LOGIT ANALYSIS OF THE EMPLOYEE CLASSIFICATION PROBLEM FOR TAX PURPOSES

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Abstract

This study undertakes the task of simplifying the complex problem of classifying workers as either an employee or an independent contractor for income tax withholding purposes. Historically, the Internal Revenue Service has relied on twenty common law factors to determine whether a worker in a given context is an employee or an independent contractor.

Logistic regression is used to estimate the parameters of a model using data obtained from Private Letter Rulings from 1988 through a portion of 1993. The model is highly accurate in correctly classifying workers as either employee or independent contractor. The final model is successful relying on only five of the twenty common law factors. The most important variables are whether the employer has the right to require either oral or written reports, set the hours of work, and whether the worker can earn a profit or sustain a loss. These findings are robust for each of the years in the study.

Using five independent variables, the model has an prediction accuracy rate of 98.5 percent using sample data. An out-of-sample test was performed and the overall accuracy rate was 94.7 percent. The model possesses excellent predictive abilities both within sample and without.

INTRODUCTION

In May, 1989 the General Accounting Office (GAO) reported that "at least \$1.6 billion in revenues were lost as a result of improper classification of employees because employers failed to collect and pay employment taxes and independent contractors claimed tax benefits they were not entitled to" [11]. Furthermore, the misclassification of employees and their treatment as independent contractors is widespread and increasing, with the Internal Revenue Service (IRS) estimating that 3.4 million workers are incorrectly classified by one out of seven employers [9]. As a result of widespread non-compliance with this area of the tax law, the IRS continues to enhance and expand initiatives to increase compliance.

Penalties that may be assessed against employers deemed in non-compliance are extensive [5,7,10]. In addition, the misclassified employee is liable for taxes that would apply to deductions incorrectly taken. But, potential liability does not stop with these two parties; it also extends to accounting firms who have attested to the fairness of financial statements, and enrolled agents who have signed tax returns. Therefore, interest in this issue is widespread.

Determining the correct status of a worker is a complex task and the ultimate determination rests with the application of common law principles when not otherwise specified by statute. Every working relationship is unique which necessitates a case-by-case determination. Generally, a worker is an employee when the employer has the right to control the activity of the worker not only as to the result to be achieved but as to how, when, and where the work is to be performed. Furthermore, the ultimate determination is made based on the actual conduct of the parties in the relationship rather than the existence of a definitive written contract. Under Revenue Ruling 87-41, the IRS employs twenty factors, gleaned from case law, to assist in evaluating when the control exercised by the employer is sufficient to classify the worker as an employee. Numerous authors including Hulen [6], Merritt [8] Sumutka [14] and Stewart [13] have questioned the need for this many factors and have consistently suggested that fewer factors can be employed to make the necessary classifications. On the other hand, the IRS in applying these twenty factors does not weigh the factors evenly but places different weights on the various factors depending upon the factual context of a particular working relationship. This leaves the question of which factors are the most important open.

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As the decision process presently stands, the ultimate determination is based upon the subjective application of the common law principles to each individual case [8]. The subjective nature of the process is a source of confusion to every party with a vested interest in the correct classification of workers.

The objective of this study is to analyze the results of previous Revenue Service Private Letter Rulings to determine: (1) if there is a pattern in the weighing of the individual factors, (2) if some of the factors are redundant, and (3) if a predictive model can be developed that is accurate and reliable in assisting with the classification question.

The remainder of the paper is organized with a background discussion in Section II followed by a description of the data and methodology in Section III. The model is presented in Section IV and results are discussed in Section V. Conclusions are in Section V.

BACKGROUND

Federal employment taxes are those contained within the Federal Insurance Contributions Act (FICA), the Federal Unemployment Tax Act (FUTA) and the Collection of Income Tax at Source on Wages. Generally, all three Acts charge the IRS with the responsibility for the collection of taxes arising under the Acts. These three Acts do not apply when the worker is an independent contractor but, are applicable when the relationship is that of an employer/employee. Guidelines for determining whether a worker is an employee are provided in the Employment Tax Treasury Regulations under §§ 31.3121(d)-1, 31.3306(I)-1, and 31.3401(c)-1 for the FICA, FUTA and federal income tax withholding, respectively.

Treasury regulations provide that an employer/employee relationship is deemed to exist when the employer has the right to control and direct the worker as to the details and means by which work is to be accomplished [\$31.3121(d)-1(c)(2)]. Whether a worker is an employee or an independent contractor under common law rules is a question of fact to be determined by considering and evaluating the circumstances surrounding each individual case. Revenue Ruling 87-41, CB 1 identifies twenty factors that are used by the IRS in evaluating each case.

The twenty common law factors (see Appendix) that have been derived over many years are compiled from numerous court cases and previous revenue rulings. Each factor contributes to an understanding of the extent to which the employer exercises control over the worker. Determining how much control is exercised in an individual case is a subjective process relying on the factual circumstances, nature of the work involved, intent of the parties and industry practice. The relative importance of each of the factors varies from case to case. A factor deemed important in one circumstance will, in different circumstances, have a different level of importance.

Each of the twenty common law factors is straight forward. The evaluation and assessment of each individual factor, when the facts in a particular case are known, are not difficult. However, the integration of all twenty factors into a determination of employment status is complex. For instance, if all twenty factors indicate either an employer/employee relationship or independent contractor status, then the decision is simple. However, in most relationships some factors will be indicative of an employment status and some factors will be indicative of independent contractor status. In these instances, a considerable amount of skill, knowledge, and reasoned judgement are necessary. Whether the *ex post* observation of prior determinations made by the IRS will permit the modeling of this subjective decision process is clearly an important empirical question.

Logit analysis has been used to reduce the criterion variables to five. In this particular study, Stewart [13], developed data using District Court and Court of Claims decisions. One hundred and forty cases are selected over the period 1940 through 1980. The court rendered a determination of employee for forty-nine cases and independent contractor for ninety-nine cases. Eleven variables were selected as being determinative of either employee or independent contractor status. A stepwise procedure was used to iteratively select those variables that make a significant contribution to the classification problem. From the stepwise procedure, five variables enter the logistic model: (1) whether the worker is supervised by the employer, (2) whether the services performed by the worker are integrated into the business of the employer, (3) whether the relationship is permanent, (4) whether the worker is in an independent trade, and (5) whether the worker can earn a profit or sustain a loss. These five variables are successful in correctly classifying 97.3 percent of the cases evaluated. It is important to note that the data used by Stewart results from challenges by taxpayers to the classification finding of IRS. Since such challenges are undertaken at the taxpayers expense, it is highly likely that the taxpayers had good reason to believe that such a challenge would be successful. Since the courts overturn the IRS in sixty-five percent of the cases, one would suspect that the IRS has an inherent bias in their classification process towards an employee classification or no systematic means of making a determination. However, since 1987 the criterion to be used has been well defined.

METHODOLOGY AND DATA

Either an employer or a worker may seek a Private Letter Ruling from the National Office of the IRS to determine the classification of the worker for FICA, FUTA and income tax withholding purposes. The procedure is available on an *ex post* basis and is initiated by the submission of a Form SS-8 by either the worker or the employer. This form requires narrative answers to a series of questions which relate to the twenty common law factors. The IRS, upon receipt of a request, notifies the other interested party and requests that they also file a Form SS-8 responding to the same series of questions. This procedure provides the National Office with factual input from both the worker and the employer. If there is more than one worker constituting a class of employees performing similar services, then other workers are also asked to provide input. If there is minimal disagreement as to the facts surrounding the working relationship, then a ruling will be issued to the affected parties with a copy provided to the District Director of the IRS.

If there is substantial disagreement as to the facts in the case, such that no determination can be made, the District Director may be requested to conduct an investigation. Upon the receipt of the results from this investigation, the National Office will make a determination and render a ruling.

Private Letter Rulings are issued to the requesting party and other individuals affected by the ruling. These rulings do not set precedent and may be used only by the parties to whom they are addressed. After issuance of the ruling, the identity of the involved parties is removed and it is subsequently made public. While these published rulings are limited in their use, they do provide some guidance to other interested but unrelated parties. More importantly, they contain a recitation of the facts on which the ruling relies, a discussion of the applicable law and regulations as well as the reasoning and factors used in reaching the final determination.

Private Letter Rulings issued from 1988 through the eleventh week of 1993 are used to obtain the necessary data for this study. The twenty common law factors as prescribed in Revenue Ruling 87-41, CB 1 are applied to the facts disclosed in each letter ruling and answers to the twenty questions are obtained from this source. The sample consists of 468 observations. Of these 468 cases, 424 were classified as employees, and 44 as independent contractors. About 95% of the cases correspond to the period between 1988 and 1990. Rulings that contain insufficient data are omitted as are cases where one or more of the factors are in dispute.

MODEL DESCRIPTION

A typical letter ruling determines if an individual is an employee or an independent contractor. The ruling constitutes an outcome variable, with only two outcomes possible. The worker is classified as either an employee or an independent contractor. A binary response variable *y* is easily defined:

$$y = \begin{cases} 1 & \text{If employee} \\ 0 & \text{Otherwise} \end{cases}$$

Treating the outcome variable as a binary variable permits an estimate of the probability that an individual will be classified as an employee, given a set of characteristics defined by the twenty common law factors.

The logistic distribution is used to represent the conditional expectation of y, given x, the set of independent variables, that is,

Equation 1

$$\pi(x) = E(y/x) = P(y = 1; x) = \frac{\exp(x_i\beta)}{1 + \exp(x_i\beta)}$$

In expression (1) E(y|x) refers to the conditional expectation of y given x, which is denoted as $\pi(x)$ for simplicity; β is a k-vector of unknown parameters, and x_i is a k-vector of independent variables.

After the logit transformation, expression (1) results in:

Equation 2

$$\ln\left[\frac{\pi(x)}{1-\pi(x)}\right] = x_i \beta$$

where; In denotes natural logarithm.

Assuming a sample of *n* independent observations of the variables (y,x), with likelihood for observation *I* given by the function $h(y_i;\beta)$, the likelihood function can be written as

Equation 3

$$L(\beta;Y) = \prod_{i=1}^{n} h(y_i;\beta)$$

and the parameters β are obtained through maximization of (3).

The logistic model presented here is a well known statistical model. A comprehensive treatment can be found in Cox and Small [4]. Asymptotic properties of maximum likelihood estimators are well developed and discussed elsewhere ([see Amemiya [1] and Ben-Akiva [2]).

This model is useful because the probability of an event occurring can be easily predicted. Given certain characteristics a choice is made involving a classification, selection, or clustering of individuals. The choice made is basically the outcome of a decision process that involves a decision maker, the characteristics of different alternatives, and the decision rule. The decision maker is IRS which follows guidelines based on treasury regulations, statutes, revenue rulings and case law. The choice set is simply the status of the worker: employee versus independent contractor. The characteristics of the alternatives are the different common law factors. There are no definitions with respect to the decision rule. It is the purpose of this study to provide evidence on the patterns followed in the decision-making process, if any, based on Private Letter Rulings issued by the IRS.

| NUMBER | Q7 | Q11 | Q14 | Q16 | Q18 | FREQUENCY |
|--------|----|-----|-----|-----|-------|-----------|
| 1 | 0 | 0 | 0 | 0 | 0 | 21 |
| 2 | 0 | 0 | 0 | 0 | 1 | 5 |
| 3 | 0 | 0 | 0 | 1 | 0 | 4 |
| 4 | 0 | 0 | 0 | 1 | 1 | 3 |
| 5 | 0 | 0 | 1 | 0 | 1 | 2 |
| 6 | 0 | 0 | 1 | 1 | 1 | 9 |
| 7 | 0 | 1 | 0 | 0 | 0 | 8 |
| 8 | 0 | 1 | 0 | 0 | 1 | 1 |
| 9 | 0 | 1 | 0 | 1 | 0 | 4 |
| 10 | 0 | 1 | 0 | 1 | 1 | 12 |
| 11 | 0 | 1 | 1 | 0 | 0 | 1 |
| 12 | 0 | 1 | 1 | 1 | 0 | 26 |
| 13 | 0 | 1 | 1 | 1 | 1 | 84 |
| 14 | 1 | 0 | 0 | 0 | 0 | 1 |
| 15 | 1 | 0 | 0 | 1 | 0 | 3 |
| 16 | 1 | 0 | 0 | 1 | 1 | 1 |
| 17 | 1 | 0 | 1 | 1 | 0 | 3 |
| 18 | 1 | 0 | 1 | 1 | 1 | 18 |
| 19 | 1 | 1 | 0 | 0 | 1 | 1 |
| 20 | 1 | 1 | 0 | 1 | 1 | 6 |
| 21 | 1 | 1 | 1 | 0 | 1 | 1 |
| 22 | 1 | 1 | 1 | 1 | 0 | 11 |
| 23 | 1 | 1 | 1 | 1 | 1 | 243 |
| | | | | | TOTAL | 468 |

TABLE 1 Population Profiles

RESULTS

Since there is no *a priori* expectation as to what kind of model can represent the selection criterion of the IRS, the data was first analyzed through simple correlations. Some of the correlations were high. Different trials with the logistic model, when all twenty independent variables were included, did not permit the estimation of all the parameters with high precision. The final logistic model was approximated using a stepwise procedure. Five of the independent variables are:

- Q7 = Does the employer set the working hours?
- Q11 = Does the employer require written or oral reports?
- Q14 = Does the employer provide tools and materials?
- Q16 = Is the worker shielded from a profit or loss?
- Q18 = The worker makes no services available to the general public.

Under the stepwise procedure used, entry into the model requires that the estimated coefficient be significant at the .05 level.

Table 1 presents a profile of the observations in the data set. More than half the cases show "yes" as answer for all five questions. For the five common law factors used in the logistic procedure there is 120 possible combinations for the variables. However, the data only has twenty-three combinations for the five variables of interest. The frequency of each of these observed combinations is presented in Table 1.

Cross tabulations between each question and the response were made. Of the 44 cases classified as independent contractors, 95.45% have a negative response to Q7. Q14 was affirmative in 398 cases, and almost 99% of those correspond to a classification of employee. In fact, an affirmative answer to all five factors increases the chances of a classification of employee. However, the pattern is not very clear if the answer is negative. For instance, in Q18, 82 cases are negative and approximately 56% of these cases were classified as employees and about 44% as independent contractors, a very uniform partition. This same pattern occurs for Q11 and Q14. Only for Q16 is there a clear majority of cases (85%) where the classification of independent contractor prevails among those that answer negatively to this factor.

| VARIABLE | ESTIMATE | STANDARD DEVIATION | ODDS RATIO |
|-----------|-----------|-----------------------|------------|
| INTERCEPT | -4.7149** | 0.9656 | 0.009 |
| Q7 | 2.8554* | 1.1996 | 17.381 |
| Q18 | 2.6706** | 0.8532 | 14.449 |
| Q11 | 2.7763** | 0.8699 | 16.059 |
| Q16 | 2.9062** | 0.7801 | 18.287 |
| Q14 | 1.9488** | 0.7623 | 7.020 |
| -2 LOG L | 233.2 | | |
| Ν | 468 | | |

TABLE 2 Logistic Regression Parameter Estimates

*Significant at the 2% level, **Significant at the 1% level.

Q7 = Does the employer set the working hours?

Q11 = Does the employer require written or oral reports?

Q14 = Does the employer provide tools and materials?

Q16 = Is the worker shielded from a profit or loss?

Q18 = The worker makes no services available to the general public.

Two extensions of the logistic model were attempted. First, with the idea of capturing differences in classification according to "year of ruling," dummy variables for different years were included, but results showed no significant difference among the years included in the sample. This result confirms that the IRS displays a consistent decision pattern over the years examined.

The exclusion of the rest of the variables in the logistic regression might raise the question of how biased the estimates might be. In order to incorporate the information that these omitted variables could contain, four principal components were computed from those variables and included in the regression. The test performed did not permit rejection of the null of zero restrictions, so those variables were excluded. Best results were obtained with the five previously identified variables. This suggests that a very small set of crucial factors are used in the classification decision.

Maximum likelihood estimates of the model are presented in Table 2. The final logistic model was estimated using only five variables representing common law factors numbered 7, 11, 14, 16, and 18 (Appendix). As explained in Section II, all these variables are binary, and they represent the presence or absence of a characteristic.

The value of the likelihood test (233.2) for joint significance of explanatory variables allows the rejection of the null of no relationship. All the coefficients in the logistic regression are significant with high confidence levels. The use of dichotomous variables permits the computation of odds ratios for each of the variables included in the model. The odds ratio for variable x_i is defined as:

Equation 4

$$\Psi = \frac{\pi(x_i = 1)/[1 - \pi(x_i = 1)]}{\pi(x_i = 0)/[1 - \pi(x_i = 0)]}$$

where the numerator is the odds of the outcome (a determination of employee) when the variable $x_i = 1$. If β_i represents the log odds, then a logarithmic transformation of (4) results in:

Equation 5

 $\Psi = e^{\beta_i}$

The interpretation of the odds ratio is very useful in identifying the likelihood of an outcome decision of employee classification, when the attribute is present, in comparison with the case where the attribute is not present.

According to the results, an individual whose hours are controlled by the employer is 17.4 times more likely to be classified as an employee than when the hours are not controlled by the employer. A worker who makes no services available to the general public is 14.4 times more likely to be classed as an employee than a worker who does. A worker who may be required to render oral or written reports is 16 times more likely to be classified as an employee than a worker who cannot be required to give reports. A worker who is shielded from either profits or losses is 18.3 times more likely to be classified as an employee than a worker who does an employee than a worker who does not supply tools or materials is 7 times more likely to be classified as an employee than a worker who does supply tools or materials. Confidence intervals for odds ratios were computed and they are included in Table 2.

The predictive effectiveness of the model can be evaluated by a goodness-of-fit measure. A simple way to see how well the model fits is by looking at the number of cases with predicted probability greater than $\frac{1}{2}$ as a prediction of $y_i = 1$, and the cases with probability less than $\frac{1}{2}$ as a prediction of $y_i = 0$. Then by computing the ratio of correct predictions over total cases, an overall measure of accuracy is obtained. In this case the ratio is very high at 99 percent (383/388). Other alternative measures are based upon the distance between y_i and y_I , that is, they are based on prediction errors.

Standard output in the SAS logistic procedure [12] includes some correlation coefficients that assist in evaluating the predictive properties of the model. These measures make use of concordant and discordant observations. Simply stated, observations i,j are concordant if:

 $x_i > x_j$ and $y_i > y_j$

for a pair of observations (x_i, y_i) , (x_j, y_j) . They are discordant if either:

$$x_i > x_j$$
 and $y_i < y_j$ or
 $x_i < x_j$ and $y_i > y_j$.

The different measures of correlation involve ratios related to NC (the number of concordant observations) and ND (the number of discordant observations). The null of zero correlation was easily rejected by using correlations measures Sommer's D and Goodman-Kruskal Gamma correlation coefficients.

The most important measures of how effective the model is for prediction purposes can be obtained by using the information provided in Table 3. Before discussing this table, it is important to emphasize that the purpose of the model is to predict the probability that an individual with certain characteristics will be classified as either employee or independent contractor. The logistic regression model predicts that probability. However, since the prediction is a number between zero and one, there is a need to determine what values of the estimated probability will be considered "close to one" and what values "close to zero" so a predicted classification can be determined. The higher the cutoff point the higher the probability of making a mistake by classifying an individual as independent contractor. At the same time, the probability that we want to minimize, results are presented using a cutoff point of P=0.3, which implies that an individual will be classified as an employee if the predicted probability $\hat{y}_I > 0.3$. Otherwise, the individual is classified as an independent contractor.

| | PREDI | CTED | ACTUAL |
|-----------|----------|---------|-----------|
| ACTUAL | 423 6 | 1 38 | 424 44 |
| PREDICTED | 429 | 39 | 468 |

TABLE 3 Within Sample Classification Results

From Table 3, the number of correct predictions is identified as the sum of the main diagonal (451) which results in a high proportion of 98.5%. Other measures, presented in Table 4, also show that the explanatory power of the model is fairly high. Examples include a sensitivity measure which is the proportion of correct classifications of "employee" over the actual number of employees as determined by the letter rulings. That ratio is 99.8%. Specificity refers to the same measure applied to independent contractors. Thus, where the cutoff point is P=0.3, 98.5% of employees and 86.1% of independent contractors are correctly classified.

The last two measures in Table 4 are the proportions of incorrect predictions of employees over the total number of predicted employees (false positive), and the proportion of missed independent contractors out of total predicted independent contractors. Results presented in Tables 3 and 4 clearly show that the predictive power of the model is very high.

 TABLE 4

 Estimated Proportions of Accuracy in Prediction

| MEASURE | VALUE | | |
|------------------|-------|--|--|
| Correct | 98.5% | | |
| Sensitivity | 99.8% | | |
| Specificity | 86.4% | | |
| False - Positive | 1.4% | | |
| False - Negative | 2.6% | | |

Model results were tested using an additional sample of case. Nineteen Private Letter Rulings from 1987 were randomly selected. Table 5 presents a summary of the forecast performance.

| (Cut-Off: P = 0.3) | | | | | |
|--------------------|------------------|--------|---------|--|--|
| | PREDICTED ACTUAL | | | | |
| ACTUAL | 15 1 | 0 3 | 15 4 | | |
| PREDICTED | 16 | 3 | 19 | | |

 TABLE 5

 Out-of-Sample Classification Results (Cut-Off: P = 0.3)

It is apparent that the predictive power of the logistic model is fairly high even for out-of-sample data. No error in the prediction of employees is detected. There is one misprediction in the independent contractor classification. The performance shows a total of 18/19 correct predictions, a success rate of 94.7%.

For practical purposes, it is important to determine first which is the most important factor, and second what is the marginal contribution in probabilistic terms of being classified as employee once a given question has been answered as "yes." The issue is to compute the change in the probability of being classified as employee conditional on a given answer. Table 6 presents the predicted logit value, the predicted probabilities ($y_i=1$), and the marginal contribution of each question answered "yes" to the probability of being classified as employee.

As an exercise one can compute these probabilities for each question, assuming that question has been answered first, and adding one question at a time to see what is the probability of being classified as employee as more questions are added. For the 120 combinations possible (n!=5!) Table 6 presents the results for which the probability of being classified as employee is the highest once three questions have been answered in the affirmative.

| Q7 | Q11 | Q14 | Q16 | Q18 | Logit | Prob. | Marginal Prob. |
|----|-----|-----|-----|-----|-------|-------|----------------|
| 0 | 0 | 0 | 0 | 0 | -4.71 | 0.009 | |
| 1 | 0 | 0 | 0 | 0 | -1.86 | 0.135 | 0.126 |
| 1 | 0 | 0 | 1 | 0 | 1.05 | 0.74 | 0.61 |
| 1 | 1 | 0 | 1 | 0 | 3.82 | 0.978 | 0.24 |
| 1 | 1 | 1 | 1 | 0 | 5.77 | 0.997 | 0.018 |
| 1 | 1 | 1 | 1 | 1 | 8.44 | 0.999 | 0.002 |

TABLE 6 Conditional Probabilities

0 = negative response and 1 = affirmative response.

Q7 = Does the employer set the working hours?

Q11 = Does the employer require written or oral reports?

Q14 = Does the employer provide tools and materials?

Q16 = Is the worker shielded from a profit or loss?

Q18 = The worker makes no services available to the general public.

From Table 6, several conclusions can be reached. The only singular factor indicating classification as employee is Q16. If the worker has an opportunity to earn a profit or sustain a loss, then the marginal probability of .61 assures classification as an employee. If the worker is shielded from a profit or loss, then classification as an employee will require that the employer set the working hours and require written or oral reports. The presence of all three factors indicate a probability of classification as employee of almost 98%. The marginal contribution of the employer providing tools and materials and the worker making no services available to the general public contribute very small marginal probabilities of .018 and .002, respectively. However, if all five factors are present, the probability of

the worker being classified as an employee is 99.9 percent. If none of the five factors are present, the model still shows a small probability of being classified as employee (0.88%). This results from a significant intercept coefficient, and represents either a classification bias on the part of the IRS or a specification error in the model. In either case, the bias is quite small but statistically significant.

CONCLUDING REMARKS

The incorrect classification of workers for income tax purposes is costly to employers and workers. Employers are exposed to potential liability for taxes not withheld, penalties for failing to withhold, and claims by workers for lost fringe benefits. Workers are potentially liable for deductions taken for which they were not eligible.

Interest in this topic extends beyond the employer and the worker. Both tax attorneys and tax accountants, have a vested interest in the correct classification of workers because they are frequently consulted for professional assistance in structuring independent contractor agreements. In addition, auditors are frequently held accountable for undisclosed liabilities under their attestation function. Use of the model developed in this study will assist all interested parties in removing some of the uncertainty in the employee classification process.

From a public policy perspective substantial revenues are lost as a consequence of non-compliance which in turn forces substantial public resources to be devoted to enforcing compliance. Therefore, considerable social cost occurs from the incorrect classification of workers as independent contractors.

The question of assessing a particular working relationship to determine the correct status has been addressed in this study. The evidence indicates that three variables are highly indicative of whether the working relationship is one of employee or independent contractor. If the employer sets the hours of work, has the right to require oral or written reports, and if the worker has no opportunity to earn a profit or sustain a loss, then the probability of an employer/employee relationship is very high. The predictive accuracy of the model using only five of the twenty common law factors is excellent. When tested on the sample used to estimate the parameters the overall success rate is 98.5 percent and when tested using out-of-sample data, the overall success rate drops modestly to 94.7 percent.

APPENDIX Twenty Common Law Factors For Determining Employment Status Under Revenue Ruling 87-41

- 1. *Instructions*. If the employer gives instructions to the worker concerning how, when, and where the work is to be performed, then the employer is exercising control indicative of an employer/employee relationship. It is sufficient if the employer has the right to give instructions and does not require that instructions actually be given. [Revenue Ruling 68-598, CB 464 and Revenue Ruling 66-381, CB 449].
- Training. If the employer provides training to the worker, then the employer is exercising control as to how the work is to be
 performed. Training can take the form of compulsory attendance at meetings, seminars, sales meetings, etc. It is also present
 if the worker is required to perform services in the company of an employee. [Revenue Ruling 70-630, CB 167].
- 3. Integration. If the services provided by the worker are integrated into the services provided by the employer, then the employer is exercising direction and control. When the economic success of the employer is dependent upon the successful delivery of services and the worker provides these services then integration is present and the employer has a vested interest in how the services are provided. [United States v Silk, 331 U.S. 704(1947), 1947-2 CB 167].
- 4. *Personal Rendering of Service*. If the worker must provide services personally, then the employer is presumed to have an interest in the methods used to deliver the service. [Revenue Ruling 55-695, 1955-2 CB 410].
- Hiring, Supervising, and Paying Assistants. If the employer hires, supervises and pays assistants who help the worker, then an employer/employee relationship is deemed to exist. On the other hand, if assistants are hired, supervised and paid by the worker, then an independent contractor relationship is implied. [Revenue Ruling 63-115, 1963-1 CB 178 and Revenue Ruling 55-593, 1955-2 CB 610].
- 6. *Continuity*. If the relationship between the employer and worker is a continuous one or where the relationship is frequently recurring but irregular, then an employer/employee relationship is deemed to exist. [United States v Silk, op. cit.].
- 7. *Hours of Work*. If the employer sets the hours of work, then control by the employer is indicated. [Revenue Ruling 73-591, 1973-2 CB 337].

- 8. *Full Time*. If the worker devotes full time to the employer such that no opportunity exists for the provision of services to others or the general public, then control over the worker is indicated such that an employer/employee relationship exists. On the other hand, an independent contractor is free to work for whom he wishes when he wishes. [Revenue Ruling 56-694, 1956-2 CB 694].
- 9. Where Work Conducted. If the work must be accomplished on the employer's premises, then and employer/employee relationship is indicated because implicit control over how the work is performed is possible. This is especially true if the work could be just as easily accomplished at some other location. [Revenue Ruling 56-660, 1956-2 CB 693]. Furthermore, this manner of control is deemed to exist when the work is accomplished off the employer premises but the employer has the right to designate a route, specific places where the work is to be performed, or to canvass a territory within a specific time period. [Revenue Ruling 56-694, 1956-2 CB 694].
- Sequence of Work. If the employer has the right to set the order in which the services are to be provided, then control is indicated and an employer/employee relationship would likely exist. On the other hand, if the worker is free to perform services in any order or sequence desired, then independent contractor status is indicated. [Revenue Ruling 56-694, 1956-2 CB 694].
- 11. *Reports*. If the employer has the right to require the worker to submit written or oral reports, then control over how and when the work is performed is deemed to be exercised and would be indicative of an employer/employee relationship. [Revenue Ruling 70-309, 1970-1 CB 199, and Revenue Ruling 68-248, 1968-1 CB 431].
- 12. *Mode of Payment*. Payment by the hour, week or month is generally indicative of an employer/employee relationship provided that these modes are not just a convenient way of distributing a lump sum contract payment under a progress payment arrangement. Payment made by the job or on a commission basis are indicative of independent contractor status. [Revenue Ruling 74-389, 1974-2 CB 330].
- 13. *Expense Reimbursement*. If the employer ordinarily pays the workers business and travel expenses, then the worker would ordinarily be an employee. This arises because an employer is interested in controlling expenses and therefore is deemed to exercise some control over the incurring of these expenditures. [Revenue Ruling 55-144, 1955-1 CB 483].
- 14. *Tools and Materials*. If the employer provides significant tools and materials, then an employer/employee relationship is indicated. This arises because the provision of tools and materials substantially reduces the possibility of the worker incurring either a profit or a loss. [Revenue Ruling 71-524, 1971-2 CB 346].
- 15. *Significant Investment*. Lack of an investment in facilities and equipment on the part of the worker tends to be indicative of an employer/employee relationship particularly when a significant investment is required for the performance of services. On the other hand, if a worker provides facilities and equipment, then an independent contractor relationship is indicated. [Revenue Ruling 71-524, 1971-2 CB 346].
- 16. *Realization of Profit or Loss.* If a worker is exposed to the potential for profit and or loss, in amounts above that which would occur for an employee providing the same service, then status of an independent contractor is indicated. [Revenue Ruling 70-309, 1970-1 CB 199].
- 17. *Multiple Employers*. If the worker provides more than *de minimis* but similar services for a multiple of unrelated employers at the same time, then status as an independent contractor is indicated. However, where a worker provides services to more than one employer the worker may be an employee of each of the employers, particularly if the services are part of the same service arrangement. [Revenue Ruling 70-572, 1970-2 CB 221].
- 18. Services Available to General Public. If a worker makes services available to the general public on a regular and consistent basis, then status as a independent contractor is indicated. [Revenue Ruling 56-660, 1956-2 CB 693].
- 19. *Right to Discharge*. If the employer retains the right to discharge the worker, then an employer/employee relationship is indicated. On the other hand, if the employer cannot discharge the worker as long as the services are in conformity with the specifications of the contract, then status as an independent contractor is indicated. [Revenue Ruling 75-41, 1975-1 CB 323].
- 20. *Right to Terminate*. If the worker has the right to terminate the provision of services at will and without incurring liability, then the status of an employer/employee relationship is indicated. [Revenue Ruling 70-309, 1970-1 CB 199].

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