

Projections of Returns to be Filed in Calendar Years 1994-2000

by Carolyn DeWilde

A total of 215.5 million tax returns are projected to be filed at Internal Revenue Service (IRS) service centers during Calendar Year (CY) 1994. This is a 2.6 percent increase from the 1993 estimated volume. The overall average annual growth in tax returns through CY 2000 is 1.9 percent, with returns filed increasing to an expected 239.4 million. Return projections by the IRS Research Division provide a foundation for IRS resource requirements and budget submissions to the Secretary of Treasury, Office of Management and Budget, and Congress.

Projection Methodology

Three distinctive methods were used to project tax returns for 1994-2000: regression techniques, time series analysis, and growth rates. Regression techniques were selected when statistically sound relationships existed between tax

A 1993 tax law change is expected to impact amended and other individual income tax returns, as well as excise tax returns.

return filings and independent economic or demographic indicators. Key economic and demographic variables which significantly affect return filings include personal income, gross domestic product (GDP), civilian employment, and total population [1]. These variables were used selectively in regression models to project individual,

employment, fiduciary, and various corporation returns. In most instances, these economic or demographic variables were lagged by 1 year to correspond more directly with the tax year in question. Also, "dummy variables" (i.e., specially constructed variables with values of "0" or "1") were occasionally used to account for the effects of legislative changes, return count aberrations, and other unusual conditions not reflected by the economic or demographic variables.

The regression models incorporated the actual 1992 return counts into the base period. Some also included 1993 estimates. In such instances, the 6-month return counts were typically used to estimate the 1993 total for the year based on the proportion of returns filed in 1993 relative to the same period in 1992. Calendar year projections reflect the year in which the returns are processed rather than the tax year covered by the information reported on the return [2].

In the absence of statistically sound relationships with

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economic or demographic variables, some returns were projected using time series analysis techniques. These include finite moving averages, exponential smoothing, and autoregressive integrated moving average (ARIMA) techniques. For example, forecasts of excise tax returns were based on a moving average, while projections of certain employment tax returns were based on ARIMA models.

Other return series have very short or even no historical base periods; therefore, the traditional projection techniques are not applicable. In these instances, simple growth rates are used for forecasting. This method generally assumes that a prior growth pattern for a limited set of years for a given form will continue in the future, or that a new return type will grow at a rate similar to a related return with an established pattern.

"Off-model adjustments" (i.e., adjustments to the initial forecasts based on the above techniques) are sometimes necessary when returns are directly impacted by legislative or administrative changes which the techniques described above cannot take into account. The IRS projections typically reflect the impact of future legislative and administrative changes to the extent that laws have been enacted or IRS programs officially approved. For example, projection adjustments have been made due to the Omnibus Budget Reconciliation Act of 1993 (OBRA 93). However, administrative initiatives are also significant. These include a form change to enable certain married couples filing jointly to use the revised Form 1040EZ short form, formerly limited to single filers with no dependents, starting in CY 1994; the IRS "Reduce Unnecessary Filing" (RUF) outreach project which started in CY 1993; and various facets of IRS efforts to expand alternative ways of filing.

Impact of Omnibus Budget Reconciliation Act of 1993

The recently enacted Omnibus Budget Reconciliation Act of 1993 (OBRA 93) is expected to alter most directly the projections of individual returns, the Form 1040X (amended individual return), and Form 720 (for excise taxes). In total, the effects of OBRA 93 on IRS forms and workload go well beyond these three basic return types. However, these were the areas in which the IRS expected to experience the most noticeable effects on projected trends, relative to the selected return types covered in the projections.

The new law greatly expands both the amount of, and the pool of taxpayers eligible for, the "earned income tax credit" (EITC), beginning with Tax Year 1994 (Calendar Year 1995 filings). For example, approximately 5 million

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taxpayers without children are expected to claim the EITC for the first time beginning in CY 1995 as a result of the new law. The increase in the allowable credit and in the number of returns with the credit impact the individual return projections in various ways. Nearly 1.4 million taxpayers who would have filed Form 1040EZ are now expected to move to the other IRS short form, Form 1040A, or to the "standard" (i.e., non-"TeleFile," as defined below) electronic filing option to claim the EITC, since the credit cannot be presently claimed on Form 1040EZ. Also, the growth in both the number (and dollar amount) of EITC returns is expected to add to the volume of returns filed electronically. This is because taxpayers who claim the EITC have a higher electronic filing participation rate than other taxpayers [3].

OBRA 93 is also expected to significantly increase the volumes of Form 1040X, *Amended U.S. Individual Income Tax Return*, in CY 1993 and CY 1994. These increases are expected based on unique aspects of the law that affect self-employed taxpayers with deductions for health insurance and other taxpayers who receive certain employer-provided educational assistance. Due to these

provisions, it is estimated that approximately 1.7 million taxpayers will submit amended returns in CY 1993 or 1994 to obtain refunds.

In the area of excise tax returns, OBRA 93 is expected to lower the volumes of Form 720 more than would otherwise be expected. These reductions will result from the repeal of parts of the luxury tax and the change in the point of taxation on diesel fuel. It is estimated that approximately 80,000 fewer Form 720 returns will be filed in the long run.

The impact of OBRA 93 on the projected return volumes, as well as other administrative factors affecting the projected trends, are noted further in the following section on Projections Highlights.

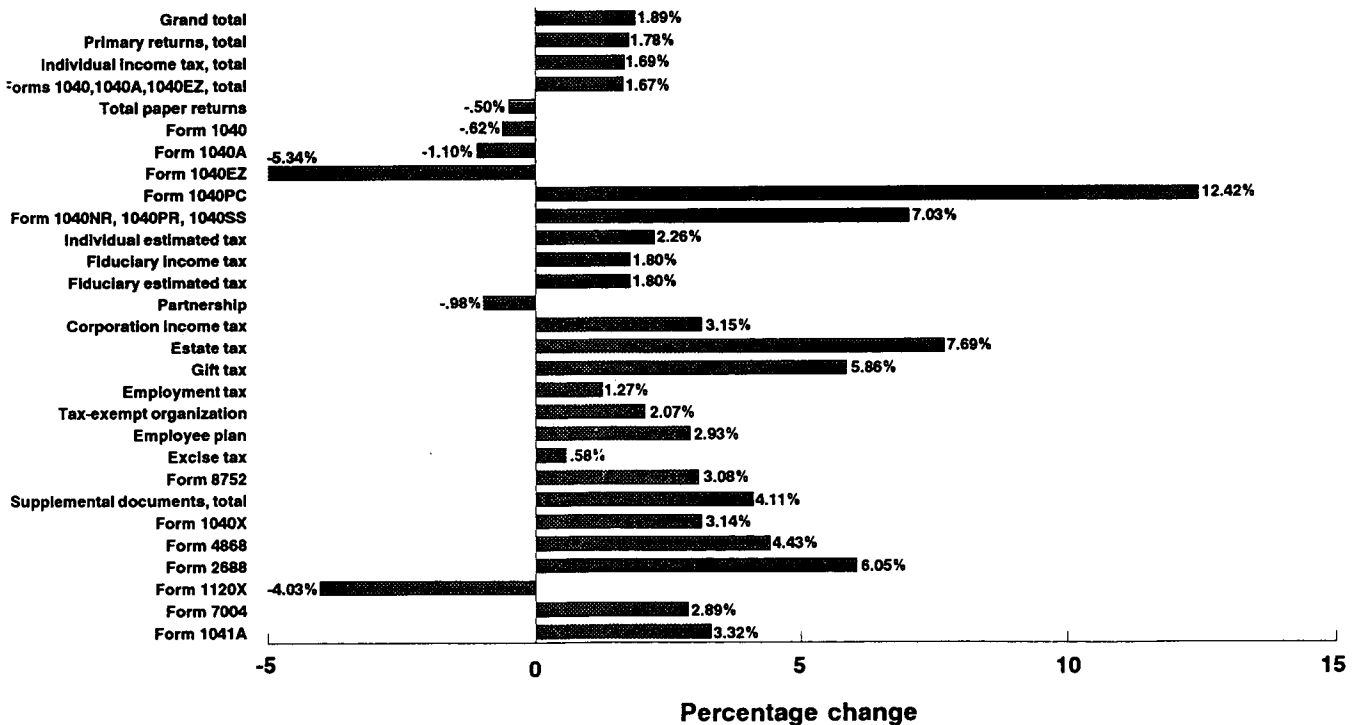
Projections Highlights

Grand Total Returns, Primary Returns, and Supplemental Documents

Grand total return projections suggest an annual average increase of 1.9 percent in the years 1994 through 2000 (Figure A)[4]. Primary returns, particularly individual, corporation, and employment tax returns, account for a major portion of the total filings and generate the majority

Figure A

Projected Average Annual Percentage Change in the Number of Returns Filed, by Type of Return, Calendar Years 1994-2000



Projections of Returns to be Filed in Calendar Years 1994-2000

Figure B

Projections for Calendar Year 1994

[Number of returns is in thousands]

| Type of return | 1994 Projections | Percentage change from 1993 ¹ (estimated) |
|---|------------------|--|
| Grand total | 215,501 | 2.63 |
| Primary returns, total | 201,904 | 2.09 |
| Individual income tax, total..... | 117,909 | 2.15 |
| Forms 1040, 1040A, 1040EZ, and 1040PC | 117,477 | 2.14 |
| Total paper returns..... | 102,797 | 0.28 |
| Paper Form 1040..... | 59,734 | -1.41 |
| Paper Form 1040A..... | 18,956 | -6.36 |
| Paper Form 1040EZ..... | 18,042 | 7.58 |
| Paper Form 1040PC..... | 6,065 | 23.61 |
| Total electronic returns..... | 14,680 | 17.34 |
| Standard electronic filing..... | 14,128 | 14.27 |
| TeleFile..... | 553 | 272.03 |
| Forms 1040NR, 1040PR, 1040SS... .. | 432 | 6.36 |
| Individual estimated tax..... | 41,357 | 2.30 |
| Fiduciary income tax..... | 2,983 | 1.68 |
| Fiduciary estimated tax..... | 717 | 1.69 |
| Partnership..... | 1,543 | -1.75 |
| Corporation income tax..... | 4,777 | 3.74 |
| Estate tax..... | 81 | 7.73 |
| Gift tax..... | 221 | 7.40 |
| Employment tax..... | 29,517 | 1.57 |
| Tax-exempt organization..... | 563 | 2.36 |
| Employee plan..... | 1,346 | 3.79 |
| Excise tax..... | 816 | -3.40 |
| Form 8752 ² | 73 | 1.67 |
| Supplemental Documents² | 13,597 | 11.56 |
| Form 1040X..... | 3,166 | 33.76 |
| Form 4868..... | 6,175 | 6.95 |
| Form 2688..... | 2,061 | 8.89 |
| Form 1120X..... | 27 | -3.93 |
| Form 7004..... | 2,128 | 1.91 |
| Form 1041A..... | 40 | 3.38 |

¹ Percentage changes for 1993 were based on estimated final counts of returns because complete information was unavailable at the time this table was compiled.

² Explanations of form numbers are presented in footnotes to Table 1, at the end of this article.

NOTE: Detail may not add to totals because of rounding.

of IRS document processing workload. Of the 215.5 million grand total for returns projected to be filed in 1994, about 201.9 million were designated as “primary returns” and the remaining 13.6 million as “supplemental documents” (Figure B). Supplemental documents are mainly composed of amended returns and requests for filing extensions from both individuals and corporations [5].

Individual Income Tax Returns

An estimated 117.9 million individual income tax returns are projected to be filed in 1994, with an average annual growth rate of 1.8 percent through CY 2000. However, this projected growth rate masks an unusual 1993 filing season that was characterized by fewer individual returns filed than previously projected. As shown in Table 1, total individual returns filed in CY 1993 are expected to be very close to their 1992 levels. This pattern is partly attributable to the “Reduce Unnecessary Filing” outreach

program which served to educate individuals filing returns needlessly.

Forms 1040, 1040A, 1040EZ, and 1040PC

The Form 1040 series, consisting of Form 1040, short Forms 1040A and 1040EZ, and Form 1040PC, reflects the major individual income tax returns filed, either on paper or electronically. (Form 1040PC represents “paper” tax returns filed by taxpayers or paid preparers using an IRS-approved computer software-generated format rather than a specific type of tax form.) In 1994, a total of 117,477,000 returns in the Form 1040 series are projected to be filed, which is a 2.1 percent increase over the estimated 1993 volume. Variation in the mix within the form types and method of filing is quite pronounced, as discussed below.

Total Paper Returns

Total “paper return” projections reflect a summation of the corresponding volumes of Forms 1040, 1040A, 1040EZ, and 1040PC. Eighty-seven percent of all Form 1040 series returns are projected to be filed by paper in CY 1994. By CY 2000, this percentage is expected to drop to 77, with electronically filed returns increasing to 23 percent (or over 30 million). These forecasts are largely extrapolations of existing trends and IRS is pursuing strategies to increase the level of electronic filing even further as part of its long-term strategic vision.

Paper Form 1040

The “long” Form 1040 represents the lion’s share of total paper returns and is projected to be about 58 percent of the total paper returns over the entire forecast horizon, from CY 1994 to CY 2000. As the volume of electronically-filed returns increases in the future, along with the growth in the use of the new 1040PC, the trend in paper Forms 1040 is expected to decline. This decline is projected to be at an average annual rate of decline of 0.62 percent through CY 2000.

Paper Form 1040A

The paper Form 1040A trend is a bit volatile as the result of legislative and administrative factors. The projected 6.4 percent decline in CY 1994 is in response to new Form 1040EZ, allowing certain married taxpayers to use the latter for the first time, as well as the projected growth in “standard” electronic filings (described below) and the new Form 1040PC. The much smaller decline of 0.3 percent from CY 1994 to

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CY 1995 largely reflects the shift of former 1040EZ filers to the Form 1040A, in order to claim the EITC under the new OBRA 93 provisions. The subsequent slow decline and then eventual rise near the end of the forecast period reflects the net effects of the projected growth in combined standard electronic and Form 1040PC filings, with volumes eventually being overtaken by the underlying growth in the Form 1040A filing population.

• **Paper Form 1040EZ**

The paper Form 1040EZ trend will also be volatile in the future, particularly over the next 3 tax seasons. An estimated 7.6 percent annual increase in 1994 is expected, followed by a 10 percent decline in 1995 and another, 11 percent, decline in 1996. The decreasing trend continues over the entire forecast horizon at an average annual rate of 5.3 percent. This trend is largely the net result of administrative and legislative changes. The increase in CY 1994 is mostly in response to the form change allowing certain married taxpayers to use the Form 1040EZ. The steep decline in CY 1995 is partly attributable to OBRA 93 provisions relating to the expansion of EITC, as well as to the expansion of TeleFile (filing by telephone; see below). The sharp 1996 decline largely reflects the impact of nationwide implementation of TeleFile, while the overall decline through CY 2000 generally reflects the future growth in TeleFile.

• **Paper Form 1040PC**

In 1994, an estimated 6.0 million Forms 1040PC will be filed in place of the traditional paper Form 1040, Form 1040A, and Form 1040EZ. Form 1040PC has been available nationwide as an alternative to filing the traditional Form 1040, 1040A, and 1040EZ returns since 1992. This form allows taxpayers to file a computer-generated return on one or two sheets of paper, regardless of the number of schedules attached. Through 1996, there is an average expected annual growth of 20 percent. After 1996, the annual growth averages around 7.0 percent. The traditional paper return projections by form type have been adjusted to reflect the expected increase of Form 1040PC.

• **Forms 1040NR, 1040PR, 1040SS**

The total of Form 1040NR (*U.S. Non-Resident Alien Income Tax Return*), Form 1040PR (*U.S. Self-Employment Tax Return - Puerto Rico*), and Form 1040SS (*U.S. Self-Employment Tax Return - Virgin Islands, Guam, and American Samoa*) is increasing at an

Figure C

Individual Income Tax Returns by Electronic Filing, Calendar Years 1994-2000

[Number of returns is in thousands]

| Type of return | Electronically-filed returns projections | | Average annual percentage change |
|--------------------------------|--|--------|----------------------------------|
| | 1994 | 2000 | |
| | (1) | (2) | (3) |
| Total electronic returns..... | 14,680 | 30,167 | 13.60 |
| Standard electronic filing.... | 14,128 | 24,525 | 10.42 |
| TeleFile..... | 553 | 5,642 | 86.93 |

NOTE: Detail may not add to totals because of rounding.

average projected rate of 7 percent per year. Approximately 85 percent of this total reflects the Form 1040NR. Typically, Forms 1040NR are filed by nonresident aliens investing in limited partnerships.

• **Total Individual Electronic Returns**

The most recent projections of electronically filed (ELF) individual income tax returns call for 14.7 million to be transmitted in 1994 (Figure C). This figure includes nearly 553,000 TeleFile returns in a limited expansion of this test program. The longer range outlook for total ELF filings (which assumes nationwide implementation of TeleFile in CY 1996) calls for 30 million returns filed electronically by CY 2000. By that year, 81 percent (24.5 million) are expected to be "standard" electronic filings (defined below) and 19 percent (5.6 million), TeleFile returns.

• **Standard Electronic Returns**

Standard electronic returns are non-TeleFile returns transmitted through an authorized third party, typically by a paid-preparer. In 1994, about 14.1 million individual income tax returns are estimated to be processed through this medium. In general, these projections were based on time-series techniques that extrapolated the growth in participation rates (i.e., the proportion of standard ELF returns to total Form 1040 series returns) at the IRS District Office level. These baseline forecasts were increased somewhat to account for certain "off model" considerations, most notably an estimated additional 900,000 "standard" ELF returns beginning in CY 1995 as a result of the expansion of the EITC under OBRA 93.

• **TeleFile**

TeleFile gives certain taxpayers filing Form 1040EZ the option to file their returns using touch-tone telephones. During the CY 1993 filing season, over 148,000 Ohio taxpayers participated in the second year

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of testing of TeleFile as a filing option. In 1994, over 550,000 TeleFile returns are expected in an expansion of the program to include seven States (Ohio, Michigan, Indiana, Kentucky, West Virginia, South Carolina, and Florida). This new technology is expected to be expanded to more States in 1995 (Georgia, Alabama, North Carolina, Mississippi, Arkansas, Tennessee, Louisiana, and California), culminating in nationwide availability in CY 1996. An estimated 3.0 million TeleFile returns are expected in CY 1996, growing to 5.6 million by CY 2000. In general, these projections were based on anticipated participation rates drawn from the Ohio test experience and the total number of taxpayers eligible to use the Form 1040EZ[6].

Individual Declarations of Estimated Tax

The *Individual Declaration of Estimated Tax* (Form 1040-ES) payment vouchers are filed when income is not subject to withholding (or if the withholding is expected to be inadequate). Income not subject to withholding includes income, such as from self-employment, interest, dividends, rents, or alimony. Estimated tax payment vouchers are usually filed on a quarterly basis depending upon the date the income was received. The projections have growth rates that range from 2.3 percent in 1994 to 2.1 percent in 2000. In 1994, there are 41.4 million Form 1040-ES vouchers projected to be filed, about 21 percent of the grand total of all returns. The Form 1040-ES projections are based on a time series model.

Fiduciary Income Tax Returns

Form 1041 is filed by a fiduciary to report the income of an estate or trust. Annual growth for this return type from 1994 to 2000 is expected to average 1.8 percent. The projected growth is based on the anticipated increase in household net worth (a measure of wealth estimated in June 1993, by Data Resources, Incorporated) in 1982 dollars, a dummy variable for the impact of the Tax Reform Act of 1986 (TRA 86) and a linear time trend.

Fiduciary Estimated Tax Returns

Form 1041-ES was created by TRA 86, which mandated that fiduciaries of estates and trusts make certain estimated income tax payments beginning with Tax Year 1987. In 1994, there are 716,900 Forms 1041-ES expected to be filed with an average annual growth of 1.8 percent through 2000. The projections were created by regressing the ratio of Forms 1041-ES to Forms 1041, based on 1987-1992 experience.

Partnership Returns

U.S. Partnership Return of Income (Form 1065) is used to

report income, deductions, credits, and losses from the operation of a partnership. The purpose of this return is to show each partner's distributive share, to be reported on the individual (or other) income tax return. The projections call for an overall decline of 1.4 percent through 1997, and then a slower decline of 0.6 percent until 2000. Partnership counts continue to decrease in part because of the residual effect of TRA 86 in curbing tax shelters. This decline started in Calendar Year 1987 and has continued until now as indicated by the partial year (January 1-September 30, 1993) return counts. These forecasts, based on a time trend model, capture this decreasing trend.

Corporation Income Tax Returns

Corporation income tax returns are the aggregate of *U.S. Corporation Income Tax Return* (Form 1120); *U.S. Corporation Short-Form Income Tax Return* (Form 1120A); *U.S. Income Tax Return for an S Corporation* (Form 1120S); and various other forms filed by such entities as real estate investment trusts, insurance and investment companies, homeowners associations, and others. In 1994, approximately 4.8 million returns are projected to be filed. The projected average annual percentage change in the number of returns through 2000 is 3.2 percent, which reflects a combination of econometric regression models using GDP and time series techniques based on past filing experiences.

In 1994, Form 1120, Form 1120S, and Form 1120A are projected to be 46 percent, 44 percent, and 7 percent of the total corporation returns filed, respectively. Due to TRA 86, certain corporations were able to take advantage of the lower individual income tax rates and switched from filing a Form 1120 to a Form 1120S. (S Corporations are taxed at the shareholder level.) The OBRA 93 legislation has the potential of reversing this trend, but the number of corporations expected to change back to filing Form 1120 is uncertain due to other business considerations which could lead a business entity to continue to file as an S Corporation. Thus, no "off model" adjustments were made in this area.

Estate Tax Returns

United States Estate Tax Return (Form 706) applies to the transfer of property at death. Presently, those estates whose gross assets exceed \$600,000 are required to file a Form 706. Estate tax returns are expected to grow at an average annual rate of 7.7 percent through 2000. The estate total is the summation of the projections for three distinct groupings of estate returns: gross assets under \$1 million; between \$1 million and \$5 million; and \$5

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million and over. The methodologies used for these projections were ARIMA, exponential smoothing, and weighted moving average, respectively.

Gift Tax Returns

United States Gift Tax Return (Form 709) is imposed on the gratuitous transfer of real or personal property which exceeds a certain dollar amount. Generally, the person making the gift (the donor) must file Form 709 to pay the tax. The 1994 projection calls for a 7.4 percent increase. The average annual growth rate for the period 1994-2000 is projected at 5.9 percent. These projections are based on a time trend of earlier years.

Employment Tax Returns

The employment tax return count is a summation of seven employment forms: *Employer's Annual Federal Unemployment Tax Return* (Forms 940 and 940EZ); *Employer's Quarterly Federal Tax Return* (Form 941, including Form 941PR for employees in Puerto Rico, Form 941SS for employees in the Virgin Islands, Guam, and American Samoa, and Form 941E for State and local Government employees);

Employer's Quarterly Tax Return for Household Employees (Form 942 and Form 942PR); *Employer's Annual Tax Return for Agricultural Employees* (Form 943 and Form 943PR); *Annual Return of Federal Withheld Income Tax* (Form 945); and *Employer's Annual Railroad Tax Return* (Form CT-1). Form 945 is a new return to be introduced for Tax Year 1994 (returns filed in Calendar Year 1995), as discussed in more detail below. The current employment return projections for CY 1994 and CY 1995, respectively, are 29.5 million and 30.2 million, with an average increase of 1.3 percent through 2000. The major contributor to the employment total is Form 941. The 1994 projection figure for Form 941 represents 22.0 million returns out of the total 29.5 million employment tax return total, or approximately 75 percent.

The methodology for the total employment tax return figure is the summation of all of the forms listed above. The regression models for Form 940, 940EZ, Form 941, and Form 941 PR/SS/E used employment measurements as independent predictor variables. Form 942, Form 942PR, Form 943, and Form 943PR were regressed on ARIMA models. Form CT-1 was forecasted by means of an exponential smoothing model.

Two areas of the total employment returns are espe-

cially noteworthy. First, the number of Forms 942 increased by approximately 5 percent in 1993 — the first such increase since 1966. This increase is likely the result of the nationwide political/media attention focused on this area, and some residual increases are expected to continue in the short run. Second, beginning in Tax Year 1994, the *Annual Return of Federal Withheld Income Tax* (Form 945) will be used to report non-payroll items such as "backup withholding" on interest and dividends, as well as tax withholding for pensions, annuities, and gambling winnings. The estimated volume for the new Form 945 in CY 1995 is just over 300,000 returns. Future growth of Form 945 is assumed to mirror the Form 941 trend.

Tax-Exempt Organization Returns

Total tax-exempt organization returns are a summation of various forms. These include *Return of Organization Exempt From Income Tax* (Form 990); *Short Form Return of Organization Exempt From Income Tax*, (Form 990EZ); *Farmers' Cooperative Association Income Tax Return* (Form 990C); *Return of a Private Foundation (or Section 4947(a)(1) Trust Treated as a Private Foundation)* (Form 990PF); Form 990T, for the tax on "unrelated business income" of exempt organizations; Form 4720, for certain excise taxes on charities and other exempt organizations; and Form 5227, filed by "split-interest" trusts. In 1994, total tax-exempt organization returns are expected to grow 2.4 percent over 1993, to about 563,000 returns. The longer range projections for 1995 through 2000 call for an average annual growth of 2.0 percent.

The seven separate forms require a variety of forecasting methods. Form 990, Form 990EZ, Form 990PF, Form 990T, Form 5227, and Form 4720 were regressed on various time trends with dummy variables for TRA 86. Form 990C was regressed on the number of farm cooperatives published by the Department of Agriculture and a dummy variable.

Employee Plans

Total employee plan returns, the sum of Forms 5500, 5500C/R, and 5500EZ, are projected to reach 1.3 million in 1994. They are expected to reach 1.6 million by 2000. The overall annual average growth rate is 2.9 percent from 1994 to 2000, reflecting recent experience.

Excise Tax Returns

Total excise tax returns are the sum of the following four categories of returns: *Occupational Tax and Registration Return for Wagering* (Form 11C); *Quarterly Federal Excise Tax Return* (Form 720); *Tax on Wagering* (Form 730); and *Heavy Vehicle Use Tax Return* (Form 2290).

**Household employ-
ment tax returns
increased by about
5 percent in 1993,
the first such
increase since
1966.**

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Form 720 and Form 2290 represent about 91 percent of the total excise tax returns. Given the erratic filing history of Form 720, constant growth was estimated by a moving average. Form 730, Form 11C, and Form 2290 were regressed on time trends. The overall average annual growth rate from 1994 to 2000 is 0.6 percent. The passage of OBRA 93 repeals parts of the luxury tax and changes the point of taxation of diesel fuel. These provisions are expected to reduce the volume of Form 720 returns by approximately 80,000 returns in the long run.

Form 8752

Form 8752 is filed annually by all partnerships and S Corporations electing either to maintain or establish a taxable year other than the required calendar year, as mandated by TRA 86. Prior to 1991, Form 8752 was encompassed in the Form 720 volumes. In 1994, an estimated 73,000 forms are projected to be filed, with an average annual growth rate of 3.0 percent through 2000. This reflects areas of growth in S Corporations and partnerships.

Supplemental Documents

"Supplemental Documents" primarily comprise amended returns and requests for filing extensions. They are expected to climb from 10.7 million returns in CY 1992 to 12.2 million in 1993 to 13.6 in CY 1994. After this, the volume is expected to drop back down to 13.1 million returns in CY 1995, and then resume a relatively slower upward trend thereafter. The relatively sharp increases in CY 1993 and CY 1994 are attributed to the short-term increase in Form 1040X returns expected as a result of the OBRA 93 provisions dealing with self-employed taxpayers with health insurance deductions and employer-provided educational assistance.

Projection Accuracy

In addition to understanding the forecasting models and

projected volumes, it is useful to consider the historical accuracy of the past projections when evaluating the future forecasts. Using the actual return counts for Calendar Years 1990 through 1992, two key measures of accuracy have been calculated — the "mean absolute error" (MAE) and the "mean absolute percentage error" (MAPE). The MAE is the average of the relevant "projection errors," regardless of whether the forecasts were overprojected or underprojected. The projection error is simply the actual result minus the projected volume. The MAPE is a similar measure, but based on percentages. The MAE and MAPE values are grouped by time horizons. The time horizon is determined by when the forecast was made and for what future year. For example, a forecast for CY 1990 made in 1987 would be part of the "three years ahead" time horizon. At each time horizon, the number of observations was held constant at three (i.e., forecasts made for CY 1990, CY 1991, and CY 1992) [7].

As shown in Figure D for the grand total and the primary total return categories, the MAPE's are generally in the 1 to 2 percent range for shorter-term forecasts, and 3 to 4 percent for longer-term projections. For total individual income tax returns, the corresponding MAPE's are below 1 percent, regardless of the time horizon. With a few exceptions, forecast error increases with the time horizon, i.e., 1-year MAPE's are lower than 2-year MAPE's, which, in turn, are lower than 3-year MAPE's, and so forth.

In general, the return category with the highest MAPE's is "supplemental documents" (where the MAPE's range from 7.52 percent to 37.83 percent). Total individual income tax returns have the lowest MAPE's (from 0.60 percent to 0.89 percent). The large projection error for supplemental documents is partly attributed to IRS decisions approving, then later rescinding, its plan to implement the Automated Processing of Extensions

Figure D

Mean Absolute Error (MAE) and Mean Absolute Percentage Error (MAPE) Accuracy of U.S. Level Projections Based on Actual Return Counts for Calendar Years 1990 through 1992

| Type of return | Mean absolute error (number of returns) | | | | Mean absolute percentage error | | | |
|--------------------------------------|---|---------------|---------------|---------------|--------------------------------|---------------|---------------|---------------|
| | 1 year ahead | 2 years ahead | 3 years ahead | 4 years ahead | 1 year ahead | 2 years ahead | 3 years ahead | 4 years ahead |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Grand total..... | 1,163,587 | 3,800,947 | 6,005,653 | 8,024,020 | 0.57 | 1.86 | 2.94 | 3.91 |
| Selected primary returns, total..... | 1,697,531 | 2,222,197 | 3,277,797 | 5,084,364 | 0.88 | 1.15 | 1.69 | 2.61 |
| Individual income tax..... | 684,228 | 848,728 | 958,028 | 1,010,439 | 0.60 | 0.74 | 0.84 | 0.89 |
| Partnership..... | 135,358 | 226,391 | 407,391 | 480,791 | 7.95 | 13.44 | 24.61 | 28.99 |
| Corporation income tax..... | 94,283 | 150,450 | 218,917 | 205,883 | 2.17 | 3.41 | 4.91 | 4.64 |
| Employment tax..... | 354,238 | 495,605 | 747,638 | 1,158,005 | 1.24 | 1.73 | 2.61 | 4.04 |
| Supplemental documents..... | 777,956 | 4,013,544 | 2,727,923 | 2,939,689 | 7.52 | 37.83 | 25.83 | 27.82 |

NOTE: Number of returns is based on three observations at each horizon and is not additive.

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(APEX) program. At one time, APEX was expected to replace Form 4868 and 3688 requests for filing extensions, thus some prior forecasts called for zero filings in these areas.

The complete set of projections for 1994 through 2000 by form type is presented in Table 1.

Notes and References

- [1] Economic and demographic variables were estimated by Data Resources, Incorporated, June 1993.
- [2] All statistics are for the year in which the tax returns were processed by the Internal Revenue Service, stated on a calendar year basis unless otherwise noted. The main calendar year projections discussed in this article are based on preliminary figures produced by the IRS Research Division; see *Calendar Year Return Projections for the United States, Regions, and Service Centers: 1994-2000*, Document 6186 (Revision 11-93), Research Division, Internal Revenue Service, U.S. Department of the Treasury. Final actual counts for all of Calendar Year 1993 were incomplete at the time this article was written. (For complete fiscal year counts, see U.S. Department of the Treasury, Internal Revenue Service, *Internal Revenue Service Annual Report*, for Fiscal Year 1992.)
- [3] Unpublished Statistics of Income data.
- [4] The number of returns filed (as used in this article) represents returns processed at IRS service centers and posted to the IRS Master File system during a calendar year. The Master File system includes the Individual Master File (IMF), the Business Master File (BMF), and the Employee Plans Master File (EPMF).

These figures do not include the number of information and withholding documents processed by the IRS, such as interest and dividend statements on Forms 1099; and Forms W-2, *Wage and Tax Statement*. Information and withholding documents contain data for use in the IRS "information matching" programs (comparing amounts reported on an information return by payers with the amounts actually reported by taxpayers on their income tax return). They are not considered to be tax returns or supplemental documents. Most information documents are received on magnetic tape and processed at the IRS Martinsburg (West Virginia) Computing Center. For additional information, see U.S. Department of the Treasury, Internal Revenue Service, Research Division, *Calendar Year Projection of Information and Withholding Documents for the United States and Service Centers: 1993-2000*, Document 6961 (Revision 4-93).
- [5] See U.S. Department of the Treasury, Internal Revenue Service, Research Division, *Calendar Year Return Projections for the United States, Regions, and Service Centers: 1993-2000*, Document 6186 (Revision 12-93) for further explanation of return types.
- [6] U.S. Department of the Treasury, Internal Revenue Service, Research Division, *Calendar Year Projections of Individual Returns By Major Processing Categories*, Document 6187 (Revision 9-93).
- [7] For further discussion of the issue of projection accuracy, see U.S. Department of the Treasury, Internal Revenue Service, Research Division, *Calendar Year Projections of Individual Returns By Major Processing Categories*, Document 6187 (Revision 9-93) and Geiman, Russell R., Nichols, Bonnie L., De Wilde, Carolyn D., "How Are We Doing? An Analysis of Projection Accuracy," *The IRS Research Bulletin* (9-91), Internal Revenue Service, U.S. Department of the Treasury.

Projections of Returns to be Filed in Calendar Years 1994-2000

Table 1.—Number of Returns Filed or to be Filed with the Internal Revenue Service, Calendar Years 1992-2000

[Numbers of returns are in thousands]

| Type of return | Actual 1992 | Estimated 1993 ² | Projected | | | | | | |
|--|----------------|-----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Grand total ¹ | 205,981 | 209,963 | 215,501 | 219,530 | 223,800 | 228,086 | 231,895 | 235,703 | 239,410 |
| Primary returns, total | 195,261 | 197,775 | 201,904 | 206,418 | 210,113 | 213,826 | 217,151 | 220,484 | 223,739 |
| Individual income tax, total..... | 115,047 | 115,427 | 117,909 | 120,480 | 122,489 | 124,603 | 126,361 | 128,126 | 129,796 |
| Forms 1040, 1040A, 1040EZ, and 1040PC..... | 114,719 | 115,021 | 117,477 | 120,017 | 121,992 | 124,069 | 125,790 | 127,515 | 129,143 |
| Total paper returns..... | 103,674 | 102,509 | 102,797 | 101,415 | 99,934 | 99,829 | 99,512 | 99,237 | 98,976 |
| Paper Form 1040..... | 64,734 | 60,588 | 59,734 | 58,947 | 58,546 | 58,501 | 58,335 | 58,186 | 57,995 |
| Paper Form 1040A..... | 20,398 | 20,244 | 18,956 | 18,892 | 18,559 | 18,524 | 18,532 | 18,609 | 18,702 |
| Paper Form 1040EZ..... | 17,060 | 16,771 | 18,042 | 16,207 | 14,417 | 13,666 | 12,889 | 12,070 | 11,286 |
| Paper Form 1040PC..... | 1,481 | 4,907 | 6,065 | 7,369 | 8,413 | 9,138 | 9,757 | 10,372 | 10,993 |
| Total electronic returns..... | 11,045 | 12,511 | 14,680 | 18,602 | 22,058 | 24,241 | 26,278 | 28,278 | 30,167 |
| Standard electronic filing..... | 10,919 | 12,363 | 14,128 | 17,345 | 19,012 | 20,565 | 21,956 | 23,276 | 24,525 |
| TeleFile..... | 126 | 149 | 553 | 1,257 | 3,045 | 3,676 | 4,322 | 5,002 | 5,642 |
| Forms 1040NR, 1040PR, and 1040SS. ³ | 328 | 406 | 432 | 463 | 497 | 533 | 571 | 611 | 653 |
| Individual estimated tax..... | 38,911 | 40,429 | 41,357 | 42,343 | 43,330 | 44,316 | 45,302 | 46,288 | 47,275 |
| Fiduciary income tax. ⁴ | 2,888 | 2,934 | 2,983 | 3,036 | 3,091 | 3,149 | 3,208 | 3,265 | 3,324 |
| Fiduciary estimated tax..... | 647 | 705 | 717 | 730 | 743 | 757 | 771 | 785 | 799 |
| Partnership..... | 1,609 | 1,571 | 1,543 | 1,520 | 1,502 | 1,487 | 1,476 | 1,469 | 1,466 |
| Corporation income tax. ⁵ | 4,518 | 4,605 | 4,777 | 4,938 | 5,098 | 5,253 | 5,403 | 5,559 | 5,720 |
| Estate tax..... | 70 | 75 | 81 | 87 | 94 | 101 | 109 | 117 | 126 |
| Gift tax..... | 171 | 205 | 221 | 238 | 254 | 269 | 282 | 294 | 306 |
| Employment tax. ⁶ | 28,717 | 29,061 | 29,517 | 30,206 | 30,600 | 30,908 | 31,184 | 31,458 | 31,739 |
| Tax-exempt organization. ⁷ | 538 | 550 | 563 | 576 | 588 | 599 | 611 | 623 | 635 |
| Employee plan. ⁸ | 1,244 | 1,297 | 1,346 | 1,392 | 1,435 | 1,476 | 1,515 | 1,552 | 1,587 |
| Excise tax. ⁹ | 832 | 845 | 816 | 797 | 812 | 828 | 845 | 862 | 878 |
| Form 8752. ¹⁰ | 71 | 72 | 73 | 75 | 78 | 81 | 83 | 86 | 89 |
| Supplemental documents, total | 10,720 | 12,188 | 13,597 | 13,112 | 13,687 | 14,260 | 14,744 | 15,219 | 15,671 |
| Form 1040X. ¹¹ | 1,995 | 2,367 | 3,166 | 2,065 | 2,141 | 2,215 | 2,274 | 2,331 | 2,383 |
| Form 4868. ¹² | 5,067 | 5,773 | 6,175 | 6,554 | 6,844 | 7,134 | 7,370 | 7,601 | 7,815 |
| Form 2688. ¹³ | 1,610 | 1,893 | 2,061 | 2,225 | 2,361 | 2,499 | 2,620 | 2,739 | 2,854 |
| Form 1120X. ¹⁴ | 27 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 |
| Form 7004. ¹⁵ | 1,984 | 2,088 | 2,128 | 2,201 | 2,273 | 2,344 | 2,412 | 2,480 | 2,550 |
| Form 1041A. ¹⁶ | 37 | 39 | 40 | 41 | 43 | 44 | 45 | 47 | 48 |

¹ Excluded from all totals are the following "Non-Master File" returns: Forms CT-2, 941M, 990BL and 1120-IC-DISC. Also excluded are withholding and information documents, including forms such as W-2 and the 1099 series and related others.

² Estimate, including that for some corporations, is based on returns processed through part of 1993. The actual number filed in CY 1993 was unavailable when this table was compiled.

³ Form 1040X is included under "Supplemental documents," below.

⁴ Forms 1041; Form 1041A is included under "Supplemental documents," below.

⁵ Includes Forms 1120, 1120A, 1120F, 1120H, 1120L, 1120POL, 1120S, 1120DF, 1120FSC, 1120PC, 1120REIT and 1120RIC; Form 1120X is included under "Supplemental documents," below.

⁶ Includes Forms 940, 940EZ, 940PR, 941, 941E, 941PR, 941SS, 942, 942PR, 943, 943PR, 945 (starting Calendar Year 1995), and CT-1.

⁷ Includes Forms 990, 990EZ, 990C, 990PF, 990T, 4720 and 5227.

⁸ Includes Forms 5500, 5500C, 5500EZ and 5500R.

⁹ Includes Forms 11C, 720, 730 and 2290; excludes Forms 11 and 5000.24 which are filed with the Bureau of Alcohol, Tobacco and Firearms, U.S. Department of the Treasury, instead of with the Internal Revenue Service.

¹⁰ Form 8752 is filed by partnerships and S Corporations electing either to maintain or establish any taxable year other than the required calendar year.

¹¹ Individual amended return.

¹² Individual request for automatic filing extension.

¹³ Individual request for additional filing extension.

¹⁴ Corporation amended return.

¹⁵ Application for automatic extension of time to file corporation income tax returns.

¹⁶ Trust accumulation of charitable amounts.

NOTE: Detail may not add to totals because of rounding.