# WHO DOES YOUR TAXES? SOCIAL LEARNING AND THE DECISION TO USE A TAX PREPARER*

*Kim M. Bloomquist,* Internal Revenue Service

## INTRODUCTION

In recent years both the number and share of individuals using the services of paid tax preparers has increased steadily. Table 1 shows that in filing year 1997 (tax year 1996), 60.9 million returns (50.2 percent of 121.4 million returns filed) had a paid preparer signature. By 2007, the number of preparer returns rose to 84.9 million and comprised 61.0 percent of all U.S. individual tax returns filed.

The specific influences motivating this trend are not well understood. However, Blumenthal and Christian (2004) point to the growing complexity of the tax code as a contributing factor. Without a doubt, this explanation has some appeal. First, it is clear that the federal tax code has become more complex in recent years. The U.S. Congress has enacted an average of two major tax bills per year since 2000.[1] Second, taxpayer surveys have shown that filing an accurate return is an overriding concern of most taxpayers. In an IRS-sponsored survey (Yankelovich, Skelly, and White, Inc., 1984), taxpayers were asked the question, "What was the primary reason you decided not to prepare your own return?" The top three responses were: fear of making a mistake (63 percent), hope that using a preparer would save money (13 percent) and insufficient time to self-prepare the return (11 percent). Assuming that greater complexity increases the odds of making a mistake, it stands to reason that taxpayers would rely more on paid preparers as the tax code becomes more complex.

Third, IRS Taxpayer Usage Study data clearly links paid preparer usage to taxpayers with more complex filing situations. Guyton, O'Hare, Stavrianos, and Toder (2003), summarizing findings from a large-scale nationwide survey of individual taxpayers, report that the self-employed have the highest time and cost burden among all taxpayers. In TY 2005, approximately 17 million of 21.6 million tax returns (78.7 percent) having one or more Schedules C or F (non-farm or farm sole proprietorship) had a paid preparer signature. In contrast, only 55.9 percent (63 million of 112.8 million) of all other taxpayers used a paid preparer.[2]

Despite the commonsense appeal of this argument, complexity alone seems unlikely to account for all of the increased use of paid preparers. Two facts seem to suggest something else is happening. First, the fraction of Form 1040-EZ filers using a paid preparer has grown even more rapidly than taxpayers overall. The EZ form is designed specifically to be used by individuals with very simple tax situations. Taxpayers who use Form 1040-EZ can file using the single or married filing joint filing status, must not claim any dependents and have income from wages, interest and/or unemployment compensation only. Table 2 shows the number of Form 1040-EZ returns filed for the years 1997 to 2006 and the number of paid preparer returns. In 1997, only 9.7 percent of EZ returns had a paid preparer signature. By 2007, tax preparers' share of EZ returns was 31.2 percent.

A close inspection of the year-to-year changes in the paid preparer share of Form 1040-EZ returns in Table 2 does not completely rule out a possible role for growing tax code complexity. For example, the large jump in the number of preparer returns in 2002 (tax year 2001) could be related to a one-time "rate reduction credit" in effect that year. If true, this suggests that even a small increase in complexity can lead significant numbers of taxpayers to seek outside help to deal with unfamiliar tax issues. The fact that the paid preparer share of EZ returns did not return to pre-2002 levels also would seem to indicate that once a decision is made to use a paid preparer this behavior persists for some time even as the original motivating factor – in this case, the presumed rate reduction credit – no longer applies.

However, Table 2 also shows paid preparer use by filers of Form 1040-EZ was increasing prior to and following 2002. Most significant is the near doubling of the share of paid preparer EZ returns prior to 2002 that does not appear to be related to tax law complexity. For example, the share of Form 1040-EZ filers claiming the Earned Income Credit was virtually unchanged from 1997 to 2001.[3]

***Disclaimer:** The views expressed here are those of the author and should not be interpreted as those of the U.S. Internal Revenue Service (IRS).

*Table 1*
**U.S. Individual Income Tax Returns and Preparer Returns: 1997-2007**

| *Filing Year* | *Returns Filed (Million)* | *Preparer Returns (Million)* | *Percent Preparer Returns* |
|---|---|---|---|
| 1997 | 121.4 | 60.9 | 50.2% |
| 1998 | 123.6 | 63.8 | 51.6% |
| 1999 | 125.4 | 66.8 | 53.2% |
| 2000 | 125.7 | 68.1 | 54.2% |
| 2001 | 130.1 | 69.1 | 53.1% |
| 2002 | 131.2 | 72.5 | 55.2% |
| 2003 | 131.3 | 73.0 | 55.6% |
| 2004 | 132.0 | 79.1 | 59.9% |
| 2005 | 133.9 | 80.7 | 60.3% |
| 2006 | 135.3 | 82.6 | 61.0% |
| 2007 | 139.2 | 84.9 | 61.0% |

Source: Individual Returns Transaction File.

*Table 2*
**Individual Form 1040-EZ Returns Filed: 1997-2007**

| *Filing Year* | *Returns Filed (Million)* | *Preparer Returns (Million)* | *Percent Preparer Returns* |
|---|---|---|---|
| 1997 | 20.9 | 2.0 | 9.6% |
| 1998 | 21.1 | 2.7 | 12.6% |
| 1999 | 20.2 | 2.9 | 14.2% |
| 2000 | 19.6 | 3.2 | 16.4% |
| 2001 | 20.1 | 3.7 | 18.2% |
| 2002 | 19.9 | 5.2 | 26.2% |
| 2003 | 18.6 | 4.8 | 25.9% |
| 2004 | 18.0 | 5.1 | 28.5% |
| 2005 | 18.2 | 5.4 | 29.4% |
| 2006 | 18.0 | 5.6 | 31.0% |
| 2007 | 18.9 | 5.9 | 31.2% |

Source: Individual Returns Transaction File.

A second fact suggesting something other than complexity is contributing to paid preparer use by Form 1040-EZ filers is the spatial pattern of preparation mode shown in Figures 1 and 2. Figure 1 displays the percent of Form 1040 and 1040-A taxpayers[4] in each county with a TY 2000 U.S. individual tax return carrying a paid preparer signature. These data represent the universe of approximately 110 million individuals who filed either a Form 1040 or a Form 1040-A in calendar year 2001 from the 50 U.S. states and the District of Columbia. Overall, 59.5 percent of these filers used a paid preparer. Figure 1 shows the areas where paid preparer use is most concentrated include much of the upper Midwest and Plains states. Other areas of high concentration include Kentucky, the Carolinas, southern Georgia, northern Alabama and southwestern Virginia.

Figure 2 displays the percent of Form 1040-EZ filers in each county who used a paid preparer in TY 2000. A visual comparison of Figures 1 and 2 reveals significant overlap of areas with high relative concentrations of both types of filers (Form 1040-EZ and all others) that use a paid preparer in

*Figure 1:* **Percent Paid Preparer Form 1040/1040-A Returns by County: TY 2000**

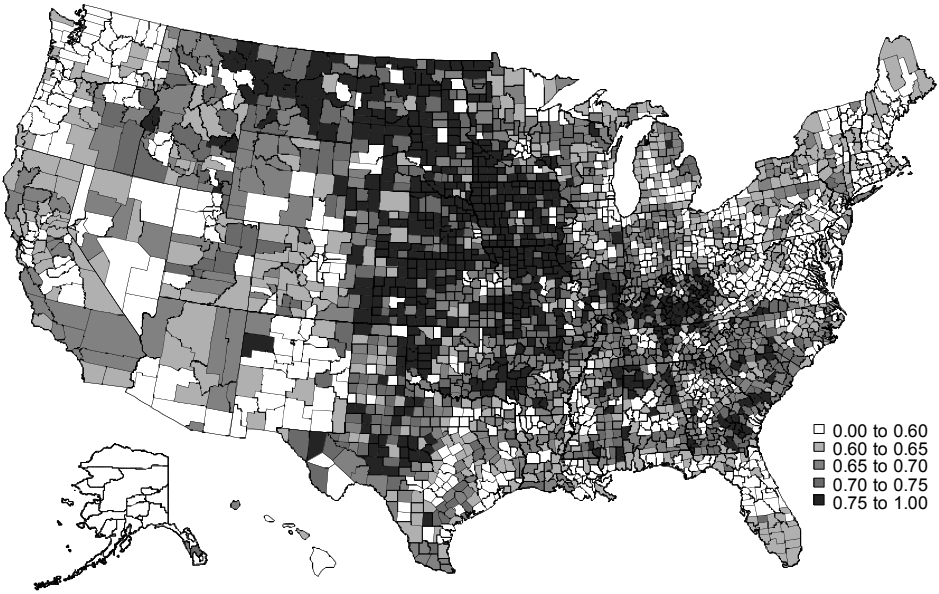
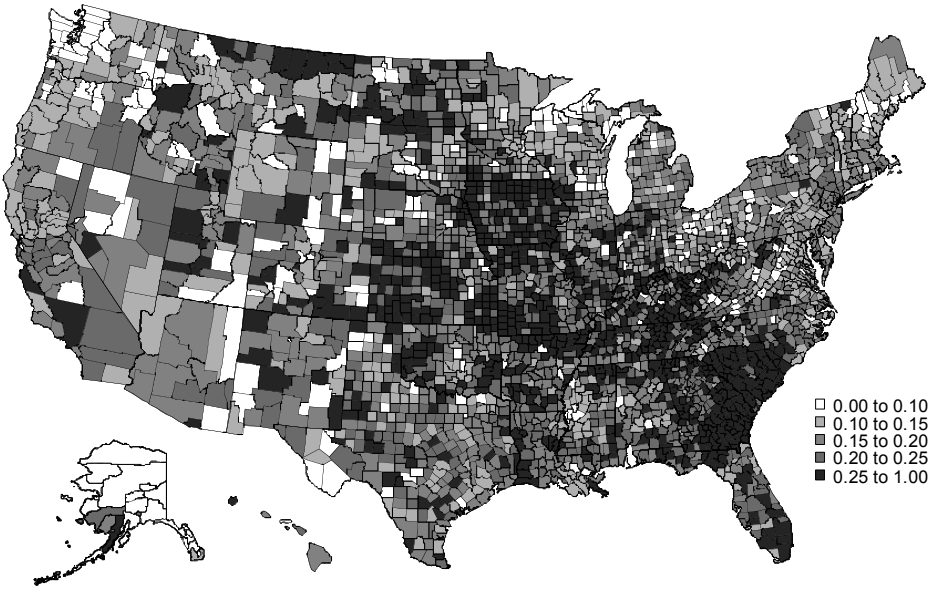



*Figure 2:* **Percent Paid Preparer Form 1040-EZ Returns by County: TY 2000**



the Midwest, the Tennessee Valley, and the Southeast. The Pearson correlation coefficient is 0.504 and is significant at the 0.01 level (two-tailed test).

However, as Manski (1993) points out, it is possible that the appearance of a spatial relationship between two populations may be due to the influence of one or more unobserved variables shared by individuals living in these areas. If so, what likely factors might these be?

Several studies (Collins, Milliron, and Toy, 1990; Dubin, Graetz, Udell, and Wilde, 1992; Erard, 1993; Slemrod and Sorum, 1984) have identified a variety of factors, in addition to complexity, that are associated with the propensity to use a paid preparer. Among the more robust predictors are: income, marital status, age, and tax knowledge (often proxied using the level of educational achievement). Evidence for the marginal tax rate, audit probability and penalty rate is mixed.

Among these candidate predictors the level of educational achievement seems most relevant for Form 1040-EZ filers. The studies cited above find that persons with less education are more likely to use a paid preparer, ceteris paribus, than persons with higher levels of education. However, it seems unlikely that changes in the level or quality of educational achievement can explain the rapid rise in paid preparer use by Form 1040-EZ filers over the period of time in question. Therefore, this explanation also seems not quite satisfactory.

### Social Learning and Tax Preparation Mode Choice

Previous empirical research on the determinants of paid preparer use has ignored the role of social learning on taxpayers' decision-making behavior. However, in the past two decades there has been significant progress on the development of theory and estimation techniques for investigating social interactions.[5] In the context of tax preparation, taxpayers who are uncertain about whether they should or should not use a paid tax preparer might consult a family member, a neighbor or friend to help inform their decision. In fact, the National Association of Tax Professionals, a trade association for tax preparers, recommends that taxpayers "seek out referrals from those you trust then, begin considering preparers your family and friends recommend."[6] Such word-of-mouth communication has been shown to significantly influence the speed of adoption of a new product (Ellison and Fudenberg, 1995).

It is clear, however, that many taxpayers do not need to consult with others on the decision to use a paid preparer. In the above-cited empirical studies investigating reasons for paid preparer use, persons with more complex tax situations are likely to use a preparer both to save time and to reduce the chance of making a potentially costly error either through over or underpayment of tax. In addition, individuals with higher education are more likely to self-prepare, other things being equal, than individuals with less education. These taxpayers confidently believe (justifiably or not) that they have the necessary quantitative and reading skills to accurately determine their tax liability.

Yet, there are other people for whom the decision to seek tax assistance is not so straightforward. These could be individuals whose educational training and tax situation are roughly equivalent in terms of skill level and complexity. Such persons may be initially uncertain if they would personally benefit by using a paid preparer and opt to talk to a family member or friend before making their decision. For these individuals, the choice of preparation mode may depend on the person they seek advice from. On the one hand, if the person consulted is a self-preparer, then the individual seeking advice may feel empowered to do the same. On the other hand, if the person consulted uses a tax preparer, then the advisee may become convinced to do likewise. Therefore, a factor indirectly influencing an individual's decision to use a paid preparer is the relative concentration of tax preparation behaviors among one's immediate social network.

In the next section, I describe a model of tax preparation mode choice with social learning. I develop a computational version of the model and present a hypothetical application in the third section. The final section concludes.

## A SOCIAL LEARNING MODEL OF PREPARATION MODE CHOICE

Previous empirical work has shown that complexity and taxpayers' level of tax knowledge (often proxied using educational achievement) are perhaps the two most important factors in the decision to use a commercial tax preparer (Collins et al., 1990; Dubin et al., 1992; Erard, 1993; Slemrod and Sorum, 1984). If we frame the individual's preparation mode decision with respect to varying levels of these two variables, holding constant the influence of income, marital status, the presence of a state income tax, etc., we can construct a hypothetical payoff matrix like that shown in Figure 3. The columns in Figure

*Figure 3*: **Hypothetical Payoffs for Using a Paid Preparer**

| | *Tax Complexity* | |
|---|---|---|
| *Tax Knowledge* | *Low* | *High* |
| Low | 0 | 1 |
| High | -1 | 0 |

3 represent different levels of complexity and the rows represent levels of tax knowledge.

The cell entries in Figure 3 represent hypothetical payoffs to individuals who use a paid tax preparer. Persons with low tax knowledge and high complexity receive a positive expected payoff for using a tax preparer. For these individuals, the decision to use a paid preparer is based on the high probability of making a mistake that could result in paying too much in tax or not enough. Either way, the tax preparer's fee is viewed as a necessary expense to avoid even larger potential costs of inaccurate tax calculation. In contrast, taxpayers with high tax knowledge and low complexity experience an expected negative payoff for using a paid preparer. In this case, a net loss is the likely outcome since a knowledgeable taxpayer with a simple tax situation is less likely to make a costly mistake yet would have to pay the preparer's fee.

For the remainder of this paper I assume that taxpayers with non-zero cell entries in Figure 3 have sufficient information to decide on their own whether or not to use a paid preparer. Let us define group $G^P$ as those taxpayers who have positive payoffs and use a preparer while taxpayers in group $G^S$ have negative payoffs and self-prepare. In contrast, taxpayers located in the diagonal cells have a payoff of 0 meaning that these individuals have insufficient information to determine on their own whether using a paid preparer would result in a net gain or loss. While this group of taxpayers ($G^U$) could resolve their uncertainty simply by tossing a coin, a more sensible approach involving little or no cost would be to consult with someone (e.g., a family member or acquaintance) regarded as a knowledgeable source on tax matters. It is important to point out that this is not a coordination game where the action of any one individual has consequences for other individuals. Here it is assumed that each taxpayer's decision only influences his or her own payoff. However, this does not imply that taxpayers make optimal choices about preparation mode based on the information they obtain. In fact, it is quite possible that taxpayers in all three groups ($G^P$, $G^S$, and $G^U$) make suboptimal choices that persist over time due to inertia. Nevertheless, it is assumed that once taxpayers make their choice of preparation mode they persist in their behavior unless some event occurs that prompts a reevaluation of their initial decision.

### Initial Conditions

To reiterate, taxpayers in $G^P$ and $G^S$ are able to determine on their own whether or not to use a paid preparer based on their own tax knowledge ($\kappa$) and awareness of the degree of complexity ($\chi$) of their tax situation. Only individuals in $G^U$ are initially uncertain about which course of action to take. If we let $f(\chi_i, \kappa_i)$ represent a function returning the payoff to taxpayer $i$ for using a paid preparer and $g_i = 1$, then we can define membership in the three subpopulations as follows:

$$G^P \equiv \sum_{i=1}^{N} g_i \quad \forall i \text{ where } f(\chi_i, \kappa_i) > 0$$

$$G^S \equiv \sum_{i=1}^{N} g_i \quad \forall i \text{ where } f(\chi_i, \kappa_i) < 0$$

$$G^U \equiv \sum_{i=1}^{N} g_i \quad \forall i \text{ where } f(\chi_i, \kappa_i) = 0.$$

Finally, we have the identity

$$G = G^P + G^S + G^U.$$

In the initial time period, paid preparer use by filers in $G^U$ is assumed to reflect historical circumstance and is taken as given. Furthermore, since $G^U$ may be comprised of filers having low ($G_H^L$) or high ($G_H^U$) degrees of tax complexity, each of these two subgroups may have distinct starting levels of paid preparer use. Let the number of these initially uncertain filers who use a paid preparer, $G^{Up}$, be defined as

$$G^{Up} = q_L G_L^U + q_H G_H^U,$$

where $q_L(q_H)$ is the initial probability of uncertain low (high) complexity filers who use a paid preparer. Therefore, the initial fraction of paid preparer returns at time ($t$) = 0 ($X_0$) is

$$\textbf{(1)} \quad X_0 = \frac{G^P + G^{Up}}{G}.$$

At this point, all filers have selected an initial mode of tax preparation (either self-prepared or paid preparer). In the next time period taxpayers are assumed to persist in their selected behavior unless a change occurs. One such change that occurs in the real world is some fraction of the taxpayer population stops filing for various reasons, but typically because they no longer have an obligation to file. At the same time, new taxpayers enter the system and file for the first time. If $\omega$ represents the expected fraction of the filer population that is replaced each time period (assuming a steady-state population), then the number of replaced filers each time period is $\omega G$. Let $\chi_H$ represent the probability that a new filer has high tax complexity and $\kappa_L$ be the probability that a new filer has low tax knowledge. Then the following relationships can be defined for $t > 0$.

| | |
|---|---|
| Number of new paid preparer filers: | $\omega G \chi_H \kappa_L$ |
| Number of new self-prepared filers: | $\omega G(1-\chi_H)(1-\kappa_L)$ |
| Number of new uncertain filers: | $G_t^U = \omega G(1-\chi_H\kappa_L - (1-\chi_H)(1-\kappa_L))$ |
| Total paid preparer filers: | $(1-\omega)G_{t-1}^P + \omega G \chi_H \kappa_L$ |
| Total self-prepared filers: | $(1-\omega)G_{t-1}^S + \omega G(1-\chi_H)(1-\kappa_L)$ |
| Total initially uncertain filers who decide to use a paid preparer: | $G_t^{Up} = (1-\omega)G_{t-1}^{Up} + X_{t-1}G_t^U$ |
| Total initially uncertain filers who decide to self-prepare: | $G_t^{Us} = G_t^U - G_t^{Up}$ |

### Model Dynamics

If filers who are initially uncertain about their preparation decision only consult with one other person before making their decision ($N = 1$), then the fraction of paid preparer returns at time $t$ is calculated as follows,

$$\textbf{(2)} \quad X_t = \frac{(1-\omega)G_{t-1}^P + \omega G(\chi_H\kappa_L) + (1-\omega)G_{t-1}^{Up} + X_{t-1}G_t^U}{G}.$$

By rearranging terms and substitution, we have

$$\textbf{(3)} \quad X_t = (1-\omega)X_{t-1} + \omega(\chi_H\kappa_L) + \omega(1-\chi_H\kappa_L - (1-\chi_H)(1-\kappa_L))X_{t-1}.$$

The first term on the right hand side of equation 3 is the fraction of filers who used a paid preparer in the previous time period. The second term is the fraction of new filers who perceive that their knowledge of tax issues is inadequate to accurately determine their tax liability on their own and, therefore, independently choose to use a preparer. The last term is the fraction of new filers who initially are uncertain which preparation mode to use but consulted with and heeded the advice of a friend or neighbor who used a paid preparer in time $t$-1.

The long-run stochastically stable equilibrium (*SSE*; Young, 1998) for all taxpayers can be determined by recognizing that when $t > 0$ all new taxpayers who are initially uncertain about their preparation mode are assumed to follow the example of the one person they consult with. The probability that the advisee will consult with someone who used a paid preparer at time $t$-1 is the ratio

$$\frac{\chi_H\kappa_L}{\chi_H\kappa_L + (1-\chi_H)(1-\kappa_L)}.$$

The numerator of this ratio is the fraction of the population that independently decides to use a paid preparer and the denominator is the fraction of the total taxpayer population that can decide on their own whether to use a preparer or self-prepare. Therefore, the *SSE* for all filers (i.e., the long-run share of all filers who use a paid preparer) is defined as

$$SSE = \chi_H\kappa_L\left(1 + \frac{(1-\chi_H\kappa_L - (1-\chi_H)(1-\kappa_L))}{\chi_H\kappa_L + (1-\chi_H)(1-\kappa_L)}\right).$$

The right-hand side of this expression includes the fraction of the taxpayer population that can independently decide to use a paid preparer as well as the fraction of initially uncertain taxpayers who decide to use a preparer after consulting with a family member or other close friend.

For filers with low tax complexity the stochastically stable equilibrium fraction of paid preparer filers ($SSE_L$) is the following expression,

$$SSE_L = \frac{(1-\chi_H)\kappa_L}{(1-\chi_H)} * \frac{\chi_H\kappa_L}{\chi_H\kappa_L + (1-\chi_H)(1-\kappa_L)}.$$

The first term in this expression is the fraction of low tax complexity filers who also have low knowledge of tax laws. According to our model, such taxpayers initially are uncertain whether or not to use a tax preparer. In the long run, however, it is assumed that the fraction of this group of filers who do use a preparer is represented by the second term. The expression for ($SSE_L$) simplifies to

$$SSE_L = \frac{\chi_H \kappa_L^2}{\chi_H \kappa_L + (1-\chi_H)(1-\kappa_L)}.$$

To illustrate with a simple numerical example, let us assume $\chi_H = 0.5$ and $\kappa_L = 0.8$. Then, we can compute $SSE$ and $SSE_L$ as follows:

$$SSE = 0.5*0.8 + \frac{0.5*0.8}{(0.5*0.8)+(1-0.5)(1-0.8)}$$
$$*(1-0.5*0.8-(1-0.5)(1-0.8))$$
$$= 0.4 + \left(\frac{0.4}{0.5}\right)*0.5 = 0.4 + 0.4 = 0.8$$

$$SSE_L = \frac{0.5*0.8^2}{(0.5*0.8)+(1-0.5)(1-0.8)} = \frac{.32}{.50} = 0.64.$$

Therefore, in this hypothetical example where the population is evenly divided between low and high tax complexity filers and 80 percent of the population has low knowledge of tax laws, we would expect about 64 percent of low tax complexity filers and 80 percent of all filers to eventually use a paid preparer.

Thus far, I have assumed that taxpayers who are initially uncertain about their preparation mode only consult with one other person prior to making a decision. Other models of social learning (Ellison and Fudenberg, 1995) consider the possibility that several persons may be consulted before a decision is made to purchase a new product or service. However, in the context of tax preparation, I believe it is more likely that taxpayers tend to consult fewer rather than more persons due to the high degree of privacy accorded to tax matters in general. Therefore, I believe the assumption of relying on the advice of a single person is not unreasonable in the tax preparation context. The main impact of requiring a larger sample size ($N > 1$) before making a decision is a reduction in the speed of diffusion of information (Ellison and Fudenberg, 1995; Ellison, 1993).

### Random Complexity Shocks

Finally, it often happens that taxpayers experience significant life events that influence tax filing behavior. Some examples include the following: marriage, the birth or adoption of children, starting a business, moving to another state, and retirement. When such events occur, taxpayers may reassess their current mode of tax preparation to make sure it is the best approach given the perceived change in complexity associated with the particular event. Therefore, the model is modified to allow random complexity shocks to occur with expected probability $\delta$ for each time period. It is assumed that $\delta$ applies randomly to filers with low or high current tax complexity and switches the affected filer into the opposite complexity category. Therefore, the fraction of low complexity filers who switch to high complexity as a result of a random shock is. $\delta(1-\chi_H)$.

Formally, exogenous shocks are incorporated into equation (3) as follows

$$\textbf{(4)} \quad X_t = (1-\delta)(1-\omega)X_{t-1} + \omega(\chi_H \kappa_L) + \omega(1-\chi_H\kappa_L - (1-\chi_H)(1-\kappa_L))X_{t-1} + \delta(1-\omega)\left\{(1-\chi_H)\kappa_L + (1-\chi_H)(1-\kappa_L)X_{t-1} + \chi_H\kappa_L X_{t-1}\right\}.$$

In equation (4), complexity shocks are only allowed to occur to taxpayers who are not first-time filers. The term in braces has three components. The first term is the fraction of low complexity filers who are moved into a high complexity status and who independently determine to use a paid preparer. The second term is the fraction of low complexity filers who become high complexity but are initially uncertain about their preparation mode. They decide to use a preparer after talking to a neighbor or member of their family who used a paid preparer in the last time period. The third term in the braces in equation (4) is the fraction of high complexity filers who fall to a lower complexity level as the result of some shock. These filers also decide to use a preparer after talking to a neighbor.

Incorporating exogenous complexity shocks has two significant impacts on the dynamics of the model. First, if the fraction of high complexity filers ($\chi_H$) is greater than 0.50, the new $SSE$ is lower than the original $SSE$. I do not derive this formally, however, intuitively the effect of the random shock

is to select more of the high complexity filers (when $\chi_H > 0.50$) and change them to a lower complexity level, which implies more taxpayers will decide to self-prepare (taxpayer knowledge is assumed not to be affected). Of course, when $\chi_H < 0.50$ the opposite occurs; the new *SSE* is higher than the old *SSE*. The second effect of introducing complexity shocks is an increase in the rate of convergence. Intuitively, complexity shocks provide more opportunities each time period for some fraction of taxpayers to switch preparation mode. By accelerating the number of opportunities, the rate of convergence to the *SSE* is faster compared to the situation when complexity shocks are absent.

## COMPUTATIONAL APPLICATION

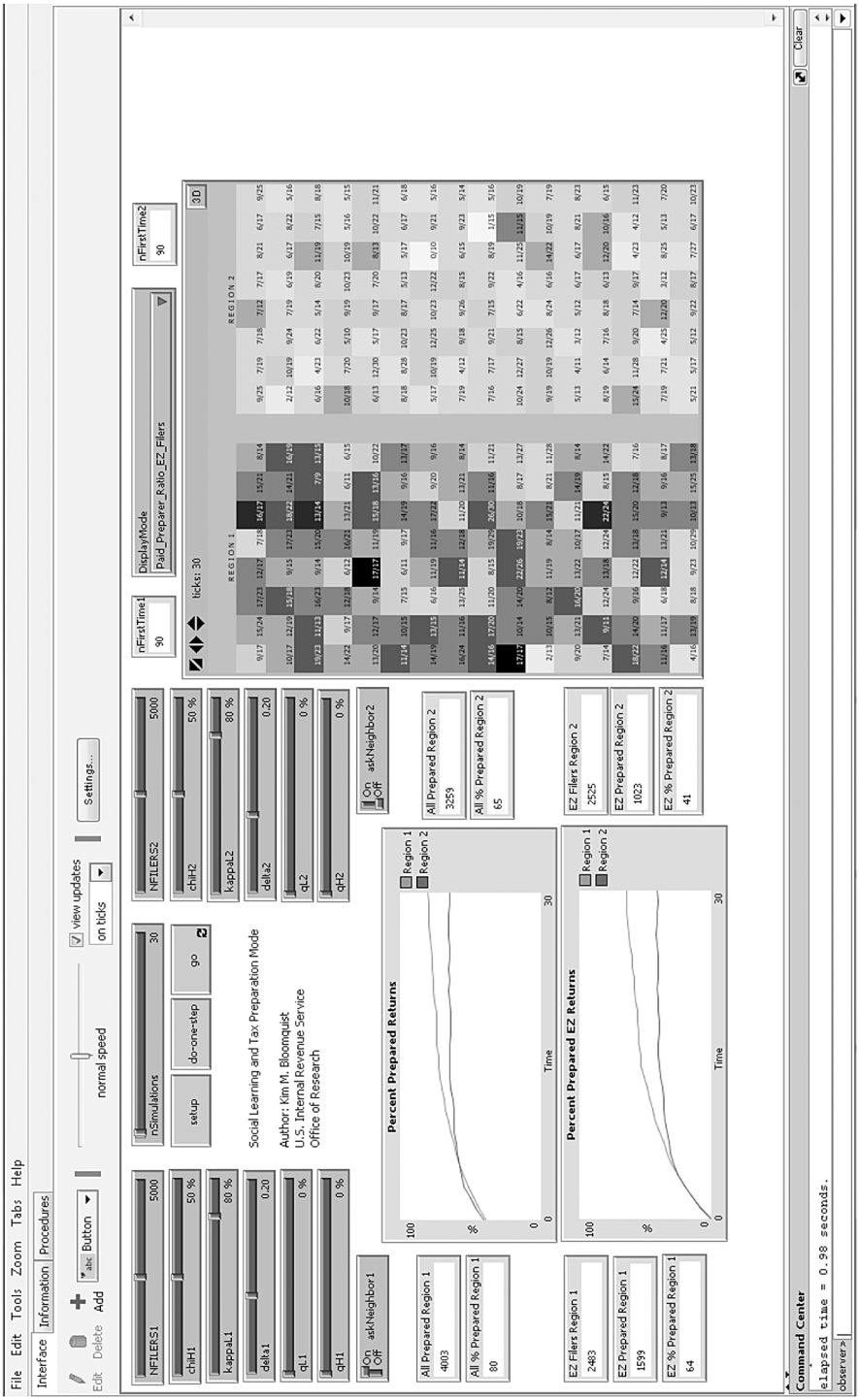
In this section, I describe an implementation of the model of social learning and tax preparation mode. The model is programmed in NetLogo version 4.0.3 (Wilensky, 1999) and the model code is available from the author on request. The user interface screen is shown in Figure 4. The graphical output area of the user interface displays relative concentrations of paid preparer returns for two separate regions containing an equal number of taxpayers and an equal number of patches (128 in each region). Currently, the model randomly allocates 5,000 taxpayers to the 128 patches in each region, or an average of 39 taxpayers per patch. Each patch may be thought to represent a local unit of area such as a county. The total number of taxpayers is a user-adjustable parameter.

Patches turn from a lighter to a darker shade of grey during program execution as the fraction of paid preparer returns grows larger. Users may choose to display the paid preparer ratios for all filers or for low tax complexity (i.e., EZ) filers. Each patch is also labeled with a ratio indicating the number of paid preparer returns in the numerator and total returns (either All or EZ depending on which filer population is displayed) in the denominator. Also available are two plots that display the progression over time of the percent paid preparer returns for all filers and EZ filers in both regions. Users may specify unique model parameters for each region in order to compare (visually and numerically) changes over time. The available parameters include the following: percent of high complexity filers (*chiH*), percent of low tax knowledge filers (*kappaL*), the probability of receiving a random complexity shock (*delta*) and the proportion of uncertain low (high) complexity filers who used a paid preparer at time $t$=0 is $qL$ ($qH$). When $qL$ and/or $qH$ are set to zero, it is assumed that uncertain filers initially self-prepare. Finally, the user interface includes several monitors that display the numerical values of summary measures.

Taxpayer agents in the model either are initially certain or uncertain about their tax preparation mode based on randomly assigned characteristics of tax complexity and tax knowledge. Taxpayers in the "certain" category are able to independently determine whether they are better off to self-prepare or use a paid preparer. Taxpayers in the "uncertain" category behave in a boundedly rational manner by adopting the preparation mode of a randomly polled taxpayer located on the same patch. If no other taxpayers are located on this patch or the *askNeighbor* switch is set to "Off," then the uncertain taxpayer agent flips a coin to determine its preparation mode. Agents that have filed for 50 years are replaced by new agents with randomly assigned characteristics. This means that roughly 2 percent of the population are new filers each time step. The frequency of complexity shocks is a parameter (*delta*) that can be set independently for each region using a slider.

Using the model we can answer questions such as "What is the impact of word-of-mouth communication on the diffusion of paid preparer use after a specific length of time?" To answer this question we set up the model so that both Regions 1 and 2 have the same initial conditions for percentage of high complexity filers (e.g., 50 percent) and percentage of low tax knowledge filers (e.g., 80 percent). We also assume that 20 percent of each region's population of 5,000 taxpayers experiences a complexity shock each time step that requires those affected to reevaluate their prior preparation mode decision. The only difference between the two regions is that we assume taxpayers in Region 1 who are uncertain about whether to use a paid preparer or self prepare ask a neighbor whereas taxpayers in Region 2 simply flip a coin to resolve their uncertainty. We run the model for 30 time steps and compare the ratio of paid prepared returns in both regions. In Region 1 we find that 80 percent of all filers and 64 percent of low complexity (EZ) filers use a paid preparer. These results agree with the *SSE* solutions derived previously. In Region 2 we find that 65 percent of

*Figure 4:* **User Interface Screen to Model of Social Learning and Tax Preparation Mode**



all filers and 41 percent of EZ filers use a paid preparer. Therefore, word-of-mouth communication boosts the share of paid preparer returns in a population by 15 percentage points after only 30 time periods.

## CONCLUSION

The increase in the share of individual tax returns prepared by commercial tax preparers over the last decade is often attributed to the growing complexity of the tax code. However, a similar trend among Form 1040-EZ filers would seem to cast some doubt on growing complexity as the sole explanation. Moreover, the overlapping spatial pattern of preparation mode choice by Form 1040/1040-A filers and Form 1040-EZ filers (Figures 1 and 2) does not appear to be associated solely with the level of educational achievement or other factors thought to influence preparation mode decisions. This paper has posited word-of-mouth communication as a possible explanation for the observed spatial and temporal patterns of commercial tax preparer usage among individual taxpayers. A model of tax preparation mode choice with word-of-mouth communication is described and stochastically stable equilibrium solutions are derived for all tax filers and filers with low tax complexity. The model is implemented in an agent-based simulation environment to facilitate exploration of a class of elements (e.g., random complexity shocks) that can be challenging to treat analytically.

## NOTES

1. Urban-Brookings Tax Policy Center.
2. U.S. Department of Treasury (2005).
3. See U.S. Department of Treasury, various years.
4. Form 1040 is the form used by filers who itemize deductions or have capital gains income and/or other business-related income. Form 1040-A is used by filers with no business or capital gains income but who may have dependents, unlike Form 1040-EZ filers who cannot claim dependents.
5. Some examples include: Durlauf and Young, 2001; Ellison, 1993; Ellison, 2000; Epstein and Axtell, 1996; Glaeser, Sacerdote, and Scheinkman, 1996 and Morris, 2000.
6. National Association of Tax Professionals (2005).

## REFERENCES


Blumenthal, Marsha, and Charles Christian. Tax Preparers. In Henry J. Aaron and J. Slemrod, eds. *The Crisis in Tax Administration*. Washington, D.C.: Brookings Institution Press, 2004, pp. 201-229.

Collins, Julie H., Valerie C. Milliron, and Daniel R. Toy. Factors Associated with Household Demand for Tax Preparers. *Journal of the American Taxation Association* 12 (Fall 1990): 9-25.

Dubin, Jeffrey A., Michael J. Graetz, Michael A. Udell and Louis L. Wilde. The Demand for Tax Return Preparation Services. *Review of Economics and Statistics* 74 (February 1992): 75-82.

Durlauf, Steven N. and H. Peyton Young, eds. *Social Dynamics*. Washington, D.C.: Brookings Institution Press, 2001.

Ellison, Glenn.

Learning, Local Interaction, and Coordination. *Econometrica* 1 (September 1993): 1047-1071.

Basins of Attraction, Long-Run Stochastic Stability, and the Speed of Step-by-Step Evolution. *Review of Economic Studies* 67 (January 2000): 17-45.

Ellison, Glenn and Drew Fudenberg. Word of Mouth Communication and Social Learning. *Quarterly Journal of Econometrics* 110 (February 1995): 93-125.

Epstein, Joshua M. and Robert L. Axtell. *Growing Artificial Societies: Social Science from the Bottom Up*, Cambridge, MA: MIT Press, 1996.

Erard, Brian. Taxation with Representation: An Analysis of the Role of Tax Practitioners in Tax Compliance. *Journal of Public Economics* 52 (September 1993): 163-197.

Glaeser, Edward L, Bruce Sacerdote, Jose A. Scheinkman. Crime and Social Interactions. *Quarterly Journal of Economics* 111 (May 1996): 507-548.

Guyton, John L., John F. O'Hare, Michael P. Stavrianos, and Eric J. Toder. Estimating the Compliance Cost of the U.S. Individual Income Tax. *National Tax Journal* 56 (September 2003): 673-688.

Manski, Charles F. Identification of Endogenous Social Effects: The Reflection Problem. *Review of Economic Studies* 60 (July 1993): 531-542.

Morris, Stephen. Contagion. *Review of Economic Studies* 67 (January 2000): 57-78.

National Association of Tax Professionals. Finding the Right Tax Preparer. Appleton, WI, 2005. http://www.natptax.com/2005findataxprobrochure.pdf.

Slemrod, Joel and Nikki Sorum. The Compliance Cost of the U.S. Individual Income Tax System. *National Tax Journal* 37 (December 1984): 461-474.

Urban-Brookings Tax Policy Center. Washington, D.C.: Urban-Brookings Tax Policy Center. http://www.taxpolicycenter.org/legislation

U.S. Treasury Department. Internal Revenue Service. Taxpayer Usage Study, Tax Year 2005. Washington, D.C. http://www.irs.gov/taxstats/article/0,,id=184856.00.html

U.S. Treasury Department. Internal Revenue Service. Statistics of Income Division. SOI Tax Stats – Individual Income Tax Returns, Table 4 – Individual Income Tax Returns with Earned Income Credit. Washington, D.C., various years. http://www.irs.gov/taxstats/indtaxstats/article/0,,id=133414,00.html

Wilensky, Uri. *NetLogo*. [Computer software.] Evanston, IL: Northwestern University, Center for Connected Learning and Computer-Based Modeling, 1999. http://ccl.northwestern.edu/netlogo/

Yankelovich, Skelly and White, Inc. *Survey of Taxpayer Attitudes*. Report prepared for the Internal Revenue Service, Washington, D.C., 1984.

Young, H. Peyton. *Individual Strategy and Social Structure*. Princeton, NJ: Princeton University Press, 1998.