CBO PAPERS

THE SHORTFALL IN CORPORATE TAX RECEIPTS SINCE THE TAX REFORM ACT OF 1986

May 1992

CONGRESSIONAL BUDGET OFFICE
SECOND AND D STREETS, S.W.
WASHINGTON, D.C. 20515

PREFACE

This paper stems from a request from the Chairman of the Senate Committee on Finance. It examines the question of why corporate income tax receipts did not grow as fast over the last five years as the Congressional Budget Office (CBO) and others expected immediately following enactment of the Tax Reform Act of 1986. To that end, the paper describes in detail CBO's methodology for forecasting corporate receipts.

The study was prepared by Mark Booth of the Tax Analysis Division, under the direction of Rosemary Marcuss, Richard Kasten, and Eric Toder. Many people made valuable comments on earlier drafts. They include James L. Blum, Leonard Burman, Robert Dennis, Maureen Griffin, Larry Ozanne, Linda Radey, Matthew Salomon, and David Weiner. Joseph Cordes and Kathleen O'Connell, both formerly of CBO, provided important counsel during the paper's formulative stages.

Roger M. Williams edited the manuscript, and Simone Thomas prepared it for production.

Robert D. Reischauer
Director

May 1992

CONTENTS

TABLES

SUMMARY AND INTRODUCTION

In January 1987, the Congressional Budget Office (CBO) and other forecasters expected federal, corporate income tax receipts to increase dramatically over the subsequent five years. The Tax Reform Act of 1986 (TRA86) had just been enacted, increasing corporate taxes, and prospects for strong profit growth looked good. While corporate receipts did increase, both in dollar magnitude and relative to overall economic activity, they did not achieve the strong growth that was expected.

CBO has continued to analyze the causes of the shortfall in revenues relative to its January 1987 projection. The starting point for the current paper is CBO's methodology for forecasting corporate receipts.

The paper concludes that economic factors contributed significantly to the shortfall. Those factors include unexpectedly high interest payments and depreciation allowances, as well as inaccurate historical data from the National Income and Product Accounts (NIPAs). It is unclear how much TRA86 itself may have caused the weakness in profits.

Technical factors also contributed: several revenue-raising provisions of TRA86, as well as legislation from some years earlier, may have been overestimated. In addition, a change in the statistical relationship between taxable profits and tax payments used to forecast receipts may also have contributed. The statistical relationship changed after enactment of TRA86 as a result of certain observable changes in corporate financial behavior. Those included increased use of S corporations and employee stock ownership plans (ESOPs), increased realizations of capital gains, and--possibly--more aggressive transfer pricing by multinational corporations. Although CBO anticipated some change in corporate behavior, it clearly changed more than CBO expected.

Receipts since 1986 suggest several important lines of research for forecasting corporate tax receipts (mentioned below), but that research lies beyond the scope of this paper.

CBO'S FORECASTING METHODOLOGY

To produce the corporate receipts baseline, CBO first forecasts corporate profits, then makes several data adjustments to the standard profit measures from the NIPAs. The resulting measure, called adjusted profits, closely approximates the tax base on which corporations calculate their income tax liabilities.

In addition to adjusted profits, CBO includes in its forecasting equation other important factors that explain corporate income tax liabilities. Accruals of liabilities represent the tax that is generated from income earned in a specific year. When paid to the Treasury, often over the course of several years, the liabilities are counted as receipts in the federal budget. Although adjusted profits represent the most important element of the liabilities equation, such other inputs as the corporate income tax rate and the effects of recent tax legislation are also significant. The estimated statistical relationship performs well in explaining liabilities and receipts over the historical period through 1985.

Although the inputs of the equation are the most important factor in determining the forecast for receipts, judgment also plays a part. The forecaster must interpret the reasons for the equation's historical errors and determine whether they result from temporary or permanent factors. In addition, the forecaster must exercise judgment in reconciling the equation's output with the current data on tax collections.

It is possible to isolate the sources of forecast error and ascribe them to new legislation or to economic or technical factors. First, because the CBO forecast assumes continuation of the present tax law, changes in it can skew the forecast. In addition, economic errors arise primarily from errors in the forecast of profits, and corporate profits are especially difficult to forecast accurately because they fluctuate sharply and irregularly over the business cycle. Finally, technical errors stem from two sources: changes in the estimated statistical relationship used to forecast receipts, and misestimates of the revenue effects of recently enacted legislation not caused by such macroeconomic factors as profits.

CASE STUDY: THE TAX REFORM ACT OF 1986

The paper isolates the sources of the forecast error that occurred in the baseline for corporate receipts that CBO produced in January 1987, the first forecast prepared after the enactment of TRA86. A shortfall in corporate receipts developed when post-1986 receipts fell far short of the amount

expected in that baseline forecast. The January 1987 forecast error for 1991 exceeded $50 billion, about one-third of the predicted level. The forecast error over the 1987-1991 period would have been even larger had not legislation enacted then raised receipts.

Corporate receipts fell short of the January 1987 baseline forecast in large part because adjusted profits--the measure that approximates the tax base--were lower than expected. That economic factor accounted for about 55 percent of the forecast error in the 1987-1991 period, which was calculated excluding the extra revenue that newly enacted legislation raised. The forecast of corporate profits proved too optimistic because of interest payments and depreciation allowances that were higher than expected. In addition, inaccurate historical NIPA data were available at the time; thus, the profits forecast started from an overly optimistic "jumping-off point."

Technical factors accounted for the other 45 percent of the total forecast error. They can be broken down into two components of approximately equal size. First, technical forecast errors occurred in the noneconomic inputs to the forecasting equation, such as the expected revenue gain from various provisions of the Tax Equity and Fiscal Responsibility Act of 1982, the Deficit Reduction Act of 1984, and TRA86.

Second, errors occurred because the estimated statistical relationship between profits and tax receipts changed, in part as a direct result of TRA86. The altered relationship occurred because the equation could not take fully into account all changes in the financial behavior of corporations. TRA86 caused two of the behavioral changes: the shift of the business form and the shift in capital gains realizations. For the first time, the law reduced the top individual marginal tax rate below the top corporate rate. As a result, many corporations shifted their business forms to partnerships and S corporations, both of which pass all income directly through to individuals and avoid the corporate tax. In addition, TRA86 raised corporate tax rates on capital gains, producing an initial surge of asset sales and capital gains at the corporate level. That surge contributed to the shortfall because some of the gains realized in late 1986 would have been realized in later years had TRA86 not been enacted.

The statistical relationship also changed as a result of the increasing use of employee stock ownership plans and, possibly, transfer pricing, both factors unrelated to TRA86. ESOPs are a specific type of employee retirement benefit plan, similar to a pension plan. They have specific tax advantages that were increasingly used in 1988 and 1989, prompting legislation to limit their advantages to smaller firms.

Transfer pricing in the context of this paper refers to the prices that domestic parent firms and their foreign subsidiaries in effect charge each other for transferred goods and services. Ever more aggressive transfer pricing by foreign multinational corporations may also explain part of the changed statistical relationship. As a result of the increasing internationalization of the major economies, firms may have had greater opportunity to use transfer pricing rules to reduce taxes.

The changed statistical relationship shows up in the equation's weakened ability to explain receipts over the very recent historical period. The weakened tracking ability of the equation is quantified by the latter's residuals, defined as the level of receipts minus the equation's prediction based on levels of the equation inputs. Consistent with the shift in the estimated relationship between profits and liabilities, the equation residuals have become significantly negative on average since 1986. The 1991 residual was surprisingly small, although that result may well change when new tax return data are incorporated into NIPA data on profits.

The changed statistical relationship has important implications for CBO's baseline forecast of receipts for 1992 and beyond. If one interprets the recent equation residuals as arising from permanent factors, the equation's forecast must be adjusted. CBO's standard forecast judgment over the last several years has assumed that the most recent equation residual is permanent and will persist throughout the forecast period, unless further adjustment is required for recent collections data. In the January 1992 baseline, that judgment led to a small adjustment in the equation's forecast because the equation residual was only -$2 billion in 1991.

Examination of the shortfall in corporate receipts suggests a larger study of both longstanding and more recent issues, but that lies beyond the scope of this paper. Those issues include the long-term behavior of corporate profits, the degree to which reduced corporate receipts are directly offset by increased individual receipts, and corporate tax integration.

CHAPTER I

CORPORATE PROFITS AND THE TAX BASE

The process of forecasting corporate revenues begins with defining and forecasting corporate profits and the tax base. Profits are an integral part of the Congressional Budget Office's (CBO's) five-year forecast of gross domestic product (GDP) and incomes. This chapter defines the primary profits measure that is estimated in the National Income and Product Accounts (NIPAs) and then shows how that measure can be adjusted to approximate more closely the corporate income tax base.

In general, corporate profits measure corporations' income from sales, interest, rent, and other sources, net of their expenses from labor, depreciation, interest, materials, and other costs. The income and expenses that determine profits are defined in different ways to serve different purposes. Corporations measure profits for their financial statements under specific accounting rules, but government statisticians use other definitions.

IRS-BASED PROFITS AND ECONOMIC PROFITS

To explain tax payments, the ideal measure of corporate profits is the amount corporations report to the Internal Revenue Service (IRS); this paper refers to the amount as "IRS-based profits." The Internal Revenue Code, as interpreted by the IRS and the courts, specifies the rules that corporations use to determine those profits.

Economic analysis must rely on approximations of recent IRS-based profits because the IRS publishes the data with a three-year lag. The lag stems from corporations filing their tax returns up to 15 months after the end of the calendar year. In the interim, CBO uses data from the NIPAs to approximate IRS-based profits. The NIPA statistics, published by the Department of Commerce's Bureau of Economic Analysis (BEA), include the detailed U.S. income data underlying the estimates of GDP. NIPA data are released in a timely manner: an estimate of each quarter's profits is generally available only two months after the quarter ends.

The best starting point from which to derive an approximation of IRS-based profits is a NIPA measure called economic profits, the component of national income measuring the return to corporations that arises solely from their current production. A corporation never calculates its own economic profits; the exercise is a statistical construct that BEA designed to measure profits accurately.[1] To measure economic profits, the bureau starts with IRS-based profits but then makes several changes in definitions. BEA's definition excludes any profits that arise from production in a previous period. In addition, BEA defines economic profits to include the profits of the Federal Reserve banks and to exclude the profits of foreign-based multinationals earned in the United States. Economic profits also use a different definition of depreciation than the one employed for tax purposes. The implications of those different definitions, addressed as the differences between economic profits and IRS-based profits, are examined below.

ADJUSTED PROFITS AS AN APPROXIMATION OF IRS-BASED PROFITS

Five adjustments are made to economic profits in order to derive an approximation of IRS-based profits. This paper describes the resulting measure as adjusted profits. Table 1 illustrates, in a definitional equation form, the five adjustments. The data for each are available in the NIPAs. Although additional adjustments could be introduced to yield an even closer approximation of IRS-based profits, those adjustments are not available in the NIPAs for recent years and would be difficult to forecast accurately. The following passage describes the five adjustments.

First, economic profits are adjusted to reflect the depreciation allowances that are claimed for tax purposes, rather than the depreciation allowances BEA calculates for theoretical purposes under economic depreciation. Depreciation represents the expenses for the wear and tear, exhaustion, and obsolescence of such fixed capital as machines and buildings. When calculating profits, firms do not generally record expenses for capital purchases in the year they are made but spread the expenses over time. In estimating economic profits, BEA measures depreciation allowances for a capital asset using a formula that includes straight-line depreciation over an asset's estimated useful lifetime, with the value of the asset increased annually to take

1. The Bureau of Economic Analysis estimates economic profits based on tax return data; when those are not available, financial statement data are used. For a full explanation of the BEA's methods, see Department of Commerce, Bureau of Economic Analysis, *Corporate Profits: Profits Before Tax, Profits Tax Liability, and Dividends* (May 1985).

TABLE 1. DEFINITIONAL EQUATION EXPLAINING ADJUSTED PROFITS

APROF = EPROF - CCADJ + INVPROF - RWPROF - FEDPROF - STLTAX

Variable Definitions:

APROF = "adjusted profits," an approximation of IRS-based profits as reported by corporations to the IRS.

EPROF = "economic profits," corporate profits from current production.

CCADJ = the difference between depreciation for tax purposes and hypothetical "economic depreciation," using a straight-line, indexed system over useful lifetimes.

INVPROF = profits from the increased value of inventory holdings during periods of rising prices.

RWPROF = profits of U.S.-owned corporations operating in foreign countries, net of profits of foreign-owned corporations operating in the United States.

FEDPROF = profits of Federal Reserve banks.

STLTAX = corporate income tax liabilities owed to state and local governments.

SOURCE: Congressional Budget Office.

NOTE: The historical data for all measures are available from the National Income and Product Accounts published by the Department of Commerce, Bureau of Economic Analysis.

account of inflation. This "economic depreciation" measures the amount of capital actually consumed over time for national income measurement purposes--but not the depreciation claimed for tax purposes. The tax law allows corporations to use accelerated (more front-loaded than straight-line) depreciation over shorter lifetimes; however, the law does not allow for the value of the asset to be increased with inflation. The "capital consumption adjustment" represents the difference between tax-based and economic depreciation. By subtracting the adjustment from economic profits, tax-based depreciation is substituted for economic depreciation in the profits measure.

Second, economic profits are increased by the amount of "inventory profits" that occur during periods of rising prices. The NIPAs define economic profits to exclude profits that arise from past production. Manufacturers often do not sell their products immediately but place them in inventory to await sale. Because the eventual sale commands then-prevailing prices, the inventories may become more highly valued than at time of production. Corporations may make such inventory profits on the sale of inventoried goods because of price increases, with the profits recorded when the inventory is sold. Economic profits are calculated to exclude inventory profits. But since corporations include them in their IRS-based profits, the estimate of adjusted profits adds back these inventory profits, too.[2]

Third, in order to account for the earnings of multinational corporations, CBO adjusts economic profits for "rest-of-world profits." Economic profits include profits earned abroad by U.S.-owned corporations but not those earned within the U.S. by foreign-owned corporations.[3] This treatment is reversed for purposes of estimating the effective tax base. Although economic profits include foreign earnings of U.S. corporations, corporations do not generally pay U.S. taxes on such foreign earnings because they receive foreign tax credits for taxes they pay to foreign governments.[4] Conversely, foreign-owned corporations that earn profits in the United States must pay U.S. taxes on their U.S.-based profits; yet these profits are not included in economic

---

2. The National Income and Product Accounts use the "inventory valuation adjustment" to correct for inventory profits; it is the same as inventory profits but with the sign reversed.

3. In the National Income and Product Accounts, profits earned by U.S. firms abroad include the earnings of their foreign subsidiaries that are either repatriated as dividends or retained abroad. In addition, those profits include dividends received by U.S. firms on foreign investments aside from those made in their subsidiaries. The corresponding profits of foreign corporations earned on operations in the United States are defined in the same way.

4. Restrictions on the use of foreign tax credits have resulted in corporations often paying, in effect, some corporate tax in the United States on their foreign earnings. The rate of tax is estimated to be quite low. Evidence of its small effect is discussed in Alan Auerbach and James Poterba, "Why Have Corporate Tax Revenues Declined?" in Lawrence H. Summers, ed., *Tax Policy and the Economy: Volume 1* (Cambridge, Mass.: MIT Press, 1987), pp. 3-29.

profits. Therefore, a better measure of the tax base adds to economic profits the U.S. profits of foreign-owned corporations and subtracts the foreign profits of U.S.-owned corporations. As shown in Table 1, this adjustment to economic profits is facilitated by rest-of-world profits, a NIPA variable broadly defined as the foreign profits of U.S.-owned corporations minus the U.S. profits of foreign-owned corporations. In order to make the adjustment, CBO subtracts rest-of-world profits from economic profits.

Fourth, profits of the Federal Reserve System are excluded from economic profits. The Federal Reserve earns a relatively large profit on its operations, primarily from interest on its holdings of Treasury securities that are used to conduct open market operations. The interest from those securities greatly exceeds the Federal Reserve's expenses. The profit is paid to the Treasury and classified as a miscellaneous--not corporate--tax receipt.[5] Since corporate tax receipts do not include the Federal Reserve's payment, the corporate tax base measure is adjusted to exclude the Federal Reserve's profits.

Fifth, corporations receive a tax deduction for income taxes paid to state and local governments. Since the measure for economic profits does not include the deduction, it is included separately as an adjustment to economic profits (see Table 1).

After making these five adjustments to economic profits, the resulting measure of adjusted profits can be linked statistically to corporate taxes owed. The next chapter will describe the statistical relationship between adjusted profits, other variables, and corporate taxes.

---

5. A very small part of the profit does not go into the Treasury. One portion is paid to member banks as dividends; another is transferred to a surplus account. A more complete description is provided in Congressional Budget Office, *The Budgetary Status of the Federal Reserve System* (February 1985).

CHAPTER II

EXPLAINING CORPORATE TAX LIABILITIES AND PAYMENTS

The historical relationship between adjusted profits and tax liabilities can be estimated statistically. This chapter presents the specific statistical relationship derived by CBO and used to forecast corporate receipts.

WHAT ARE LIABILITIES, AND HOW ARE THEY CALCULATED?

Income tax liabilities represent the amount of tax that is generated from income earned in a specific year. Liabilities are distinguished from the actual payment of the taxes. Corporations pay liabilities for a specific year in one of three ways: as estimated quarterly (installment) payments during the same year; as a final settlement during the following year; or as back taxes in later years. On average, corporations have recently paid almost three-quarters of their annual liabilities as estimated payments, almost 20 percent as final settlements, and about 8 percent as back taxes. Liabilities do not include amounts that are never paid--because of bankruptcies, for example.

Corporate income tax liabilities generally equal the tax rate multiplied by IRS-based profits, net of credits against tax. The corporation first calculates its profits under the tax rules and multiplies the amount by its tax rate. The statutory tax rate schedule that corporations currently face, shown in Table 2, is a graduated rate structure because lower profit (income) brackets receive lower tax rates. The corporation then subtracts any credits it has earned, such as the investment tax credit for purchases of equipment made before 1986 (now only useful as a carryover credit) and the foreign tax credit for tax payments to foreign governments. This general description of the corporate income tax does not take into account other complicating provisions, including the alternative minimum tax, carryforwards of net operating losses, and capital gains.

TABLE 2. STATUTORY CORPORATE INCOME TAX RATES UNDER CURRENT LAW

Taxable Income		Tax Rate
Over	Up To	(Percentage)
$0	$50,000	15
$50,000	$75,000	25
$75,000	$100,000	34
$100,000	$335,000	34 + 5 additional tax
$335,000		34

SOURCE: Internal Revenue Code.

NOTE: The tax rate schedule has been effective since 1988. The 5 percent additional tax on taxable incomes between $100,000 and $335,000 acts to phase out the benefits of the graduated rates.

CBO'S ESTIMATED STATISTICAL RELATIONSHIP BETWEEN ADJUSTED PROFITS AND TAX LIABILITIES

The procedure corporations use to calculate their tax liabilities can be represented statistically. While each corporation's liabilities obviously cannot be separately explained, it is possible to explain aggregate (economywide) liabilities by using the aggregate profit data previously discussed.

Table 3 presents the results of a regression equation CBO uses to forecast baseline corporate liabilities. Liabilities are explained on a "pre-1986-law basis," meaning that the equation is estimated using data only through 1985 and that it ignores the effect of later changes in the law affecting liabilities. For forecasting purposes, as will be discussed later, this methodology requires some out-of-model adjustments for the tax legislation enacted after 1985. The variables in the regression are measured in level form. CBO estimated the equation using National Income and Product Account data available before

TABLE 3. REGRESSION EQUATION EXPLAINING TOTAL CORPORATE TAX LIABILITIES ASSUMING CONSTANT 1985 LAW, BEFORE INVESTMENT TAX CREDITS, IN THE 1962-1985 PERIOD

LIABSGITC = 1.188 + 0.867*TAXRATE*APROF
(1.72) (68.44)a

-0.206*TAXRATE*APROFCH
(6.99)a

+6.878*D1 + 3.894*D2
(5.18)a (2.50)b

R-Squared = 0.997; Standard Error = 1.224;
Percent Standard Error = 2.5 percent; Durbin-Watson Statistic = 2.023.
Estimation Period = Calendar Year Annual, 1962 to 1985.

Variable Definitions:

LIABSGITC =	corporate tax liabilities before investment tax credits reduce them; from Internal Revenue Service (IRS), *Statistics of Income*; and the National Income and Product Accounts (NIPAs).
TAXRATE =	top statutory corporate tax rate.
APROF =	"adjusted profits," an approximation of IRS-based profits (as reported to the IRS); constructed from the NIPAs (see Table 1).
APROFCH =	annual change in the level of adjusted profits (APROF).
D1 =	dummy variable representing effects of the Tax Equity and Fiscal Responsibility Act of 1982. The variable equals 0 from 1962 to 1982 and 1 thereafter.
D2 =	dummy variable representing effects of the Deficit Reduction Act of 1984. The variable equals 0 from 1962 to 1983 and 1 thereafter.

SOURCE: Congressional Budget Office.

NOTES: t-statistics are in parentheses.
a = statistically significant at 1 percent level.
b = statistically significant at 5 percent level.

the Bureau of Economic Analysis comprehensively revised the data in December 1991.

Corporate liabilities plus investment tax credits form the dependent variable in the regression equation. It measures liabilities before investment credits reduce them but after all other credits do so. Note that because CBO's approximation of the tax base does not include foreign income of U.S. corporations, no estimate of foreign tax credits is needed.

VARIABLES USED TO EXPLAIN LIABILITIES

The equation includes four independent variables, two of which are dummies. The first independent variable is the top statutory tax rate multiplied by adjusted profits. The top statutory rate, which has changed several times since 1962, is shown in Appendix, Table A-1. The tax rate schedule over the estimation period differs from that of present law as shown in Table 2. The second variable is a variation of the first: the top statutory tax rate multiplied by the annual level change in adjusted profits. The first of the two dummy variables, D1, represents the effects of the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA); it equals 0 from 1962 to 1982 and 1 thereafter. The second, D2, represents the effects of the Deficit Reduction Act of 1984 (DEFRA); it equals 0 from 1962 to 1983 and 1 thereafter.

First Variable: Tax Rate Multiplied by Adjusted Profits

The first independent variable, which measures the product of the tax rate and adjusted profits, is statistically very significant. Since liabilities are calculated largely by multiplying the applicable tax rate by IRS-based profits, the importance of this variable comes as no surprise. The t-statistic measures the statistical significance of the estimated coefficient. The t-statistic of 68.4 indicates that the coefficient differs significantly from 0 at the 1 percent level.

The coefficient is 0.867, suggesting that the current top statutory rate of 34 percent actually results in an effective tax rate of about 29 percent (0.867 multiplied by 34 percent). The percentage rate can be viewed as a marginal tax rate in that an additional dollar of adjusted profits results, in the aggregate, in an estimated 29 cents of additional corporate liability.

The estimated effective marginal rate is lower than the top statutory rate--the coefficient on the first variable is less than 1--largely because of the effects of the graduated corporate tax-rate structure. The coefficient would

be expected to approximate 1 under certain circumstances--for example, if the rate structure were not graduated and certain omitted factors were incorporated into the equation. The estimated marginal tax rate is reduced by the graduated rate structure and, to a smaller degree, by the exclusion from the equation of such factors as the research and development tax credit and the possessions tax credit. Other omitted factors, such as capital gains, act to increase the estimated coefficient.

The estimated marginal tax rate must be viewed as an approximation because the equation assumes that the rate structure remains stable at the average degree of graduation it exhibited over the 1962-1985 period. New tax return data suggest that the marginal rate may be even higher than estimated because the rate structure following enactment of the Tax Reform Act of 1986 may be less graduated than before. Even if true and known in 1987, that knowledge would not have increased the accuracy of the forecast produced five years ago. Use of a higher estimated marginal tax rate in CBO's 1987 projection of receipts would have led to an even greater overestimate.

Second Variable: Net Operating Losses

CBO designed the second independent variable, the tax rate multiplied by the change in adjusted profits, to capture the timing influence of net operating losses. If a corporation's tax deductions exceed its receipts, its IRS-based income will be less than zero, reflecting losses. They are called net operating losses (NOLs). While they are generally not subject to immediate refund, a firm can use them under certain circumstances to reduce its tax payment in an earlier, current, or later year; for example, a firm can reduce taxes owed in a previous year by refiling its tax return from that year to include the NOLs as an additional deduction, with each dollar's worth of NOL reducing taxable income from the previous year by a dollar. In that way, the firm can receive a refund of taxes paid in a previous year (up to three years back) as a result of current losses. A firm may be unable to claim a refund because it paid no taxes over the prior three years or had already used enough other losses to refund the previous taxes paid. In that case, the firm can carry the net operating losses forward, generally for as many as 15 years. However, NOLs carried forward do not accrue interest and may expire unused.

The second independent variable carries a negative coefficient, implying that NOLs act in the short term to offset a portion of the effect of a change in profits on liabilities. When adjusted profits grow strongly in a year, it is an indication that many firms have become profitable following a period of unprofitability. These firms might be able to offset some of their newly found profits with NOLs. If the firms remain profitable, however, they will

eventually run out of NOLs and will no longer be able to offset their higher profits. The independent variable is constructed in level change form to reflect the short-term effect of NOLs. (Longer unconstrained lags on this variable were not statistically significant.) The coefficient of -0.206 indicates that the first-year marginal tax rate on changes in adjusted profits amounts, in effect, to 22 percent (0.867 minus 0.206 multiplied by 34 percent). The effect after the first year, however, is about 29 percent (0.867 multiplied by 34 percent), as shown in the first independent variable. This coefficient is also significant at the 1 percent level.

Other Variables: Recent Legislation

The final two independent, dummy variables represent the revenue-raising effects of tax legislation enacted between 1982 and 1984 and not captured in the other variables. Along with other changes to the tax code, TEFRA reduced the tax preference for completed contracts, tightened the rules governing the possessions tax credit, and prescribed new accounting rules for income from original issue discount bonds. DEFRA raised the minimum tax rate and made numerous revenue-raising changes to accounting rules. None of those provisions of TEFRA and DEFRA is reflected in the other variables of the regression equation, since none of the changes affected the top statutory tax rate or the adjusted profits measure. TEFRA and DEFRA did include other revenue-raising provisions, such as changes in depreciation and the investment tax credit, and those are taken into account by the equation's other variables.

The estimated coefficients of 6.9 on the TEFRA dummy variable and 3.9 on the DEFRA dummy variable represent the estimated amount of tax liabilities (in billions of dollars) that these tax acts raised and the other coefficients of the equation do not capture. In sum, the two laws added an estimated $10.8 billion a year in tax liabilities to the equation's estimate. These estimates correspond roughly with those the Treasury Department produced; the Treasury has also estimated that the tax act provisions in question raised a relatively constant amount of revenue over time.

ASSESSMENT OF THE ESTIMATED EQUATION

The various summary statistics of the regression equation show that it performs well in explaining liabilities over the 1962-1985 period. The R-squared is 99.7 percent, indicating that independent variables explain a very high percentage of liabilities over the period. The standard error indicates that, for about 30 percent of the time, liabilities were at least 2.5 percent

above or below the amount the equation predicted. On average over the 1962-1985 period, that 2.5 percent error translates to $1.2 billion. The Durbin-Watson statistic of 2.023 signifies that the estimated errors from one period to the next were nearly uncorrelated--a favorable result.

While the equation explains the historical period well and provides a useful forecasting tool, it clearly oversimplifies the taxpaying process. The equation omits many influences on tax policy, such as realizations of capital gains and their special tax rate, percentage depletion, the research and experimentation and possessions tax credits, and the deductibility of intangible drilling costs. In addition, the degree of graduation of the corporate tax rate structure changed many times over the equation's estimation interval; as discussed earlier, that made the coefficient on the tax rate term difficult to interpret, and it rendered the term unlikely to capture exactly the rate structure that exists under present law. Even though those many influences are simplified or ignored, it is not clear that modeling them separately would produce significant gains in forecasting precision. The major source of forecast error, as will be shown later, has been with the forecast of profits rather than with these model simplifications.

An alternative--but rejected--specification for an equation would have extended the estimation period to 1987 or later and used dummy variables to measure the effect of the important TRA86. That tax act, however, contained several important provisions that raised revenue primarily over the first three to five years--that is, through 1991. A model specification that assumed these revenue gains were permanent would yield an inadequate forecast.

CHAPTER III

THE FORECASTING PROCESS

The process of forecasting typically relies on both the output of the equation and the judgment of the forecaster. Forecasting corporate income tax receipts is no exception. The forecasting equation is necessary because it indicates the broad trends that--given expectations about income and tax rates--can be expected for liabilities. The trends are imperfect, and the forecaster must reconcile the equation's results with data on recent tax collections. The forecaster also needs to consider how accurately the equation has performed in the recent past and decide whether to make any out-of-model adjustments.

USING THE EQUATION

To forecast corporate tax liabilities, the equation shown in Table 3 must be adjusted slightly. In particular, the equation estimated on the basis of pre-1986 law must be made applicable to current law. Table 4 shows the rewritten equation. It is based on present law and includes the effect on revenues of legislation enacted after 1985 that other variables of the equation do not capture. In an additional algebraic adjustment, the equation includes the investment tax credits on the right-hand side; the Congressional Budget Office produces a separate forecast of those credits.

CBO must forecast the inputs to the liabilities equation. Some inputs, called endogenous variables, are themselves outputs from other models; an example is the economic forecast. The endogenous variables change with the forecasts of other measures. Other inputs, called exogenous variables, are fixed.

Adjusted profits, an endogenous variable, form the most important input in the equation. CBO forecasts each of the six components of adjusted profits (see Table 5). It forecasts economic profits as part of its macroeconomic

TABLE 4. BASELINE EQUATION EXPLAINING CORPORATE TAX LIABILITIES

LIABS = 1.188 + 0.867*TAXRATE*APROF

-0.206*TAXRATE*APROFCH + 6.878*D1

+3.894*D2 - ITC + LEG86TO92

Variable Definitions:

LIABS = federal corporate tax liabilities.

TAXRATE = top statutory corporate tax rate.

APROF = "adjusted profits," an approximation of IRS-based profits (as reported to the IRS); constructed from the National Income and Product Accounts (see Table 1).

APROFCH = annual change in the level of adjusted profits (APROF).

D1 = dummy variable representing effects of the Tax Equity and Fiscal Responsibility Act of 1982. The variable equals 0 from 1962 to 1982 and 1 thereafter.

D2 = dummy variable representing effects of the Deficit Reduction Act of 1984. The variable equals 0 from 1962 to 1983 and 1 thereafter.

ITC = investment tax credits claimed for tax purposes.

LEG86TO92 = effect on tax liabilities of legislation enacted after 1985 and not accounted for by other variables in the equation.

SOURCE: Congressional Budget Office.

NOTE: The coefficients for two variables, ITC and LEG86TO92, are not estimated econometrically; by definition, they equal 1.

TABLE 5. DERIVATION OF ADJUSTED PROFITS
(Actual values by calendar year, in billions of dollars)

	1985	1986	1987	1988	1989	1990	1991
Economic Profits	282	282	308	338	312	298	290
Subtractions							
Capital consumption adjustment	60	54	52	48	26	5	4
Rest-of-world profits	31	33	37	43	51	57	61
Federal Reserve profits	17	16	16	18	21	22	21
State and local corporate taxes	20	23	24	26	25	24	21
Subtotal	128	126	129	135	123	108	107
Additions							
Inventory profits	2	-7	19	27	22	11	1
Total Adjusted Profits	156	150	198	230	212	202	184

SOURCE: Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts available before the December 1991 comprehensive revision. CBO estimated the 1991 values based on incomplete quarterly data.

NOTE: Negative value for inventory profits in 1986 denotes inventory losses.

forecast. Other elements of the latter include inventory profits and rest-of-world profits, two of the adjustments made to economic profits to derive adjusted profits. CBO forecasts the capital consumption adjustment by dealing separately with its two parts: economic depreciation as a part of the macroeconomic forecast, and tax depreciation through the use of a stand-alone model. Federal Reserve profits and corporate taxes paid to state and local governments, the two remaining components of adjusted profits, are forecast as separate modules within the process of estimating tax receipts.

Determining the values of the exogenous inputs to the equation is a straightforward procedure. CBO assumes that the top statutory tax rate, TAXRATE, equals its level set under present law--34 percent. The forecast

of the investment tax credit comes directly from estimates of tax expenditures by the Joint Committee on Taxation (JCT).[6]

The final variable, LEG86TO92, the effect of legislation enacted since 1985, captures many influences that are partly endogenous, partly exogenous. This variable compiles the revenue effects of the many revenue provisions included in recently enacted legislation. CBO has endogenously incorporated some of those effects into its methodology through separate models. For example, the effects of several provisions in the Tax Reform Act of 1986 are now modeled separately; they include the repeal of reserve accounting for bad debts, uniform capitalization rules for inventories, the reduction in the use of completed contract accounting, the repeal of certain installment sales accounting methods, and the limitation on business expenses.

Many other effects of legislation enacted after 1985 are taken exogenously from the estimates JCT produced when the legislation was considered. For example, CBO incorporates the JCT's estimates of the revenue increase from the alternative minimum tax and certain foreign tax provisions of TRA86 directly into the equation through the LEG86TO92 variable. Numerous other, less significant provisions are incorporated in the same way. It is important to note that, as with TEFRA and DEFRA, other variables in the equation capture the effects of some provisions of recent legislation. For example, TRA86 repealed the investment tax credit, with the revenue effect captured by the investment tax credit variable. In addition, that legislation lowered tax rates and changed depreciation accounting rules, with the effect on liabilities captured in the tax rate and variables on profits, respectively.

Once the model's forecast for corporate liabilities is computed, converting the forecast into unified budget receipts on a fiscal year basis becomes a fairly straightforward matter. The federal budget is calculated on a cash basis, with corporate taxes counted only when paid. However, the tax return and the National Income and Product Account data count the liability when earned. To convert the forecast of liabilities into receipts, 55 percent of a calendar year liability is assumed paid in the same federal fiscal year, with the remaining 45 percent paid in the following fiscal year. That conversion formula largely reflects the estimated payment pattern of corporations, which typically pay their taxes in four annual installments and one final settlement. Of those five payments of a calendar-year liability, three generally occur within the same federal fiscal year and the other two in the following federal fiscal year. In addition, corporations pay some liabilities in following years as back taxes.

---

6. The most recent estimates are presented in Joint Committee on Taxation, *Estimates of Federal Tax Expenditures for Fiscal Years 1992-1996* (March 11, 1991).

USING FORECAST JUDGMENT

Although the equation inputs are the most important factors in determining the corporate liabilities forecast, CBO uses its judgment to assess the accuracy of the equation over the recent historical period. As described earlier, the liabilities equation explains history well, but it does not capture all influences on tax liabilities. The forecaster must interpret the reasons for the equation's historical errors (often called residuals) and determine whether they result from temporary or permanent factors. If the forecaster finds that temporary, already-expended factors are responsible, he or she makes no judgmental adjustments to the equation's forecast. If permanent factors underlie the historical error, however, the equation's forecast must be adjusted. It is impossible to know with certainty what causes the historical errors. If that were possible, one could simply adjust the equation and avoid out-of-model judgments.

The forecaster must also exercise judgment to reconcile the equation's output with the current data on tax collections. CBO forecasts twice a year, in winter and summer. In the winter baseline forecast, full data on corporate receipts exist for the first two months of the fiscal year plus data (often partial) for the important December estimated payment. By the time CBO produces its summer baseline update, eight or nine months' worth of receipts for the current year typically have already been tabulated. As a result, part of corporate receipts for the current fiscal year have already been paid by the time the forecast is prepared, and that information must be incorporated into the receipts forecast. Especially in the summer baseline, the forecaster can use the data on collections to estimate receipts more reliably for the current year. If the equation shows a substantially different forecast than the one based on collections data, the forecaster must reconcile the two.

ISOLATING THE SOURCES OF FORECAST ERROR

It is possible to classify the sources of forecast errors in different ways. One is to categorize the errors with reference to the estimated equation. Using that method, the forecast errors in receipts stem from errors in the equation inputs, changes in the equation's estimated relationship between profits and liabilities, or unanticipated legislative changes. A similar way to classify the errors, which CBO traditionally employs to assess its forecasts, attributes the errors to either economic, technical, or legislative factors.

The simpler way is to classify errors with reference to the equation. Errors in the forecasts of the inputs to the equation on receipts typically form

the most important source of error in the forecast for corporate receipts. Corporate profits are notoriously difficult to forecast accurately because they fluctuate sharply and irregularly over the business cycle. The input representing the effects on revenue of recent legislation is also subject to forecast error, in part because the macroeconomic variables used in the estimation are themselves subject to error. The other inputs to the equation do not contribute significantly to the forecast error. Now repealed, the investment tax credit has become increasingly less significant to the overall corporate forecast; current law sets the tax rate, and definition sets the dummy variables.

The relationship between adjusted profits and liabilities may change over time, further contributing to the error in the forecast. In other words, the equation's coefficients may not apply as well to the forecast period as to the historical period. That could actually occur if taxpayers changed their behavior in ways not incorporated into the equation. Although the equation models some major behavioral factors, it cannot model the full complexity of business and personal behavior. The factors omitted may cause actual receipts to diverge from the forecast and may become more important over time, particularly if the tax law changes.

Finally, forecast error arises from legislated changes in the law. The CBO baseline for corporate receipts assumes the present tax law will continue. Of course, the forecast period may see the enactment of new legislation that changes the pattern of receipts.

In general, CBO classifies the forecast errors in terms of economic, technical, and legislative factors. In order to classify the errors in the equation for corporate receipts in a way consistent with CBO reporting, the effects described above must be separated into those components. In the case of corporate receipts, economic errors arise primarily from errors in the forecast of adjusted profits. Technical errors include changes in the statistical relationship between profits and liabilities, as well as errors in the estimated revenue effects of TEFRA, DEFRA, TRA86, and more recent legislation that errors in the macroeconomic forecast did not cause.[7] Legislative differences are the same as those described in the other classification method; they represent the effects of legislation enacted after completion of the forecast.

All three of these types of errors played a role in the forecast that CBO produced immediately after TRA86 was enacted. The following chapter discusses that forecast.

---

7. It is often difficult to separate precisely the economic and technical errors. For example, some economic errors may contain a technical component that is not readily identifiable.

CHAPTER IV

FORECAST ERROR AND THE TAX REFORM ACT OF 1986

The forecast for corporate receipts produced immediately after the Tax Reform Act of 1986 presents an informative case study. It shows how the error for one specific forecast was recognized, measured, attributed, and corrected. This chapter traces the forecasting process and, because many questions remain unanswered, makes several suggestions regarding further research.

MEASURING THE FORECAST ERROR

CBO's forecast for corporate receipts produced shortly after TRA86 was enacted contained abnormally large errors. The forecast, embodied in CBO's January 1987 baseline, was too high; CBO had expected corporate receipts to rise more rapidly over the 1987-1991 period than they actually did. CBO was not alone: other forecasters also expected stronger growth in corporate receipts. Table 6 shows CBO's forecast error for the corporate receipts baseline of January 1987. In that year, receipts were $17 billion less than expected by CBO, and by 1991 they were $52 billion less than expected. The Administration's forecast errors were very similar.[8]

8. See testimony by Robert D. Reischauer, Director, Congressional Budget Office, before the Senate Finance Committee, May 3, 1990.

TABLE 6. CORPORATE INCOME TAX RECEIPTS: CBO AND ADMINISTRATION PROJECTIONS MADE IN JANUARY 1987 COMPARED WITH ACTUAL RECEIPTS
(By fiscal year, in billions of dollars)

	1987	1988	1989	1990	1991
Projections of Corporate Receipts in January 1987					
CBO	101	119	126	138	151
Administration	105	116	127	138	148
Actual Receipts	84	94	103	94	98
Shortfall					
Actual less CBO	-17	-24	-22	-44	-52
Actual less Administration	-21	-22	-24	-45	-50

SOURCE: Forecasts from Congressional Budget Office, *The Economic and Budget Outlook: Fiscal Years 1988-1992* (January 1987), and Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 1988* (January 1987).

The forecast errors in CBO's January 1987 baseline were substantially corrected in subsequent forecasts, although the errors remained systematically negative. The unexpected weakness in corporate income tax receipts in 1987 became apparent shortly after the forecast was released. That recognition led to a reassessment of the ability of the forecasting methodology to capture the effects of TRA86.

Table 7 shows that much of the error in CBO's baseline receipts forecast of January 1987 no longer appeared in the forecasts produced in January of 1988 and 1989. Although the January 1987 baseline error for 1989 was -$22 billion, the error for 1989 was reduced to only -$3 billion in the January 1988 baseline. In the January 1989 baseline, moreover, the forecast error for 1989 approximated zero. The January 1987 baseline errors of -$44 billion for 1990 and -$52 billion for 1991 were corrected much more slowly because of the unexpected severity of the economic slowdown.

TABLE 7. THE REDUCTION IN CBO FORECAST ERRORS FOR CORPORATE INCOME TAX RECEIPTS SINCE 1987
(By fiscal year, in billions of dollars)

CBO Forecast Errors in:	1987	1988	1989	1990	1991
January 1987 Baseline	-17	-24	-22	-44	-52
January 1988 Baseline	---	-4	-3	-25	-28
January 1989 Baseline	---	---	a	-18	-22
January 1990 Baseline	---	---	---	-8	-13
January 1991 Baseline	---	---	---	---	-1

SOURCE: Congressional Budget Office.

NOTE: Dashes = not applicable.

a. Smaller than $200 million.

THE LEGISLATIVE COMPONENT

The true forecast error was actually greater than suggested in Table 6 because the January 1987 forecast did not include the effects of legislation, enacted over the 1987-1991 period, that increased corporate receipts. Without that legislation, actual corporate receipts would have been smaller and the apparent forecast error shown in Table 6 would have been even greater. Adjusting the apparent forecast error for the legislation resulted in CBO's error in the forecast reaching $65 billion by 1991 and totaling $196 billion over the 1987-1991 period (see Table 8).

TABLE 8. AN ALTERNATIVE MEASURE OF CBO'S JANUARY 1987 FORECAST ERROR
(By fiscal year, in billions of dollars)

	1987	1988	1989	1990	1991
CBO Forecast Error in January 1987 Baseline	-17	-24	-22	-44	-52
Effect of Legislation Enacted Between 1987 and 1991[a]	0	5	9	9	13
CBO Forecast Error Assuming Unchanged January 1987 Tax Law	-17	-29	-31	-53	-65

SOURCE: Congressional Budget Office.

a. Includes the revenue effects of the following legislation: the Omnibus Budget Reconciliation Act of 1987; the Technical and Miscellaneous Revenue Act of 1988; the Financial Institutions Reform, Recovery, and Enforcement Act of 1989; and the Omnibus Budget Reconciliation Acts of 1989 and 1990.

THE ECONOMIC COMPONENT

Corporate receipts fell short of the January 1987 baseline forecast in large part because adjusted profits--the measure that approximates the corporate tax base--were lower than expected: specifically, as shown in Table 9, $37 billion less in calendar year 1987 than expected in the January 1987 baseline, with the error falling in 1988 to $21 billion before growing rapidly to $201 billion by 1991.[9] The error in the forecast for adjusted profits accounted for

9. The calculation incorporates actual National Income and Product Account data that were available before the comprehensive revision in December 1991. The revised data include definitional changes to profits that render unreliable any comparisons to forecasts using the unrevised data.

TABLE 9. CBO BASELINE PROJECTIONS FOR ADJUSTED PROFITS COMPARED WITH ACTUAL VALUES
(By calendar year, in billions of dollars)

	1986	1987	1988	1989	1990	1991
Actual[a]	150	198	230	212	202	184
January 1987 Baseline	168	235	251	296	336	385
Difference	-18	-37	-21	-84	-134	-201

SOURCE: Congressional Budget Office and Department of Commerce, Bureau of Economic Analysis.

a. National Income and Product Accounts data available prior to the December 1991 comprehensive revision, which changed the definition of profits. The 1991 actual value is a CBO estimate.

$9 billion of the error in receipts in both 1987 and 1988, $15 billion in 1989, and $46 billion in 1991.[10] On average over the 1987-1991 period, the error in adjusted profits--the economic component of the forecast error--accounted for about 55 percent of the error in receipts not attributed to new legislation (see Table 10). A substantial revision of the data on profits could change that estimate.

These errors in the forecast for adjusted profits result from a number of factors, including unexpectedly high interest payments on corporate debt, an unexpectedly high level of tax-based depreciation allowances, and revisions to the historical data on profits. The first reason for the unexpectedly low profits was that, after 1988, interest payments on corporate debt were surprisingly high compared with the level projected in the baseline forecast of January 1987. Since interest payments on debt are deductible from gross corporate

10. The calculation uses the equation's estimated marginal tax rates of 35 percent in 1987 and 29 percent thereafter. The rates, documented in this study, are virtually the same as those estimated in the equation used for the January 1987 baseline forecast. The calculation also uses the model's estimated effect of net operating losses and accounts for the translation of liabilities to receipts using the 55 percent/45 percent timing pattern discussed earlier.

TABLE 10. ATTRIBUTION OF THE JANUARY 1987 FORECAST ERROR FOR CORPORATE RECEIPTS (In billions of dollars)

	1987	1988	1989	1990	1991	1987-1991
Changes in Policy	0	5	9	9	13	36
Economic Factors	-9	-9	-15	-29	-46	-108
Technical Factors	-8	-20	-16	-24	-18	-87
Total Forecast Error	-17	-24	-22	-44	-52	-159

SOURCE: Congressional Budget Office.

income, unexpectedly high interest payments resulted in unexpectedly low adjusted profits. Some analysts have suggested that TRA86 may ultimately be credited with causing a large run-up in debt and, therefore, high interest payments.[11] That conclusion remains uncertain because the run-up occurred several years after enactment of TRA86.

The second factor in the unexpectedly low level of adjusted profits, explaining the results in 1987, was tax-based depreciation allowances that were higher than expected. It appears that TRA86, which was expected to boost tax-based depreciation allowances temporarily, had an even stronger effect in 1987 than anticipated. Since depreciation allowances are also deducted from gross corporate income, the unexpectedly high depreciation allowances depressed adjusted profits.

The third reason is the inaccuracy of the historical data produced by the Bureau of Economic Analysis that were available at the time of the January 1987 baseline forecast. For 1986, CBO and other forecasters had used adjusted profits data that BEA had overestimated by $18 billion (and would subsequently revise). CBO's January 1987 baseline profits forecast started from this overly optimistic "jumping-off point."

11. See James M. Poterba, *Why Didn't the Tax Reform Act of 1986 Raise Corporate Taxes?*, Working Paper No. 3940 (Cambridge, Mass.: National Bureau of Economic Research, December 1991).

THE TECHNICAL COMPONENT

The technical component of the forecast error can be broken into two parts: noneconomic forecast errors to the inputs of the equation; and changes in the equation's estimated relationship between adjusted profits and liabilities. Over the 1987-1991 period, the technical error in CBO's January 1987 forecast accounted for an estimated 45 percent of the total forecast error not attributed to new legislation (an uncertain estimate because errors of this kind can never be calculated with certainty). This technical estimate (a residual calculation) is defined as the forecast error component that is independent of economic and legislative factors. Like the economic and legislative errors, the estimated technical error is subject to change with newer data.

Errors Other Than Profits in the Inputs to the Equation

Noneconomic forecast errors to equation inputs explain about a quarter of the total forecast error. It now appears that, for reasons unrelated to the macroeconomic environment, several legislative changes did not raise as much revenue as originally anticipated. For example, several provisions in TRA86 seem to have been overestimated, including restrictions on the completed contract method of accounting and the enactment of the alternative minimum tax. In addition, CBO concludes, based on its updated equation and Treasury Department estimates, that the revenue gains of the Tax Equity and Fiscal Responsibility Act of 1982 and the Deficit Reduction Act of 1984 that it originally used were too large. Over the 1987-1991 period, those input errors contributed an estimated 25 percent of the entire $196 billion forecast error (assuming constant January 1987 tax law).

The Changed Statistical Relationship Between Adjusted Profits and Liabilities

The technical error in the forecast for receipts resulted also from an altered statistical relationship between adjusted profits and liabilities. The equation could not incorporate all changes in the financial behavior of corporations. The equation's coefficients failed to account for certain behavioral changes--in capital gains, foreign transfer pricing, employee stock ownership plans (ESOPs) and the corporate form of organization--that occurred following enactment of TRA86. As will be discussed later, that factor explains the remaining 20 percent of the forecast error.

Perhaps most important, the change in individual and corporate tax rates in TRA86 brought about an unanticipated change in the corporate form.

Many corporations became either partnerships or S corporations in order to avoid paying the corporate income tax. In addition, corporations cashed in many capital gains in 1986, presumably in anticipation of the higher tax rates; those capital gains changed the timing of corporate tax payments beyond CBO's expectations. Also, many firms used ESOPs and thereby reduced tax payments. Finally, more effective transfer pricing by foreign multinational corporations may have contributed to the forecast error. Before quantifying the effects of the changed relationship, one must examine the four factors just cited.

S Corporations. The shift in corporate form, largely unanticipated, was an important consequence of TRA86. Starting in 1987, that act triggered the shift of many corporations to S corporation and partnership status by reducing--for the first time--the top individual marginal tax rate below the top corporate rate. Those two business forms sidestep double taxation of equity income by "passing through" the income to shareholders and partners and avoiding the corporate tax. Not all corporations can elect the S form, however. An S corporation must have 35 or fewer shareholders, one class of stock, and only individuals, estates, and trusts as shareholders; it also must be domestic and not a member of an affiliated group.[12]

The equation of corporate liabilities was not structured to account for the behavioral changes in corporate form. Since S corporation profits, like those of taxable C corporations, are included in corporate profits as measured by the National Income and Product Accounts, increased use of the S form had no effect on aggregate adjusted profits. The mix of adjusted profits, however, shifted away from profits subject to the corporate income tax. That shift was not captured by the equation, which implicitly assumed a continuation of the existing trends in the mix between taxable and nontaxable profits. Although the mix of profits remained stable from 1983 to 1986, it shifted very sharply after the enactment of TRA86. Profits of S corporations increased from about $8 billion in 1986 to more than $24 billion in 1987--that is, from 3.1 percent to 7.4 percent of total corporate net income (see Table 11).[13] The increase in S corporate profits contributed about $3 billion to the receipts forecast error in 1987 and about $6 billion per year over the 1988-1991 period. Some of those effects on total federal receipts may have been offset by increases in individual income taxes.

---

12. For a more extensive discussion, see George A. Plesko, "Entity Choice: Financial Characteristics of S and C Corporations," Working Paper (Boston: Northeastern University, 1991).

13. Although very similar to IRS-based profits, net income counts losses in the year incurred rather than when used as a carryover deduction for net operating losses. The measurement of net income is thus consistent with S corporation profits, which also measure all losses in the year incurred.

TABLE 11. THE SURGE IN S CORPORATIONS' PROFITS AFTER 1986
(By calendar year, in billions of dollars)

	1983	1984	1985	1986	1987	1988
Net Income of S Corporations	5.1	6.9	7.6	8.3	24.2	33.4
Net Income of All Corporations	188.3	232.9	240.1	269.5	328.2	413.0
Net Income of S Corporations as a Percentage of Total	2.7	3.0	3.2	3.1	7.4	8.1

SOURCE: Congressional Budget Office from Internal Revenue Service data in various annual issues of the IRS's *Corporation Source Book.*

NOTE: Both profit measures are net of losses.

Capital Gains. Another unexpected behavioral response occurred because TRA86 raised tax rates on capital gains for corporations, resulting in a surge of asset sales and capital gains at the corporate level that resembled the well-documented surge for individuals. TRA86 raised tax rates on corporate capital gains from 28 percent in 1986 to 34 percent thereafter. Corporations responded by selling many assets in late 1986, before the higher rate became effective. In 1986, corporations realized almost $100 billion in capital gains, compared with only $64 billion in 1985 (see Table 12).[14] In the several years leading up to 1986, corporate capital gains increased strongly as a result of the wave of mergers and acquisitions; the increase that year, however, was unmistakably related to the change in tax rates. The 1986 increase in capital gains was temporary. In 1987, capital gains retrenched to $70 billion.

14. CBO's measure of corporate capital gains excludes those from several sources: mutual funds, because the gains are taxed to individuals instead of to corporations; coal and unharvested crops, because the gains are treated as ordinary business income in the National Income and Product Accounts and included in adjusted economic profits; and casualty gains from insurance proceeds in excess of the historical cost of the property, because the gains are incorporated in adjusted profits in the NIPAs.

TABLE 12. THE 1986 SURGE IN CORPORATE CAPITAL GAINS (By calendar year, in billions of dollars)

	1981	1982	1983	1984	1985	1986	1987	1988
Corporate Capital Gains	25	25	34	42	64	99	70	79

SOURCE: Congressional Budget Office from Internal Revenue Service data in various annual issues of the IRS's *Corporation Source Book*; and Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts.

NOTE: Does not include capital gains from mutual funds, unharvested crops, and certain casualty insurance payments.

CBO's forecasting procedure for corporate receipts could not capture the surge in capital gains income. Neither adjusted profits nor any other NIPA income measure includes capital gains because they do not represent income from current production. CBO's corporate baseline methodology assumes implicitly that capital gains grow at historical trend rates. The annual growth rate in capital gains income in 1986--more than 50 percent--was clearly higher than the historical rate.

While the capital gains surge significantly affected the timing of receipts over the 1986-1991 period, it did not affect the overall amount of receipts. Interestingly, the unexpected surge in late 1986 increased corporate receipts in fiscal years 1986 and 1987 beyond what they otherwise would have been. That development reduced the January 1987 forecast error for fiscal year 1987 by about $5 billion. However, that in turn increased the January 1987 forecast error for fiscal years 1988 to 1991 because some of the gains that were realized in late 1986 would have been realized in later years had TRA86 not been enacted.

Employee Stock Ownership Plans. Another important behavioral response by corporations in the post-TRA86 environment--one not caused by TRA86--was the growth in employee stock ownership plans. Under an ESOP, which is similar to a pension plan, a firm provides retirement benefits to its employees. In a typical ESOP funding arrangement, a corporation borrows to buy its own stock and contributes that to the ESOP. As the corporation pays off the loan, the stock held by the ESOP is allocated to employees according to rules the

plan specifies. Firms have used ESOPs in part because of their tax advantages. Unlike dividend payments to other stockholders, corporations can deduct from income their dividend payments to employees on ESOP stock. Further, interest on loans to ESOPs is 50 percent tax-exempt to the lender. (Legislation enacted in 1989 restricted this benefit generally to smaller companies that set up ESOPs.)

Rapid growth in ESOPs occurred in 1989, when firms acquired $24 billion of their own stock to set up ESOPs. That greatly exceeded the $6.5 billion in 1988, $5.5 billion in 1987, and slightly more than $1 billion in 1986.[15] The use of ESOPs surged in part because news of their effectiveness in reducing taxes spread widely. In addition, many firms used ESOPs as a means of defending themselves against unwanted takeovers.

CBO's January 1987 forecast of corporate receipts did not anticipate that surge in ESOP growth, contributing to the forecast error. As with S corporations and capital gains, the equation for corporate liabilities does not specifically take account of the effects of ESOPs. The ESOP tax preferences affect IRS-based profits, the true tax base, but not adjusted profits, the liability equation's approximation of the tax base. CBO adjusted its forecast in the summer of 1989 after recognizing the surge in the use of ESOPs and its implications for forecasting corporate liabilities. Soon thereafter, the Congress enacted legislation that reduced the tax benefits. Combined with the recession, the legislation had a dramatic effect: in 1990, ESOP financing dropped to only $8 billion, and then fell again to $3 billion in 1991.

Transfer Pricing. Increasingly aggressive transfer pricing by foreign multinational corporations may represent another behavioral change, also unrelated to TRA86. Transfer pricing in this context refers to the prices that domestic parent firms and their foreign subsidiaries in effect charge each other for transferred goods and services. Differing tax rates among countries involved give the multinational corporation an incentive to record as much of the profit as possible in the countries with lower taxes or, in some cases, to transfer income overseas to facilitate the use of foreign tax credits. Transfer prices can therefore be used to minimize taxes: the IRS finds it difficult to verify reasonable market prices for these transferred goods, especially in cases involving intangible assets (such as patents), where often no comparable transactions exist among unrelated parties. Transfer prices that minimize taxes need not be abusive, since a large gray area exists between reasonable and unreasonable prices. Because of the increasing degree of internationalization of the world's economies, firms may have had more opportunity to use transfer pricing rules in recent years. In addition, firms

15. Data obtained from the National Center for Employee Ownership, Oakland, California.

may have learned more about how to set transfer prices effectively, although the IRS is looking more closely at those practices.

More aggressive forms of transfer pricing may have contributed to the forecast error. Some people argue that foreign-owned corporations do not pay the legal amount of taxes on their U.S. income. Adjusted profits include those earned by foreign-owned corporations on their U.S. operations. Perhaps, because of transfer pricing, the measure of profits in the NIPAs overstates the amount actually claimed as IRS-based profits. If that is the case, CBO's forecast may be implicitly overstating the amount of U.S. taxes foreign-owned firms pay, especially during a period of greater internationalization of the economy. Not enough information currently exists to draw definitive conclusions, however.

QUANTIFYING THE CHANGED RELATIONSHIP BETWEEN ADJUSTED PROFITS AND LIABILITIES

The changed statistical relationship between profits and liabilities explains an estimated 20 percent of the 1987-1991 forecast error not caused by new legislation. One way to assess the changed statistical relationship is to look at the forecasting equation's ability to explain historical liabilities and receipts. The equation's predicted values of liabilities and receipts over the historical period can be calculated by using actual--not forecast--values for the equation's inputs. The difference between the actual and predicted values of receipts is defined as the equation residual. The measure of the residual indicates the changed relationship between adjusted profits and liabilities. Table 13 traces the equation's prediction of receipts over the 1985-1991 period and shows the residuals. The equation does not explain 1986-1991 receipts nearly as well as those of prior years. Note that the calculated residuals could change after the release of revised NIPA data.

It is apparent that the equation residuals turned significantly negative after 1986, consistent with the behavioral changes discussed earlier, indicating a shift in the relationship between adjusted profits and liabilities. Large changes in the residuals from year to year imply that one or more significant factors not accounted for in the equation has had a marked effect on receipts. Small changes may stem from random "noise" and not be significant.

TABLE 13. THE EQUATION'S PREDICTION OF HISTORICAL RECEIPTS
(Calendar years unless otherwise noted, in billions of dollars)

	1985	1986	1987	1988	1989	1990	1991
Equation Inputs							
Adjusted profits	156	150	198	230	212	202	184
Top statutory rate (percent)	46	46	40	34	34	34	34
Equation Calculations							
Estimated liabilities from the equation	76	72	77	77	76	72	67
Adjustments							
Liabilities from post-1985 legislation	0	0	27	29	32	32	31
Investment tax credits	-19	-12	-7	-4	-4	-3	-1
Subtotal	-19	-12	20	25	28	29	30
Total (Estimated Liabilities, Present Law Basis)	57	61	96	102	104	101	97
Liabilities Converted to Receipts (FY)[a]	58	59	81	100	103	103	99
Adjustments							
Investment tax credit[b]	0	-4	4	0	0	0	0
Legislation affecting timing[c]	0	0	0	1	1	d	2
Equation residual (FY)	3	8	-2	-7	-1	-9	-2
Subtotal	3	4	2	-6	d	-9	d
Total Actual Receipts (FY)	61	63	84	94	103	94	98

SOURCE: Congressional Budget Office's corporate tax model; Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts (NIPAs); various annual issues of the Internal Revenue Service, *Corporation Income Tax Returns*.

NOTE: FY = fiscal year. The data on adjusted profits are from the NIPAs available before the December 1991 comprehensive revision, which changed the definition of profits; CBO estimated the 1991 value.

a. This calculation equals 55 percent of the current year's liability plus 45 percent of the prior year's liability.
b. This adjustment represents a timing effect for the retroactive repeal of the investment tax credit by the Tax Reform Act of 1986. Many corporations underpaid estimated taxes in fiscal year 1986 because they anticipated receiving the credits. Those corporations had to increase their payments in fiscal year 1987.
c. Certain legislation enacted after 1985 changed the estimated payment rules and the interest rate on delinquent taxes, increasing unified payments but not liabilities.
d. Less than $500 million.

The equation residuals averaged -$6 billion over the 1988-1990 period, a $9 billion swing per year from the average error over the 1983-1985 period. The large swing suggests that the changed statistical relationship contributed about $35 billion to $40 billion, or about 20 percent, of the total $196 billion adjusted forecast error over the 1987-1991 period. Note that the calculation ignores the small residual for 1991 because it is an estimate based on data on profits that BEA could revise substantially.

Implications for the Baseline Forecast Beyond 1991

Interpretation of the equation residuals--especially the matter of whether the causes are temporary or permanent--holds great importance for forecasting. As discussed in Chapter 3, if the forecaster attributes the cause of the residuals to permanent factors that are likely to persist into the forecast period, the equation's forecast must be adjusted. If temporary factors have caused the residuals, adjustments need not be made.

The short-term capital gains phenomenon probably explains the large positive error in 1986, and the error has no significant long-lasting effect. As explained earlier, TRA86 caused corporations to realize many capital gains in 1986 rather than in later years, when the tax rate was set to increase. Some of those gains were realized in fiscal year 1986 and reflected in tax payments that year, increasing receipts above the level the equation predicted. Fiscal year 1987 receipts also reflected some of the gains; otherwise, the 1987 equation residual would have been more negative and perhaps more in line with subsequent ones.

The equation residuals over the 1988-1990 period are best viewed as relatively stable at an average level of -$6 billion and at least partly caused by the changes in revenue from S corporations, capital gains, ESOPs, and transfer pricing. The oscillating pattern of the residuals over the 1988-1990 period appears to stem from the timing of corporate payments going into the recession and to have no long-term significance. The swing of the residuals into the negative range is very significant, however, because it indicates the changed relationship between adjusted profits and liabilities.

The 1991 equation residual is only -$2 billion, a divergence from the 1988-1990 figure. That value could easily change over the next few years as new tax return data are incorporated into the NIPA measure of profits. Profits in 1991 may have been higher than those currently incorporated into the NIPAs, so profits may ultimately be revised upward. In that case, the residual might

ultimately be more negative and more in line with the average amount over the 1988-1990 period.

CBO's standard forecast over the last few years has judged the most recent residual to be permanent and likely to persist through the forecast period. Unless further adjustment is required for recent data on collections, therefore, CBO typically will add the most recent residual to the equation's forecast. In the January 1992 baseline, that judgment produced only a small negative adjustment of the equation's forecast.

FURTHER RESEARCH

The CBO methodology used to assess corporate receipts suggests further avenues of research. For instance, why have adjusted profits fallen steadily relative to the size of the economy over the last 40 years? That long-standing question has not been adequately resolved, and it has critical implications for CBO's forecast of corporate receipts.

What is the relationship between errors in corporate receipts and in individual receipts? Some evidence exists that CBO's errors in its forecasts of individual income tax receipts offset other errors in its forecast for corporate receipts. Those offsetting errors may not have been coincidental. CBO's forecasts of overall gross domestic product could very possibly be more accurate than its forecast of the mix of GDP between individual and corporate incomes. In addition, some corporate strategies to minimize the tax serve to increase individual receipts.

Strategies for transfer pricing, as discussed above, may be an important component of the changing behavior of corporate receipts. Perhaps additional studies can determine the effects of transfer pricing on the corporate tax base.

It would also be important to understand how corporate capital gains affect forecasts of corporate income tax receipts. How might analysts explicitly model capital gains? Would such modeling make forecasting more precise?

Finally, how does corporate tax integration fit into the perspective of corporate income tax performance? The large shift to S corporations represents an effective integration of the corporate income tax into the individual income tax. Can that shift in corporate form provide evidence concerning the changes in revenue likely to result from legislated corporate tax integration?

APPENDIX

TOP CORPORATE STATUTORY TAX RATES

This appendix details statistically the history of the top corporate statutory tax rate from 1952 to the present. Its also provides information on the tax bracket that corresponds to the top statutory rate.

TABLE A-1. CORPORATE TAX RATES AND BRACKETS

Period or Year	Top Statutory Rate (Percentage)	Effective on Taxable Income Above
1952-63	52	$25,000
1964	50	$25,000
1965-67	48	$25,000
1968-69[a]	52.8	$25,000
1970[a]	49.2	$25,000
1971-74	48	$25,000
1975-78	48	$50,000
1979-1986[b]	46	$100,000
1987	40	c
1988-Present[d]	34	$75,000

SOURCE: Congressional Budget Office from Internal Revenue Codes.

a. Includes Vietnam War surcharge of 10 percent in 1968 and 1969 and 2.5 percent in 1970.
b. From 1984 to 1986, does not include an additional 5 percent tax on taxable income between $1 million and approximately $1.4 million that was imposed to phase out the benefits of the graduated rates.
c. In the 1987 transition year provided under the Tax Reform Act of 1986, the tax rates and brackets equaled averages of the 1986 and 1988 amounts. As a result, the tax schedule contained many rates and brackets that are difficult to compare with those of other years.
d. Does not include the additional 5 percent tax on taxable income between $100,000 and $335,000 that was imposed to phase out the benefits of the graduated rates.