

## Revenue Projections and the Stock Market

The recent gyrations of the stock market, combined with large reductions in projected federal revenues, have invited speculation about the sensitivity of federal receipts to the market's movements. Observers have pointed to the rapid rise in the value of stocks as a likely source of the late 1990s' surge in revenues relative to gross domestic product (GDP). And the drop in receipts in fiscal year 2002 in the wake of the market's decline seems to be consistent with a stock market/revenue link.

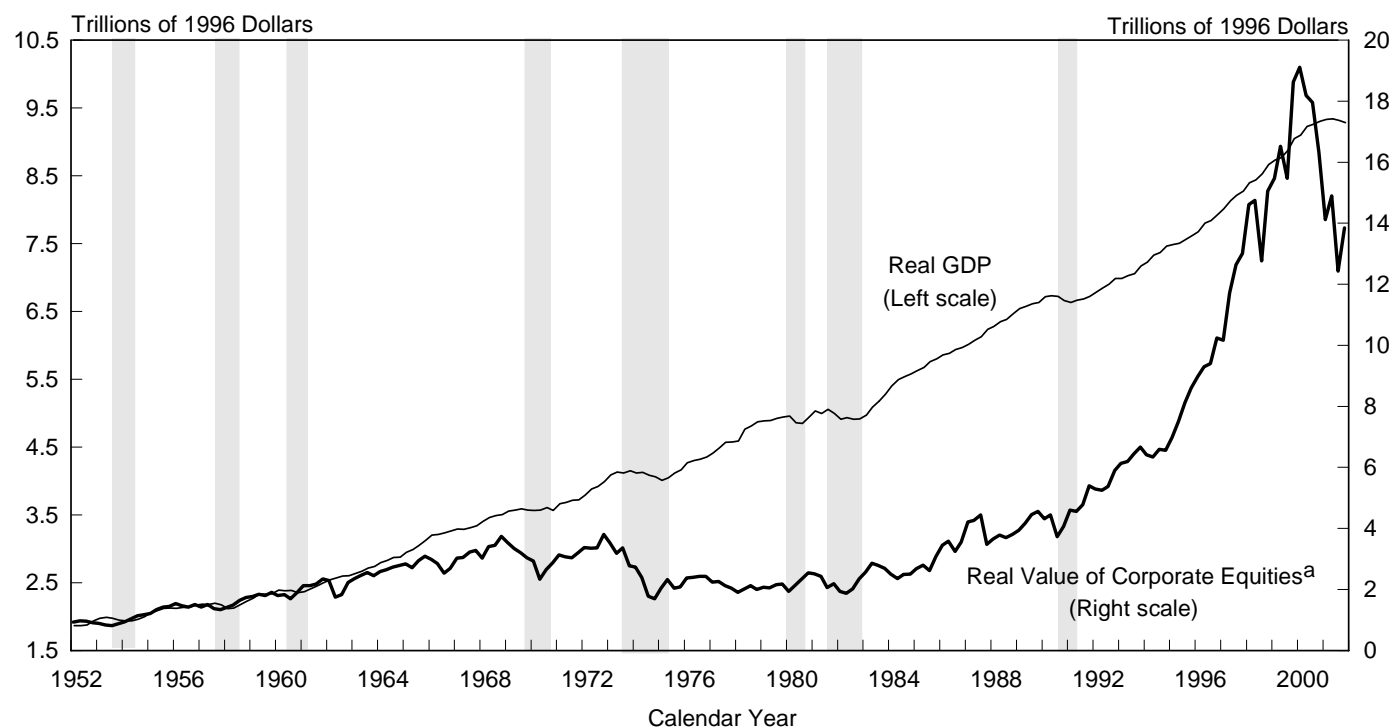
Information on stock prices is a useful adjunct to the projection of incomes that CBO employs to produce a revenue forecast. Although the growth of the federal tax base is pri-

marily driven by overall economic activity, a number of components of the base, such as capital gains, respond to changes in the prices of stocks. But the stock market and the economy do not move in tandem. Equity prices have a tendency to drop when the economy is in or about to fall into a recession. Yet similar drops occur in the stock market at other times as well. Over long periods, the real value of the market may decline (such as in the 1970s) as the economy continues to grow (*see Figure 1*). And the market may also rise much faster than the economy does (as in the 1990s).

The relationship of stock prices to receipts, however, is complex. It involves a variety of lags, offsets, and other complica-

**Figure 1.**

### GDP and the Value of Corporate Equities, 1952 to 2001



Source: Congressional Budget Office.

Note: Shaded bars represent recessions. The recession that began in March 2001 is not shown because its end date has not yet been officially determined.

a. Primarily the total inflation-adjusted value of all stocks held by individuals and entities in the United States.

tions, so that stock market-sensitive revenue components do not necessarily mimic the market's movements. As a result, knowing what the market has done (or will do) is of limited value in projecting federal receipts. This revenue and tax policy brief examines the stock market/revenue connection in some detail and explores the degree to which an understanding of that link informs the Congressional Budget Office's (CBO's) revenue forecasts.

## Sources of Recent Fluctuations in Revenue

Total federal receipts as a percentage of GDP have varied substantially over the past decade, growing from 17.5 percent in 1992 to 20.8 percent in 2000 and then dropping to 17.9 percent in 2002 (*see Table 1*). While some of that rise and fall was due to legislation—in particular, to tax increases in 1993 and tax cuts in 2001—the lion's share resulted from changes in the amount of revenue that a given level of economic activity generated.<sup>1</sup>

**Table 1.**  
**Receipts as a Percentage of GDP,  
1992 to 2002**

| Fiscal Year | Total | Individual | Corporate |
|-------------|-------|------------|-----------|
| 1992        | 17.5  | 7.7        | 1.6       |
| 1993        | 17.6  | 7.8        | 1.8       |
| 1994        | 18.1  | 7.8        | 2.0       |
| 1995        | 18.5  | 8.1        | 2.1       |
| 1996        | 18.9  | 8.5        | 2.2       |
| 1997        | 19.3  | 9.0        | 2.2       |
| 1998        | 19.9  | 9.6        | 2.2       |
| 1999        | 20.0  | 9.6        | 2.0       |
| 2000        | 20.8  | 10.3       | 2.1       |
| 2001        | 19.8  | 9.9        | 1.5       |
| 2002        | 17.9  | 8.3        | 1.4       |

Source: Congressional Budget Office.

Some of the variation showed up as corporate income tax receipts, which grew from 1.6 percent of GDP in 1992 to 2.2 percent in 1998 before dropping to 1.4 percent in 2002. There are several reasons that corporate income taxes do not rise and fall proportionately with GDP. Profits make up the underlying base of the corporate tax. As the residual in the

economy—what remains for the owners of firms after compensating all other factors of production—profits are inherently more variable relative to GDP than are many other sources of taxable income. Other reasons that corporate taxes do not move proportionately with GDP are that the corporate tax base excludes some forms of income that are part of GDP, includes some items that are not part of it, and recognizes income at different times (because some income is deferred for tax purposes). A further explanation is the nonsymmetrical tax treatment of profits and losses. A firm pays taxes if it makes a profit, but it does not receive money from the government when it takes a loss (except to the extent that it can carry losses backward or forward into other tax years). Because of that asymmetry, corporate tax receipts do not move proportionately with the net of all profits and losses in the economy.

Much more of the recent rise and fall in the receipts-to-GDP ratio manifested itself as changes in individual income tax receipts, which grew from 7.7 percent of GDP in 1992 to 10.3 percent in 2000 and then fell to 8.3 percent in 2002. As with corporate taxes, there are several reasons that individual income taxes do not rise and fall proportionately with GDP. First, income taxable under the individual income tax excludes some components of GDP—for example, labor compensation in the form of fringe benefits and noncash rent imputed to owner-occupied housing. As a consequence, changes in the proportion of taxable personal income included in GDP alter the receipts/GDP ratio.

Second, some forms of taxable income are not part of GDP. In general, realizations of capital gains are taxable. But they are not part of the economy's overall national income measures. Hence, increases or decreases in capital gains realizations relative to total economic activity can change the receipts/GDP ratio.

Third, some taxation is deferred. Contributions to individual retirement accounts, 401(k) plans, defined-benefit pension plans, and other retirement vehicles typically are not taxed, but distributions from those plans usually are. Consequently, shifts in the amount of either contributions or distributions relative to total income lead to revenues that may shrink or grow relative to GDP.

Finally, individual income tax rates are progressive; people with high income pay a larger percentage of it in taxes (a higher average tax rate), as well as a larger percentage of increases in their income (a higher marginal tax rate), than

1. Some of the rise occurred in the face of tax cuts enacted in 1997.

lower-income earners pay. As a result, the tax rate effectively imposed on income tends both to rise in response to the growth of real (inflation-adjusted) income—a phenomenon sometimes referred to as “real bracket creep”—and to move up and down in response to shifts in the way income is distributed among more highly and less highly taxed individuals. The resulting movements in the effective tax rate cause corresponding changes in the receipts/GDP ratio.

CBO’s analysis of tax-return data from 1994 to 2000 quantifies the contributions of those phenomena to the increase in individual income tax receipts relative to GDP (*see Table 2*). Over that period, the rise in taxable personal income (TPI) as a proportion of GDP contributed 20 percent of the growth of individual income tax liabilities in excess of the growth of GDP. Increasing realizations of capital gains accounted for 28 percent. The growth of retirement distributions and of other non-TPI components of adjusted gross income (the tax base of the individual income tax) accounted for 7 percent. The remaining 45 percent of liabilities growth in excess of GDP growth can be ascribed to a rise in the effective tax rate. Real bracket creep contributed about three-fifths of that rise; the rest probably stemmed from income growth being concentrated at the top of the income distribution and thus a greater proportion of income being taxed at the highest rates.

Analyses such as those identify the proximate causes of the revenue surge, but its underlying economic causes are still un-

clear. A possible explanation is the effect of the stock market. The sensitivity of the receipts/GDP ratio to capital gains realizations, the potential importance of stock options in the income of highly taxed earners, and the way that market values affect other tax sources suggest that the bull market of the late 1990s and the recent bear market may be big factors in the revenue roller coaster of the past few years. However, translating that insight into information useful for revenue estimating is complicated by the actual relationship of stock prices to tax receipts.

### Capital Gains Receipts and the Stock Market

Changes in stock prices produce changes in tax receipts by affecting capital gains. As the prices of equities rise, capital gains accrue. And when gains are realized—when the assets are sold—capital gains income shows up as taxable income for both individuals and corporations. From the beginning of the 1990s to 2000—the period roughly corresponding to the big run-up in stock prices—individual capital gains tax receipts grew from about 3 percent of total federal tax receipts to about 6 percent, or roughly \$120 billion in 2000. Corporate capital gains contributed about half that amount, or about \$60 billion; they, too, experienced substantial growth in the late 1990s.

**Table 2.**

## Sources of Growth of Individual Income Tax Liabilities in Excess of GDP Growth, 1994 to 2000

(As a percentage of total liabilities)

| Source   | 1994-1995 | 1995-1996 | 1996-1997 | 1997-1998 | 1998-1999 | 1999-2000 | Total, 1994-1999 |
|--|-----------|-----------|-----------|-----------|-----------|-----------|------------------|
| Taxable Personal Income (TPI) Grew Faster than GDP | 21        | 12        | 14        | 42        | -2        | 33        | 20               |
| Adjusted Gross Income (AGI) Grew Faster than TPI   | 35        | 57        | 39        | 8         | 57        | 16        | 35               |
| Capital Gains Receipts Grew Faster than TPI        | 20        | 52        | 29        | 12        | 36        | 20        | 28               |
| Other AGI Grew Faster than TPI                     | 15        | 5         | 10        | -4        | 20        | -4        | 7                |
| Changes in the Effective Tax Rate on AGI           | 45        | 31        | 47        | 51        | 45        | 50        | 45               |
| Effect of Real Growth on Rate                      | 31        | 20        | 34        | 30        | 26        | 28        | 28               |
| Remaining Growth                                   | 14        | 11        | 13        | 20        | 19        | 22        | 18               |
| Total Liabilities                                  | 100       | 100       | 100       | 100       | 100       | 100       | 100              |

Source: Congressional Budget Office.

Note: Numbers in the table may not add up to totals because of rounding.

Currently, about half of taxable capital gains come from stocks, but almost all of the increase during the recent bull market derived from that source. Gains from real estate and other financial assets grew only modestly. Gains from pass-through entities (such as partnerships) did increase significantly over the period; however, they probably derived from stocks as well.

Yet it does not follow that realizations must then rise and fall with the level of the stock market. For one thing, if gains are determined by the market, the *level* of gains accruals will relate to the *growth* of asset prices. Consequently, if prices simply plateau after rising, new gains accruals will fall.

For another thing, it is generally capital gains realizations that are taxed, not capital gains accruals. And movements in realizations are not contemporaneous with movements in asset prices. In both rising and falling markets, a great many accrued gains are available for realization and taxation, awaiting taxpayers' decisions to sell their assets. After a bull market such as that of the 1990s, a sizable amount of accrued gains remain to be realized even as the market flattens or drops; thus, stock sales in a falling market can still result in large taxable gains. Realizations in calendar year 2000, for example, increased by 16 percent despite the year's fall in the Standard & Poor's 500 stock price index.

## Stock Options

Movements in the stock market may also affect tax receipts through their effect on stock options. As part of their compensation, some employees are granted the right to buy the employing company's stock at a certain price—typically, the price at the time that the option is granted. Once a required vesting period has passed, the employee may exercise the option, earning income if the stock's price has risen in the meantime. To the extent that workers are compensated with stock options, a rising stock market may mean more taxable compensation.

Discerning how big a factor option income has been in the recent growth and decline of receipts is complicated by the fact that it is not reported separately on tax forms. Nevertheless, analyses of corporate financial reports suggest that it rose from negligible amounts in the early 1990s to about \$50 billion in 1997, then to more than \$100 billion in 2000. Much of that income was probably concentrated among taxpayers paying the highest marginal tax rates. Hence, option income may have yielded individual income tax receipts on the order

of \$40 billion to \$45 billion in 2000.<sup>2</sup> Preliminary evidence suggests that option income may have fallen by 40 percent or more in 2001.

Again, however, it does not follow that movements in equity prices translate into receipts from stock option income. Like gains accruals, the *level* of option income that people receive depends on the *change* in stock prices. If prices level off after years of rising, option income presumably falls, since the price of stocks typically must rise for options to have value. In addition, because option income depends on the prices of individual equities and not on the market average, it does not disappear just because the overall market is level. Even in a generally falling market, some prices still rise. Another reason that rising stock prices do not necessarily translate into option income is that vesting keeps taxpayers from capturing such income for a year or more.

A more important consideration for revenue projecting is the fact that tax rules for most stock options require that the income earned be reported as wage and salary income when the options are exercised.<sup>3</sup> Both payroll and income taxes are withheld, and the income is included in the employee compensation component of national income measures. That has two major implications for the way that option income affects receipts.

First, the inclusion of option income in reported compensation means that at the same time that income is taxable to individuals, it is deductible under the corporate income tax. Every dollar of option income realized by individuals generates an offsetting dollar reduction in corporate profits. If individual and corporate marginal tax rates are similar, the net revenue yield of option income in the year of exercise will be largely limited to options exercised by employees of unprofitable firms—because the additional deduction will have no effect on those firms' corporate tax liability, which is already zero.<sup>4</sup>

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2. Estimates of tax receipts are drawn from Scott Jaquette, Matthew Knittel, and Karl Russo, "Stock Options and Federal Tax Receipts: Recent Evidence," in National Tax Association, *Proceedings of the 94th Annual Conference on Taxation* (Washington, D.C.: National Tax Association, 2002).

3. The options described here, so-called nonqualified options, account for more than 90 percent of all option-related compensation.

4. There may still be an offsetting deduction in a future year should the corporation become profitable for tax purposes.

Consequently, given those offsetting effects on corporate receipts, even substantial changes in stock prices and option income tend to generate much smaller changes in total taxable income and total tax receipts.

Second, option income's inclusion in GDP means that its behavior, in contrast to that of gains income, does not directly affect the receipts/GDP ratio. Rather, option income affects the ratio in the same way that other wage and salary income does—and thus it is already embodied in an economic forecast even in the absence of data on the stock market. Any effect that option income has on the receipts/GDP ratio will be largely indirect—that is, by concentrating more income in the highest tax brackets.

### Other Market Effects on Receipts

Besides the stock market's influence on capital gains and stock options, rising equity values may affect receipts through three other routes: by increasing receipts from the income of estates (assets of deceased individuals that have not yet been passed on to heirs) and trusts (entities that hold assets and distribute income to beneficiaries); by swelling the tax base of the estate tax; and by affecting taxable distributions from retirement accounts.

Both estates and trusts generate income that is reported on so-called fiduciary returns and taxed under the individual income tax. Some of that income is due to capital gains from the growth of stock prices, but the amount is unknown—separate data are not available on the share of income tax receipts from fiduciary returns that derive from realizations. Presumably, in the late 1990s, much of the growth in those receipts relative to GDP resulted from increased realizations of gains.

Because the estate tax is imposed on the value of large estates at death and such estates often include large holdings of stock, higher stock prices swell the base of that tax. Tax laws enacted in recent years that affected estate tax revenue make it difficult to determine the sensitivity of the estate tax to the bull market. But in all likelihood, some additional receipts garnered under this tax stemmed from rising stock prices.

In the case of retirement accounts, higher stock values are likely to raise the accounts' balances. That increase permits—and in the case of taxpayers older than 70½ requires—bigger taxable distributions. To some extent, the larger balances also

allow their holders to make smaller tax-deferred contributions to achieve a target level of retirement income. The net effect is to enlarge the base of the individual income tax. Because taxable distributions from retirement accounts over the past several years have contributed to the rise in receipts relative to GDP, the stock market may have generated receipts through that connection.

The market-generated revenue effects of both the estate tax and retirement accounts tend to be drawn out over a long period. Hence, even a sustained rise in stock prices generally will not manifest itself immediately as additional receipts from either source. The effects of higher stock market values must await death in the case of the estate tax and retirement in the case of retirement accounts. Consequently, their impact on revenues does not necessarily coincide with stock price movements.

### The Importance of Market-Sensitive Receipts

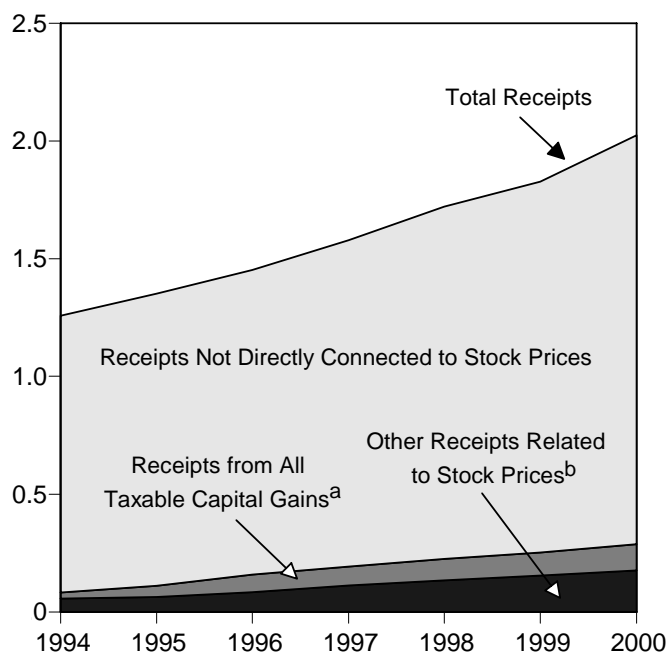
The revenue components most sensitive to the value of the stock market are those derived from capital gains realizations, income from trusts and estates, distributions from retirement accounts, and the estate tax. Individual income tax receipts generated by stock options are probably largely offset by corporate income tax deductions. In any case, they are likely to have little effect on the growth of receipts independent of their effect on GDP.

Overall, the contribution of those components to total federal receipts is small *see Figure 2*. The 1994-2000 period saw their share increase from about 6.5 percent to 14 percent. But their contribution over that period to the growth of receipts relative to GDP was much greater—they equaled about two-thirds of the increase in the ratio of total federal receipts to GDP.

That fraction probably overstates their effect, though, because not all of the growth in those components was due to changes in stock prices. Some of the increase in pension distributions relative to GDP, for example, resulted from an aging population. In addition, because the tax cuts enacted in 1997 reduced the growth of total receipts relative to GDP, the components' apparent contribution over the period is exaggerated. Nonetheless, the behavior of stock prices probably explains a very large fraction of the growth of receipts relative to GDP in the late 1990s.

## Figure 2. Total and Stock Market-Related Receipts, 1994 to 2000

(In trillions of dollars)



Source: Congressional Budget Office.

a. Includes gains from stock and nonstock assets.

b. Includes receipts related to pensions and individual retirement accounts, the estate and gift tax, and fiduciary returns.

## The Stock Market in CBO's Projections

CBO does not build a forecast of stock prices into its economic projections because stock prices cannot be predicted. If they could, investors would bid them up or down to the predicted future level immediately. As a result, the best forecast of tomorrow's stock price is today's, and the best prediction of stock prices in the more distant future is one based on the economy's growth. CBO uses the latest stock price average to adjust projections of receipts that depend on stock market wealth. But for future years, it assumes that market-sensitive

components of income, such as capital gains realizations, will return to their historical relationship with GDP.

Even when stock prices are known, they have limited value in projecting receipts. Equations for estimating taxable gains realizations, for example, are characterized by large forecasting errors even when they use actual stock market data. In January 2002, for example, CBO estimated—largely because of the drop in the stock market—that capital gains tax liability for calendar year 2001 declined by about 20 percent from its level in 2000. But the data now available from tax returns filed for tax year 2001 suggest that the drop was closer to 50 percent. In that instance, the gains-estimating problem stemmed not from assumptions about the stock market—its behavior was already known—but from the difficulty of modeling taxpayers' decisions to realize their accrued gains.

## Conclusion

The rise and fall of stock prices influences federal receipts through channels separate from the effect of overall economic activity. Stock market-sensitive components of revenue are a comparatively small fraction of total receipts. But they appear to have played a big role in the run-up of receipts relative to GDP in the late 1990s. And while there is little hard evidence as yet, they probably also played a major part in the fall in receipts of the past two years.

Analysts' underestimation of revenue in the late 1990s and their overestimation of it in 2002 were not due to a failure to take the stock market's influence into account. Revenue forecasters employ a number of modeling techniques to project receipts generated by market-sensitive components of the tax base. But those components, while sensitive to stock prices, do not closely track the ups and downs of the market. Thus, knowing what the market does adds only limited information to what is provided by an economic forecast.

**Contact:** This revenue and tax policy brief was prepared by G. Thomas Woodward. It and other publications by CBO are available at the agency's Web site: [www.cbo.gov](http://www.cbo.gov).