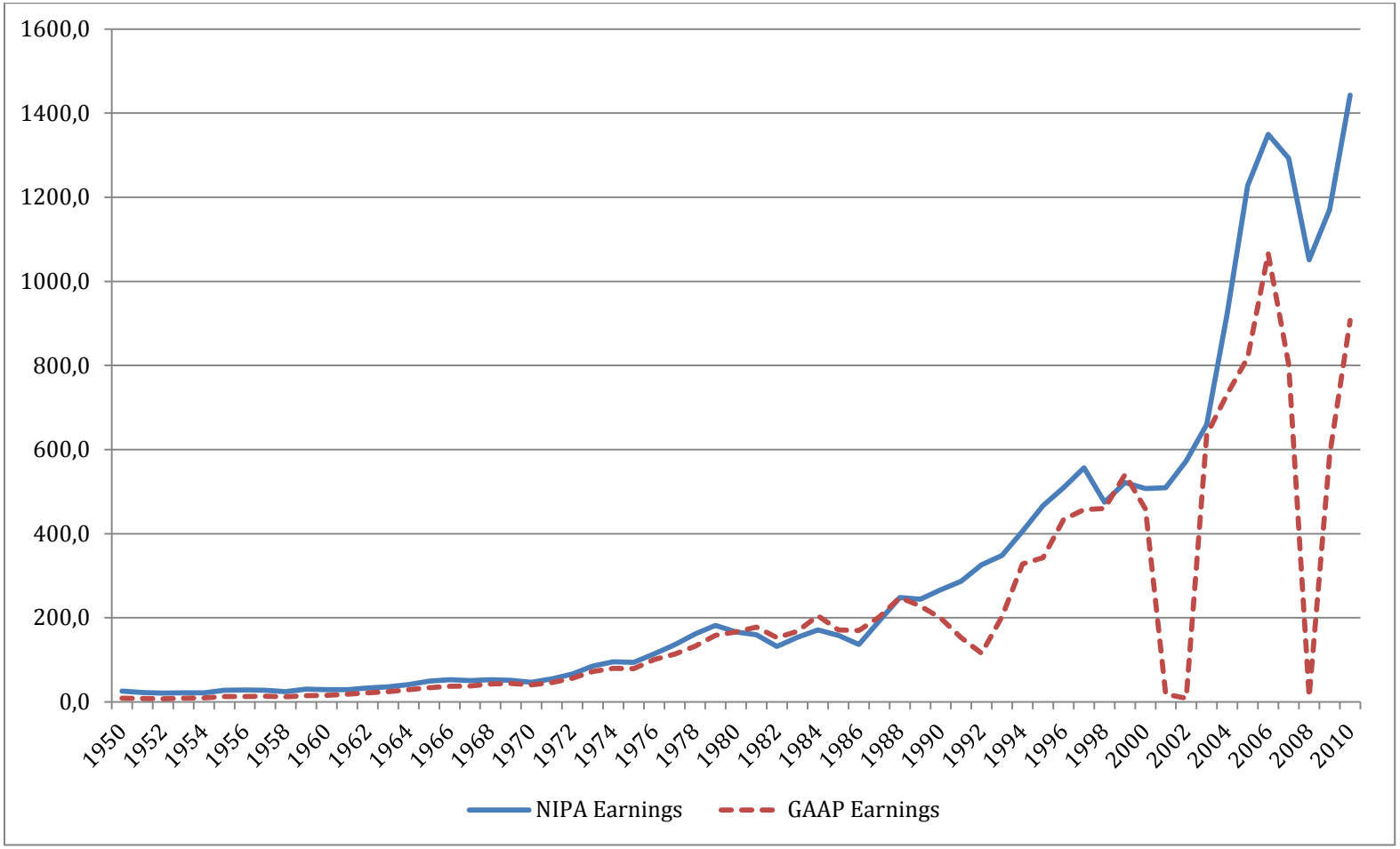


Figure 2
Aggregate NIPA and GAAP Earnings over 1950-2010, amounts in $ billion
Log10 scale on Y axis

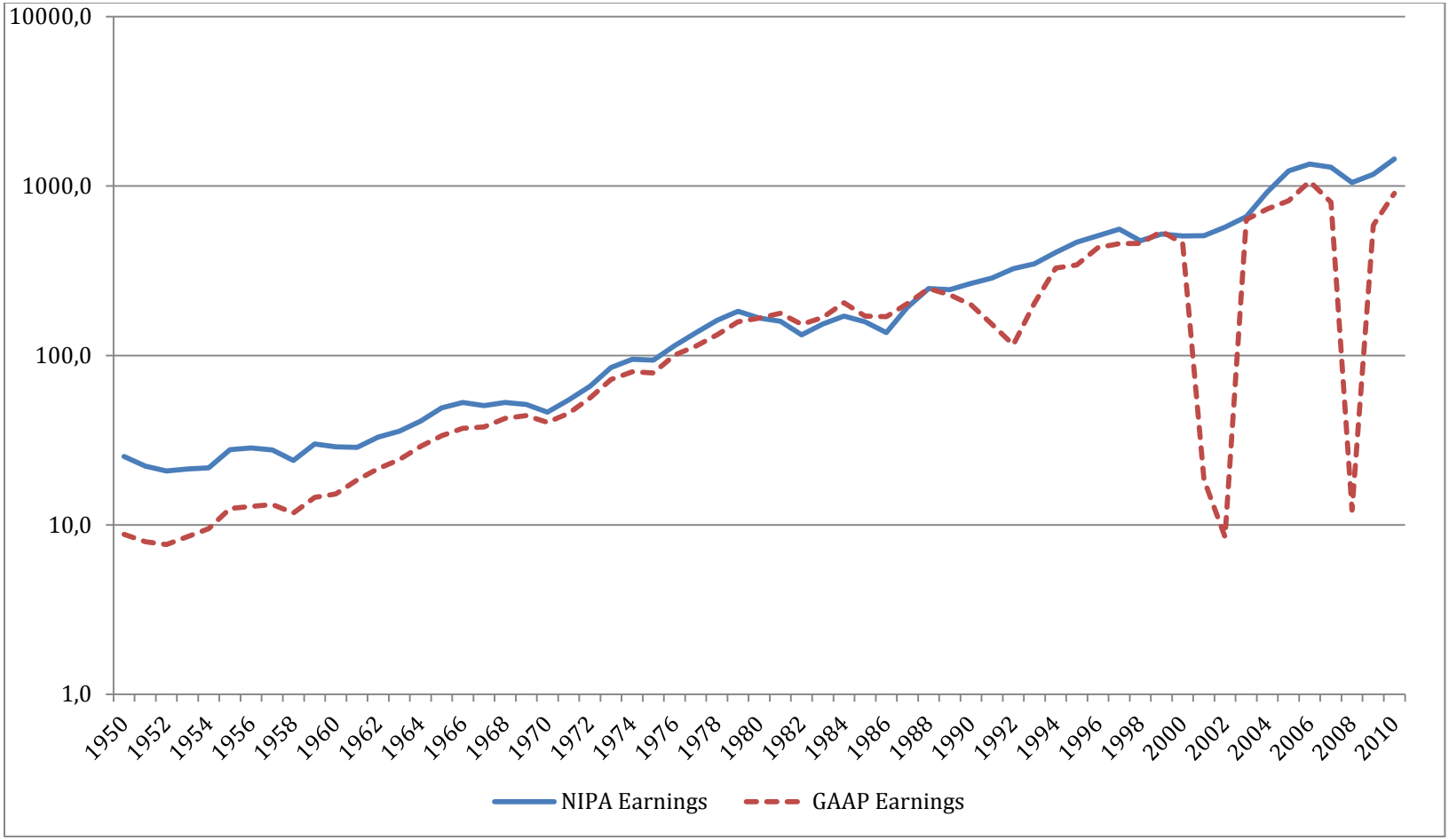
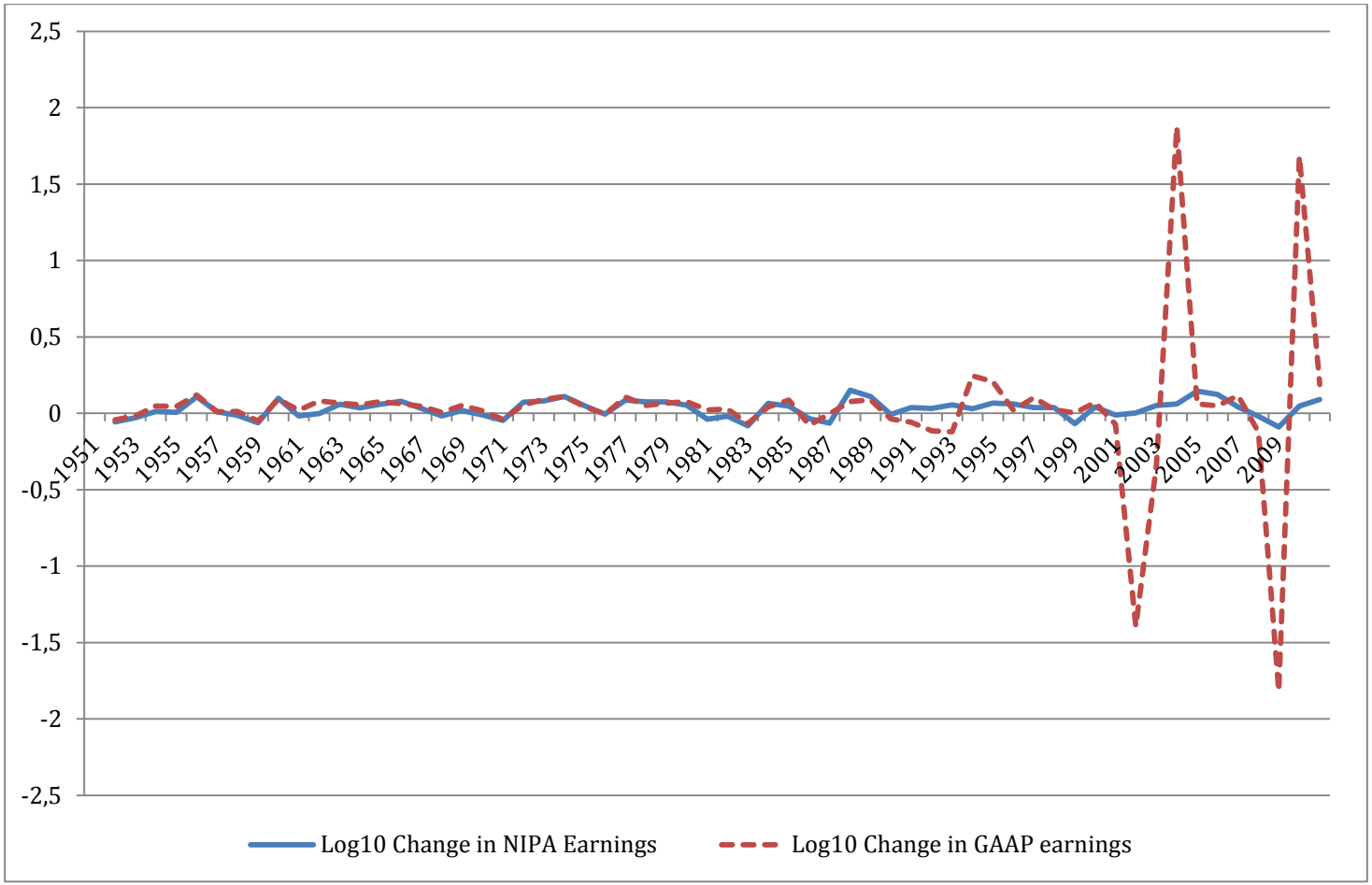


Figure 3
Log10 Changes in aggregate GAAP and NIPA Earnings over 1950-2010



Log10 changes in earnings for period t is defined as Log10(E_t/E_{t-1})