

# IRS Human Capital: Hiring and Attrition of Employees in Compliance Occupations

*Alex Turk and Thomas Mielke, Internal Revenue Service*

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**T**he Federal Government's workforce is rapidly aging (Government Accounting Office (GAO), 2001). Within the Internal Revenue Service (IRS), this trend is even more pronounced for two of the IRS's mission critical jobs, Revenue Agents (RA's) and Revenue Officers (RO's).

Revenue Agents, Revenue Officers, and Tax Compliance Officers (TCO's) make up a large proportion of the IRS compliance workforce. Revenue Officers generally work with taxpayers who are delinquent in paying their tax liabilities. Revenue Agents and TCO's conduct audits of previously filed tax returns to determine if tax liability was correctly reported. RA and TCO positions, while similar, differ in the complexity of work assigned to them. TCO's were examined in our original study, but they will not be discussed in this paper.

Many Revenue Agents and Revenue Officers are near retirement age. In just under 5 years,<sup>1</sup> October of 2008, 45 percent of the currently employed RA's and RO's will be eligible for retirement. In another 5 years, this percentage climbs to 66 percent. Thus, the IRS must invest in hiring and training over the next several years in order to maintain staffing in critical areas.

In this paper, we develop a micromodel of attrition for both IRS Revenue Agents and IRS Revenue Officers. We use this model to develop forecasts of the number of RA's and RO's who change jobs or leave the IRS under two different scenarios. The first scenario assumes no new employees are hired. The second scenario assumes hiring levels of RA's and RO's that maintain a constant staffing level.

## Background

A significant amount of research has focused on employee turnover.<sup>2</sup> Previous research has explored the relationship of wages, human capital, and demographics to the length of employee tenure in a job or organization. The model developed in this paper is consistent with the body of previous research but does not add significantly to the understanding of worker tenure decisions. Instead, it focuses on using the model of individual tenure decisions to provide aggregate attrition forecasts of the IRS compliance workforce. De-

veloping the forecasts in this manner provides the ability to predict attrition under almost any hiring plan.

## Model and Forecast Methodology

### Empirical Model

Assume that workers choose at time  $t$  to remain employed in their current jobs, change jobs internally, or leave the IRS altogether. For the model used here, we do not distinguish between internal job transfers and leaving the Service. Thus, we assume that employees compare the net benefit between the two employment opportunities based on a set of exogenous factors  $x_{it-1}$  and a stochastic shock  $e_{it}$ . Let  $e_{it}=0$  represent the employee choice of remaining in the current job at time  $t$ , and let  $e_{it}=1$  represent exiting the current job for employment elsewhere. An individual will choose to leave the current job if

$$E_t^* = U(e_{it}=1, x_{it-1}, e_{it}) - U(e_{it}=0, x_{it-1}, e_{it}) > 0.$$

Unfortunately, the value of  $E_t^*$  is not revealed to us. Only the sign of  $E_t^*$  is revealed by observing if the individual retains the job at time  $t$ . Assume that the net benefit from changing jobs can be represented as

$$E_t^* = x_{it-1} \mathbf{a} + e_{it}.$$

Assuming that  $e_{it}$  is distributed normally, the decision to exit the current job can then be represented as

$$P(E_t^* > 0) = \int_{-\infty}^{x_{it-1} \mathbf{a}} f(z) dz = \Phi(x_{it-1} \mathbf{a}),$$

where  $f$  is the normal density function, and  $F$  is the normal distribution function.

The standard probit model discussed above generates a probability that a given worker will leave the current job within the next year, conditional on being in the job in the current year. We use the 1-year transition probabilities to generate aggregate predictions of attrition over the next 5 years in both RA and RO occupations.

### Forecast Methodology

The current-year forecast of attrition rates is derived by aggregating the predicted probabilities of each employee leaving before time  $t$ , denoted as  $P_{it}$ . For  $t = 2004$ , expected attrition is

$$A_t = \sum_{\forall i} P_{it} \text{ for all employees in their respective jobs at time } t-1.$$

2004 expected attrition is based on the observed characteristics of the employees in 2003. However, to predict attrition between 2004 and 2005, we need to know the characteristics of the employees who will be in the labor pool in 2004. To accomplish this, we “aged” the current employees and recomputed all the variables derived from age and tenure. The expected number of employees exiting at time t+1 is then

$$A_{t+1} = \sum_{\forall i} P_{it+1} = \sum_{\forall i} (1 - P_{it}) P_{it+1}$$

for all employees in their respective jobs at time t-1. At time t+2, the forecasted attrition is

$$A_{t+2} = \sum_{\forall i} P_{it+2} = \sum_{\forall i} (1 - P_{it})(1 - P_{it+1}) P_{it+2}.$$

In general, the  $K$  period ahead forecast of attrition can be expressed as

$$A_{t+K} = \sum_{\forall i} \left( \left( \prod_{k=0}^{K-1} (1 - P_{it+k}) \right) P_{it+K} \right).$$

Attrition forecasts are generated for two different scenarios. In the first, no additional employees are hired to replace those who leave. Thus, the forecast formula above is applied to the existing employees in 2003.

The second scenario consists of hiring sufficient numbers to maintain the number of employees in a given occupation at the 2003 level. To account for new employees entering the IRS labor force, we identified all new hires during the sample period. We use these individuals as a pseudopool of potential applicants in the subsequent years. We then randomly “clone” individuals out of this pool to be the new hires in each forecast year. In this scenario, the forecast formulas are applied to the existing workforce and the “clones” who represent the new hires. One problem with this scenario is that the RA and RO occupations have had only limited hiring during the sample period. However, most of the hiring occurred in the more recent years. Thus, we feel that past hires should be very similar to qualified applicants who would be in future applicant pools.

## Data

Our data come from IRS payroll data. We obtained annual data from the 20<sup>th</sup> biweekly pay periods of each calendar year during 1997-2003. The payroll data contained an abundance of employment information. During this period, the IRS underwent a substantial reorganization that resulted in many RA’s and RO’s changing jobs.

In each year of our data, the total number of RA’s and RO’s has declined. Staffing levels for RO’s and RA’s are reported in Table 1. From 1997

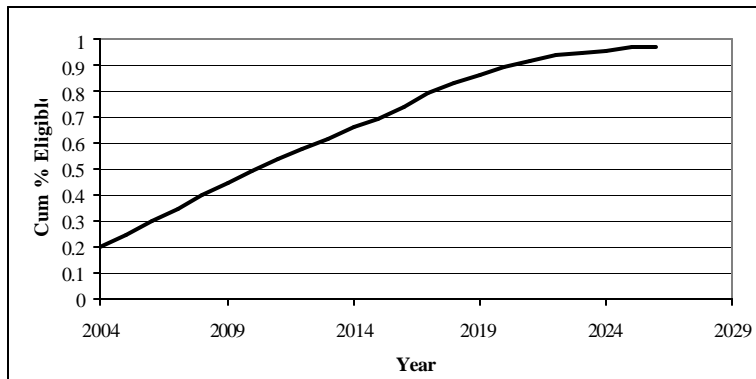
to 2003, the total number of RA's has declined by 18.7 percent and RO's by 25.3 percent. Even in years when significant numbers of external hires were made, the additional staff has not kept up with attrition. As Figure 1 depicts, 19.7 percent of all current RA's and RO's will be retirement eligible by the end of 2004. This figure climbs to 61 percent over the next 10 years (2013). In addition, a large cohort of employees (23 percent of all RO's and RA's) have 15 years to 17 years of tenure. For the most part, these employees will be eligible within the next 15 years.

Since the early 1990's, years of tight budget conditions have limited IRS hiring. This has resulted in a void of workers at the lower end of the tenure distribution (Figure 2). In Fiscal Years (FY) 2001 and 2002, the IRS hired 992 RA's and 243 RO's from the external labor market (Table 1, Calendar Years

**Table 1 - RO and RA Staffing levels and Attrition, 1997-2003**

	Year	Employees	Quits	External Hires	Transfers out of the Job Series	Transfer into the Job Series	Percentage Change in Staffing
Revenue Agents	1997	15,028	714	19	196	86	-
	1998	14,223	483	35	196	129	-5.36%
	1999	13,708	498	24	190	145	-3.62%
	2000	13,189	526	460	597	223	-3.79%
	2001	12,730	480	532	232	162	-3.48%
	2002	12,712	556	67	102	104	-0.14%
	2003	12,222	-	-	-	-	-3.85%
Revenue Officers	1997	7,454	343	6	89	40	-
	1998	7,068	267	6	161	72	-5.18%
	1999	6,718	223	6	191	50	-4.95%
	2000	6,360	263	240	373	305	-5.33%
	2001	6,269	282	3	167	56	-1.43%
	2002	5,879	269	20	80	22	-6.22%
	2003	5,571	-	-	-	-	-5.24%

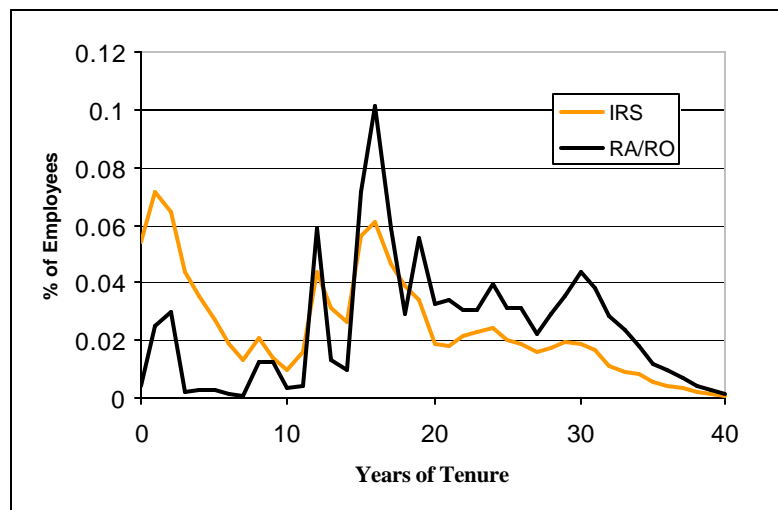
**Figure 1 - Percent of the RAs and ROs Employed in 2003 that will be Eligible for Retirement**



2000 and 2001) However, the average ages of these new hires was 38 (Small Business and Self-Employed (SB/SE) Internal Scan), and some hires were individuals who left the Service and subsequently returned. The average age suggests the IRS is not hiring recent college graduates but rather employees with significant labor market experience.

Excluding retirement-eligible years, employee turnover in private and public sector jobs is the highest in the first years of tenure (new employees). The IRS experience has been no different. Figure 3 displays the exit rates for

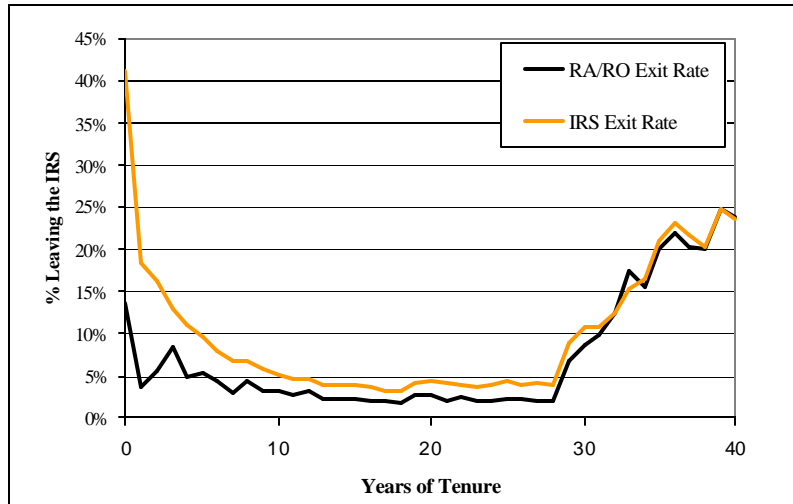
**Figure 2 - Distribution Tenure RA/RO Employees and All IRS Employees , Calendar Year 2003 (Pay Period 20)**



RA's and RO's and for the IRS overall from 1997 to 2002. In addition to the retention problems of new hires, IRS Strategic Human Resources has identified factors that are expected to complicate the retaining and replacing of experienced employees. The retention and replacement of employees will be affected by 1) a portable retirement system, 2) a growing pay gap between the public and private sectors, 3) high external competition for candidates, and 4) an emerging pattern of frequent job changes during an employee's life span. The effects of these factors will likely be in remission until private sector jobs become plentiful again.

The majority of Federal employees are under one of two retirement systems, the Civil Service Retirement System (CSRS) and the Federal Employees Retirement System (FERS). CSRS is a traditional pension plan, and FERS is comparable to a 401K plan where the employee and employer con-

**Figure 3 - RA/RO and IRS Employee Exit Rates by Years of Tenure - 1997 to 2002**

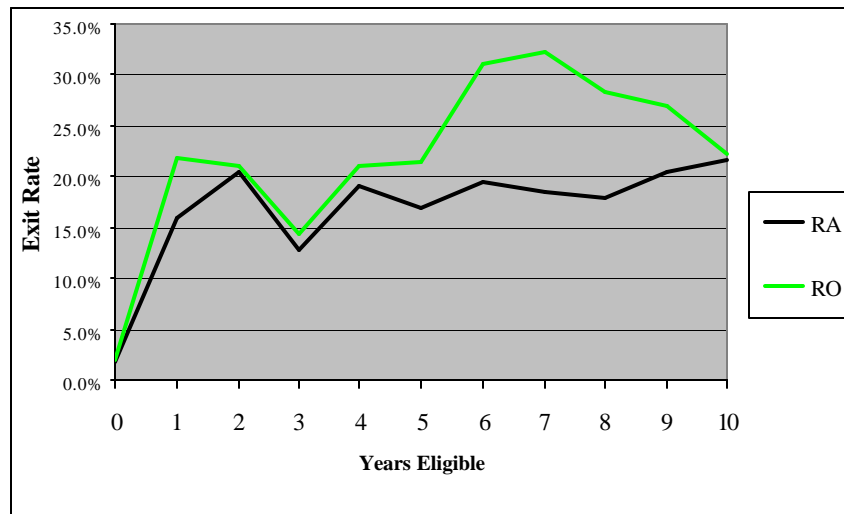


tribute. Since 1987, every new Federal employee is covered in the FERS retirement system. For the most part, employees hired before 1987 are covered under the CSRS program. CSRS employees who leave before retirement eligibility stand to lose a sizable amount of their retirement savings. Given a more portable retirement system, FERS employees presumably incur lower exit costs and thus may be more inclined to exit Federal service when the opportunity arises. The difference in retirement plans is utilized in creating certain retirement variables in our model. We include dummy variables for FERS employees who are eligible for early retirement, CSRS employees who are retirement-eligible and at the top of the pay scale, and finally any FERS employees who have reached the top of the pay scale. In addition, we use many variables that change with age and tenure. These include retirement eligibility, being retirement eligible for the 3<sup>rd</sup> year, becoming eligible for early retirement, and also having low tenure. Each of these variables has been “aged” when we develop forecasts.

Figure 4 displays the observed exit rates by the number of years since reaching retirement eligibility. The exit rate for retirement eligible employees is relatively more stable for the RA position. Exit rates for the RO position show more variation overall, peaking after 5 years of eligibility. The exit rate appears to decline for both RA and RO employees who have been eligible for 3 years. We attempt to control for these differences in the model.

Using the yearly changes in an employee’s sick and annual leave balances enables us to control for an individual’s use of leave. We control for

**Figure 4 - Exit Rates by the Years of Being Retirement Eligible, 1998-2002**



those workers who begin hoarding annual leave (accruing annual leave in a year without using any of it) as many employees who are planning to retire exhibit this behavior. A second dummy variable was included for those workers who have used significant portions of their accrued sick leave.

Many factors that may affect an employee’s decision to leave the job are not measured with the available data. For example, we do not have an indicator of financial standing. Wealth makes retirement more feasible and may make workers more mobile. Generally, as wealth tends to increase with age and pay, parameter estimates associated with these variables may also include a wealth effect. Another factor is the number of dependents. Having dependents may make retirement less financially feasible and makes workers less mobile. We include a dummy variable for family health care coverage as a proxy of family status. Unemployment rates by region could also have an effect on turnover. If unemployment is low, obtaining another job is not as difficult; so, turnover should increase (and vice versa). We considered including a regional unemployment measure in the model but felt that we needed a longer sample period to obtain a defensible estimate of the effect of local labor market conditions. The IRS’s reorganization would further confound our ability to measure local labor market conditions. Instead, we used annual and regional dummy variables to control for these effects.

An issue with using a micromodel to develop forecasts is that it is not known how many of the individual factors may change in the future. For example, we do not know how characteristics like the hoarding of annual leave, sick leave balances, and an employee’s performance evaluation may

change over time. For each of these factors, we used the 2003 values for the forecasted years.

## Model Estimates

The probit model parameter estimates for the RA and RO models are reported in the Appendix. For the most part, these estimates are consistent with previous research. In addition, the results of the RA model are similar to the estimates for the RO model.

An interesting finding is that the overall retirement plan dummy variable (FERS) was negative and insignificant. This suggests that there is no difference in quit rates between FERS and CSRS employees who are not retirement-eligible. However, the model does indicate that not using annual leave is a good indicator that employees are going to quit. Workers who receive poor performance evaluations and are not receiving awards for performance are also more likely to quit.

### Forecast Scenario 1—*Attrition with No Hiring*

As a benchmark, we first examined the extreme case where no new employees are hired. Both the RA and RO forecasts that are reported in Table 2 suggest a modest increase in the attrition rate over time. However, the number of employees leaving each year is actually declining because we assume there is no hiring and, therefore, the labor force is shrinking. Between 2003 and 2004, the estimated attrition rate for RA's is 5.2 percent and for RO's, 6.4 percent. The estimated attrition rate increases through the 2007/2008 year when our estimated attrition figures are 5.7 percent for RA's and 7.4 percent for RO's. If this occurs, we expect that, by 2008, the number of RA's declines by 24.3 percent to 9,248 employees, and the number of RO's declines by 29.7 percent to 3,916 employees. The forecasts assume that external labor market conditions and the organizational structure will remain constant. If significant organizational change occurs, especially change that creates new internal job opportunities, one can expect that staffing would decline more rapidly.

**Table 2 - Attrition Estimates with No New Hires**

Year	Revenue Agents		Revenue Officers	
	Count	Attrition Rate	Count	Attrition Rate
2003	12,222	5.21%	5,571	6.39%
2004	11,585	5.25%	5,215	6.53%
2005	10,977	5.40%	4,874	6.75%
2006	10,383	5.55%	4,546	7.00%
2007	9,808	5.70%	4,227	7.36%
2008	9,248	-	3,916	-



Forecast Scenario 2—*Maintaining the Status Quo*

A more interesting and relevant question is how many new RO's and RA's need to be hired to maintain staffing levels. In this scenario, every employee who leaves is backfilled with a new hire from the external labor market. Thus, we keep the number of RO's and RA's at the 2003 levels. Those workers who were hired externally between 1998 and 2003 are used to proxy the pool of potential applicants. We randomly selected from this pool, with replacement, employees to backfill.

Table 3 displays our forecast results for both RA's and RO's. Both RA and RO attrition is forecasted to initially rise as new hires are introduced and then eventually decline. Recall that both models include dummy variables for employees with less than 2 years of tenure. In the first few years of the simulated hiring, new employees account for a larger percentage of the workforce than they do in later years. As new employees age beyond the initial 2 years, attrition rates start to fall.

**Table 3 - Attrition Estimates: Hiring to Maintain a Constant Staffing Level**

	Revenue Agents		Revenue Officers	
	Target Level = 12,222		Target Level = 5,571	
Year	New Hires	Attrition Rate	New Hires	Attrition Rate
2003	637	5.21%	356	6.39%
2004	653	5.34%	370	6.65%
2005	649	5.31%	385	6.91%
2006	631	5.16%	379	6.80%
2007	613	5.01%	371	6.67%

The results suggest that, if all remains constant, the IRS will need to hire between 613 and 653 RA's and between 356 and 385 RO's each year over the next 5 years in order to maintain staffing. If there were improvements in the external labor market or significant postings of internal jobs, we would expect the attrition numbers to be higher.

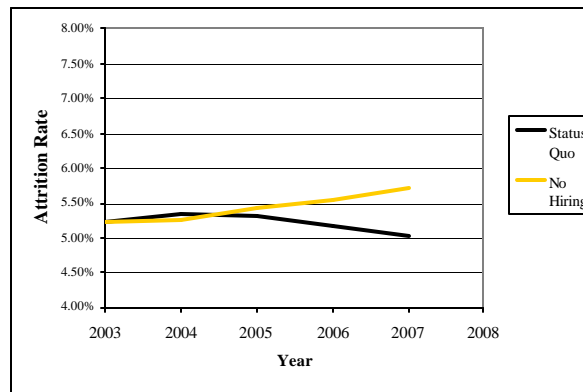
While both models include dummy variables for low-tenured workers, the magnitudes of the increase are different. The RA estimate is negative, very small, and not statistically significant. The RO estimate is positive, much larger, and significant at any reasonable level. Thus, newly hired RO's have a higher attrition rate than RA's do. One possible explanation is that RO's come from a broader background in terms of academic and labor market experience. Prior academic and labor market experience may be a much better

screening device for RA applicants than for RO applicants. Thus, the RA hiring process may be more likely to produce applicants who are a good match with job duties.

## Comparing the Two Scenarios

Figure 5 and Figure 6 depict the differences in the estimates of the two scenarios. The RA estimates do not differ dramatically for the two scenarios in the initial years of the hiring. The RO model, depicted in Figure 6, shows a larger deviation, but it appears to be converging in the later years of the estimate. Both scenarios show that, for RO's, increasing hires will increase employee turnover in the short term. The difference is smaller for the RA hires. In both cases, the scenario with hiring to match attrition tends to moderate attrition rates in the long run. The moderation occurs because the hiring eventually repopulates the segments of the tenure distribution that have low quit rates.

**Figure 5 - Forecasted Revenue Agent Attrition Rates for the “No Hiring” and the “Status Quo” Scenarios**

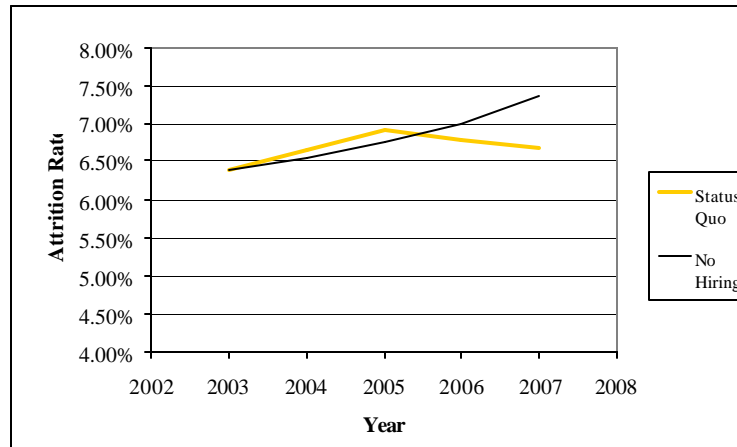


## Conclusions and Direction for Further Research

The model developed here not only provides a tool to forecast staffing levels, it provides some insight into the tenure decision of workers within the IRS.

First, we do not see a mass exodus once employees become eligible for retirement. Rather, only a fraction of retirement-eligible RA's and RO's leave the IRS each year. In addition, Revenue Agents appear to have more incentive to continue working. It would be interesting to explore to what degree this decision is being driven by financial issues versus job satisfaction issues.

**Figure 6 - Forecasted Revenue Officer Attrition Rates for the “No Hiring” and the “Status Quo” Scenarios**



Second, the difference in retirement plans does affect tenure decisions, but only to a point. The results suggest that there is not a significant difference in attrition between CSRS and FERS employees who are not eligible for any form of retirement. One interpretation of this result is that portable retirement funds are not making IRS compliance staff more mobile. However, the model did show FERS employees are more likely to leave when they are eligible for early retirement or if they have reached the top of the pay scale. In addition, CSRS retirement-eligible employees are more likely to leave when they have reached the top of the pay scale. Since CSRS pension payments are related to the highest 3 years of pay, retirement-eligible employees who can receive a pay increase have more incentive to delay retirement.

Revenue Agent and Revenue Officer attrition rates are forecasted to be higher in the next 5 years than they have been in the past 5 years, excluding Calendar Year 2000. We forecast that, by 2008, 24.3 percent of the current RA staff and 9.7 percent of the current RO staff will no longer be employed as a RA or a RO. We also found that RO’s are more likely to leave their jobs than RA’s, especially in the first years of employment. Thus, as the IRS increases hiring to replace RO’s, there will be noticeable increases in attrition rates. For new hires, attrition for RA’s is more evenly spread out in the initial years of employment.

This research could be expanded in several ways. Differentiating employees who make internal job changes from those who leave the Service could provide forecasts that are more useful. Some variables, like performance evaluations, may have qualitatively different impacts on internal pro-

motion than on quits. Also, including measures of wages would improve the forecast and provide the ability to forecast attrition with various proposed pay raises. However, more data would be needed to estimate the wage effects with any degree of confidence. Additional years of data, especially with new hires, would also give more confidence about attrition in the early years of employment.

## Endnotes

<sup>1</sup> See Figure 1.

<sup>2</sup> For examples, see Topel (1991), Koch and Ragan (1986), Light and Ureta (1992), Rees (1991), and Wolpin (1992).

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## **Note**

The views expressed in this article represent the opinions and conclusions of the authors. They do not necessarily represent the opinion of the Internal Revenue Service.

## Appendix

**Table A1 - Attrition Model Parameter Estimates**

	Revenue Agents		*	Revenue Officers	
	Estimate	Standard Error		Estimate	Standard Error
Intercept	-0.5019	0.096	*	-0.5681	0.1396 *
Southern US	0.1027	0.0301	*	0.0971	0.0378 *
Western US	0.00523	0.0277		-0.0223	0.0358
North Central US	-0.0884	0.0286	*	-0.0832	0.0406 *
Eastern US	-0.149	0.0277	*	-0.1345	0.0384 *
Washington DC Area	0.2008	0.0382	*	0.2682	0.0514 *
Bargaining Unit	-0.4049	0.0258	*	-0.5019	0.0321 *
Part-Time	0.0345	0.0527		0.1766	0.1058
Under 2 Years of Tenure	-0.00572	0.071		0.3746	0.1114 *
Tenure	-0.0483	0.00513	*	-0.0353	0.00878 *
Tenure Sq.	0.00082	0.00011	*	0.00061	0.000187 *
Age (minus 21)	-0.0236	0.00496	*	-0.0208	0.00781 *
Age (minus 21) Sq.	0.0003	0.000091	*	0.00026	0.000147
Veteran	-0.00525	0.0197		0.0631	0.0244 *
Perf. Eval. Outstanding	-0.0254	0.0222		-0.0323	0.0278
Perf. Eval. Poor	0.7165	0.0799	*	0.7143	0.0764 *
Bachelor's Degree	-0.1422	0.0234	*	-0.00844	0.0249
Advanced Degree	-0.0755	0.0357	*	0.0142	0.0486
Year 1998	0.0674	0.0298	*	0.0789	0.0398 *
Year 1999	0.0902	0.0296	*	0.0971	0.0394 *
Year 2000	0.3895	0.0272	*	0.3822	0.0371 *
Year 2001	0.1141	0.0288	*	0.1289	0.0385 *
Received No Cash Award	0.0873	0.0206	*	0.2006	0.0304 *
Manager (Eligible)	-0.2662	0.0725	*	-0.1788	0.1221
Health Plan (Enrolled)	-0.0929	0.0254	*	-0.1092	0.0322 *
Medical Disability	0.1015	0.0495	*	0.1164	0.0592 *
FERS Early Eligible	0.2167	0.0479	*	0.0601	0.0667
Eligible)	0.1959	0.0646	*	0.1542	0.0876 *
(Eligible)	0.1504	0.036	*	0.0283	0.0556
Hoarding Annual Leave	1.5419	0.0699	*	1.26	0.1017 *
Sick Leave User	0.2289	0.0213	*	0.2203	0.0277 *
Family (Part. Proxy)	-0.012	0.0195		-0.046	0.0249
Retire Eligible	1.0424	0.0363	*	1.0446	0.0534 *
3rd Year of Ret. Eligible	-0.192	0.0488	*	-0.2076	0.0767 *
Under FERS	-0.0447	0.0308		-0.0528	0.0407
Race	-0.0325	0.021		-0.0436	0.0255
Increase	-0.1922	0.0329	*	-0.2116	0.0412 *
N	66,562			32,294	
Log Likelihood	-14,737			-8,231	

\* Denotes statistical significance at the 5% level

**Table A2 - Descriptive Statistics for Attrition Model Data (1998-2002)**

	Revenue Agents		Revenue Officers	
	Mean	Standard Deviation	Mean	Standard Deviation
Intercept	0.0580	0.2337	0.0705	0.2560
Southern US	0.1300	0.3363	0.1558	0.3627
Western US	0.2043	0.4032	0.2464	0.4309
North Central US	0.2039	0.4029	0.1631	0.3694
Eastern US	0.2397	0.4269	0.2130	0.4094
Washington DC Area	0.0527	0.2234	0.0508	0.2197
Bargaining Unit	0.8805	0.3244	0.8725	0.3336
Part-Time	0.0293	0.1687	0.0107	0.1030
Under 2 Years of Tenure	0.0178	0.1323	0.0121	0.1092
Tenure	19.0786	8.4678	19.1486	7.8056
Tenure Sq.	435.6948	345.3972	427.5935	316.9315
Age (minus 21)	26.1725	8.3479	26.0207	7.9220
Age (minus 21) Sq.	754.6867	443.1375	739.8322	412.4928
Veteran	0.2061	0.4499	0.2160	0.4712
Perf. Eval. Outstanding	0.2280	0.4196	0.2620	0.4397
Perf. Eval. Poor	0.0054	0.0730	0.0122	0.1099
Bachelor's Degree	0.7650	0.4240	0.5093	0.4999
Advanced Degree	0.0842	0.2776	0.0627	0.2424
Year 1998	0.2137	0.4099	0.2189	0.4135
Year 1999	0.2059	0.4044	0.2080	0.4059
Year 2000	0.1981	0.3986	0.1969	0.3977
Year 2001	0.1913	0.3933	0.1941	0.3955
Received No Cash Award	0.2021	0.4016	0.1365	0.3433
Manager (Eligible)	0.0082	0.0904	0.0045	0.0669
Health Plan (Enrolled)	0.8613	0.3456	0.8558	0.3513
Medical Disability	0.0256	0.1579	0.0329	0.1783
FERS Early Eligible	0.0455	0.2084	0.0477	0.2132
FERS Step 10 (not Eligible)	0.0155	0.1237	0.0177	0.1318
CSRS at Step 10 (Eligible)	0.0526	0.2232	0.0420	0.2005
Hoarding Annual Leave	0.0057	0.0753	0.0055	0.0740
Sick Leave User	0.1821	0.3859	0.2192	0.4137
Family (Part. Proxy)	0.2845	0.4512	0.3498	0.4769
Retire Eligible	0.1368	0.3436	0.1040	0.3053
3rd Year of Ret. Eligible	0.0190	0.1367	0.0140	0.1173
Under FERS	0.5055	0.5000	0.4627	0.4986
Race	0.2409	0.4276	0.3349	0.4719
Promotion/Grade Increase	0.0961	0.2948	0.1072	0.3094
N	66,562		32,294	