

## INFORMATION TO USERS

This reproduction was made from a copy of a manuscript sent to us for publication and microfilming. While the most advanced technology has been used to photograph and reproduce this manuscript, the quality of the reproduction is heavily dependent upon the quality of the material submitted. Pages in any manuscript may have indistinct print. In all cases the best available copy has been filmed.

The following explanation of techniques is provided to help clarify notations which may appear on this reproduction.

1. Manuscripts may not always be complete. When it is not possible to obtain missing pages, a note appears to indicate this.
2. When copyrighted materials are removed from the manuscript, a note appears to indicate this.
3. Oversize materials (maps, drawings, and charts) are photographed by sectioning the original, beginning at the upper left hand corner and continuing from left to right in equal sections with small overlaps. Each oversize page is also filmed as one exposure and is available, for an additional charge, as a standard 35mm slide or in black and white paper format.\*
4. Most photographs reproduce acceptably on positive microfilm or microfiche but lack clarity on xerographic copies made from the microfilm. For an additional charge, all photographs are available in black and white standard 35mm slide format.\*

\*For more information about black and white slides or enlarged paper reproductions, please contact the Dissertations Customer Services Department.

**UMI** University  
Microfilms  
International



8614453

**Garrison, Larry Richard**

**THE EXCLUSION FROM INCOME OF SCHOLARSHIPS AND FELLOWSHIP  
GRANTS: AN EMPIRICAL INVESTIGATION OF TAX COURT  
DETERMINATIONS**

*The University of Nebraska - Lincoln*

PH.D. 1986

**University  
Microfilms  
International** 300 N. Zeeb Road, Ann Arbor, MI 48106

**Copyright 1986**

by

**Garrison, Larry Richard**

**All Rights Reserved**



**PLEASE NOTE:**

In all cases this material has been filmed in the best possible way from the available copy. Problems encountered with this document have been identified here with a check mark .

1. Glossy photographs or pages \_\_\_\_\_
2. Colored illustrations, paper or print \_\_\_\_\_
3. Photographs with dark background \_\_\_\_\_
4. Illustrations are poor copy \_\_\_\_\_
5. Pages with black marks, not original copy \_\_\_\_\_
6. Print shows through as there is text on both sides of page \_\_\_\_\_
7. Indistinct, broken or small print on several pages  \_\_\_\_\_
8. Print exceeds margin requirements \_\_\_\_\_
9. Tightly bound copy with print lost in spine \_\_\_\_\_
10. Computer printout pages with indistinct print \_\_\_\_\_
11. Page(s) \_\_\_\_\_ lacking when material received, and not available from school or author.
12. Page(s) \_\_\_\_\_ seem to be missing in numbering only as text follows.
13. Two pages numbered \_\_\_\_\_. Text follows.
14. Curling and wrinkled pages \_\_\_\_\_
15. Dissertation contains pages with print at a slant, filmed as received \_\_\_\_\_
16. Other \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

University  
Microfilms  
International





THE EXCLUSION FROM INCOME OF SCHOLARSHIPS  
AND FELLOWSHIP GRANTS:  
AN EMPIRICAL INVESTIGATION OF TAX COURT DETERMINATIONS

by

Larry R. Garrison

A DISSERTATION

Presented to the Faculty of  
The Graduate College in the University of Nebraska  
In Partial Fulfillment of Requirements  
For the Degree of Doctor of Philosophy

Major: Interdepartmental Area of Business (Accounting)

Under the Supervision of Professor Richard W. Metcalf

Lincoln, Nebraska

August, 1986

**TITLE**

**THE EXCLUSION FROM INCOME OF SCHOLARSHIPS AND FELLOWSHIP GRANTS:**

**AN EMPIRICAL INVESTIGATION OF TAX COURT DETERMINATIONS**

**BY**

Larry R. Garrison

**APPROVED**

**DATE**

<u>Richard W. Metcalf</u>	<u>April 17, 1986</u>
<u>Robert H. Michaelsen</u>	<u>April 17, 1986</u>
<u>Kung H. Chen</u>	<u>April 17, 1986</u>
<u>David A. Ludtke</u>	<u>April 17, 1986</u>
<u>Keith L. Broman</u>	<u>April 17, 1986</u>
<u> </u>	<u> </u>
<u> </u>	<u> </u>

**SUPERVISORY COMMITTEE**

**GRADUATE COLLEGE**

**UNIVERSITY OF NEBRASKA**



©1986

LARRY RICHARD GARRISON

All Rights Reserved

THE EXCLUSION FROM INCOME OF SCHOLARSHIPS  
AND FELLOWSHIP GRANTS:  
AN EMPIRICAL INVESTIGATION OF TAX COURT DETERMINATIONS

Larry Richard Garrison, Ph.D.

University of Nebraska, 1986

Advisor: Richard W. Metcalf

The primary objective of this research was the development of a model that would identify and rank in order of importance the controlling facts used by the Tax Court in determining the taxability or nontaxability of scholarships and fellowship grants.

To accomplish this objective data based on factors contained in the regulations of Section 117 and the Tax Court decisions were specified as 14 qualitative variables. A random sample of 89 cases was selected. The decision of the court either in favor of the government or the taxpayer provided the dichotomous dependent variable for assigning each case to one of the two decision groups. Each case was analyzed for the 14 qualitative independent variables. Each variable was coded to indicate the specification of the court as to its presence, absence, or failure to be mentioned.

A linear discriminant model containing four variables was determined to be the "best" model based on a classification accuracy of 90 percent using the Lachenbruch U (jackknife) method. The "best" (4-variable) model was

used to test the null hypothesis to determine if the results of the "best" model were statistically significant relative to the results expected by chance. The hypothesis was rejected at the five percent significance level.

Various sensitivity analyses were performed to evaluate the stability of the model parameters. The structural sensitivity analyses included (1) tests of stability over time, (2) tests of stability between regular Tax Court and Tax Court memorandum decisions, and (3) identification of the Tax Court judges for the sample cases. The "best" (4-variable) model was stable over time and between types of court decisions. Individual judges showed no bias. Data sensitivity analyses included (1) tests for measurement errors and (2) misclassification costs. The "best" (4-variable) model was stable after introducing a three percent random measurement error for the independent variables. Misclassification costs at a ratio of five to one were necessary to correctly classify all but two of the decisions for the taxpayer.

## DEDICATION

This dissertation is dedicated to Jesus Christ.

And Philip ran thither to him, and heard him read the prophet Esaias, and said, Understandest thou what thou readest?

And he said, How can I, except some man should guide me?

Acts 8:30-31

For my sweet and loving wife Sheila who sacrificed most that I might reach this goal.

## TABLE OF CONTENTS

	Page
LIST OF EXHIBITS . . . . .	iv
ACKNOWLEDGEMENTS . . . . .	v
Chapter	
1. INTRODUCTION . . . . .	1
Objectives . . . . .	4
Overview of the Research Project . . . . .	5
Chapter 2: Background of the Taxability of Scholarships and Fellowship Grants . . . . .	5
Chapter 3: Literature Review . . . . .	5
Chapter 4: Research Methodology . . . . .	6
Chapter 5: Results of Analysis . . . . .	6
Chapter 6: Conclusion . . . . .	6
2. BACKGROUND OF THE TAXABILITY OF SCHOLARSHIPS AND FELLOWSHIP GRANTS . . . . .	9
History of the Scholarship and Fellowship Grant Exclusion . . . . .	9
Law Prior to Enactment of Section 117 . . . . .	9
Section 117 . . . . .	11
Regulations Under Section 117 . . . . .	13
Tests Under Section 117 . . . . .	15
Primary Purpose Test . . . . .	15
Substantial <u>Quid Pro Quo</u> Test . . . . .	16
Factors Considered Under Section 117 . . . . .	19
Characterizations of the Grant by Grantor . . . . .	19
Withholding of Taxes by Grantor . . . . .	21
Receipt of Fringe Benefits by Grantee . . . . .	22
Grant Amount Increases with Experience . . . . .	22
Grant Based on Need . . . . .	23
Grant Based on Academic Achievement . . . . .	23
Magnitude of Grant . . . . .	23
Grant Less Than Earnings for the Same Work . . . . .	23
Grant Computed on an Hourly Basis . . . . .	24
Grant Dependent on Future Services . . . . .	24
Type of Facility . . . . .	25
Preparation of Progress Reports by Grantee . . . . .	25
Degree of Control Exercised by Grantor . . . . .	26
Grantee Substitutes for an Employee . . . . .	26
Summary . . . . .	27

	Page
3. LITERATURE REVIEW . . . . .	39
Discriminant Analysis . . . . .	39
The Dependent Variable . . . . .	39
The Independent Variables . . . . .	40
Sample Selection . . . . .	42
Relationship Between the Independent Variables . . . . .	44
Model Reduction . . . . .	45
Significance of the Findings . . . . .	48
Tests of Stability . . . . .	49
Stability Over Time . . . . .	51
Stability Between Courts or Types of Decisions . . . . .	51
Stability Between Statistical Models . . . . .	51
Stability of the Measurement Process . . . . .	52
Other Tests of Stability . . . . .	52
Summary . . . . .	53
4. RESEARCH METHODOLOGY . . . . .	55
Statement of the Problem . . . . .	55
Research Design . . . . .	56
Research Sample . . . . .	57
Variable Selection . . . . .	58
The Dependent Variable . . . . .	58
The Independent Variables . . . . .	59
Identifying the Independent Variables . . . . .	59
Measuring the Independent Variables . . . . .	59
Statistical Tests . . . . .	60
Discriminant Analysis . . . . .	61
Classification Accuracy . . . . .	62
A Priori Probabilities . . . . .	63
Tests of Statistical Significance . . . . .	65
Sensitivity Analysis . . . . .	67
Structural Sensitivity . . . . .	67
Test Over Time . . . . .	68
Regular Tax Court and Tax Court Memorandum Decisions . . . . .	68
Identification of the Tax Court Judges . . . . .	69
Data Sensitivity . . . . .	70
Measurement Errors . . . . .	70
Costs of Misclassification . . . . .	71
Summary . . . . .	72

5. RESULTS OF THE ANALYSIS . . . . .	74
Univariate Analysis . . . . .	74
Linear Multivariate Analysis . . . . .	80
Results of the Forward	
Stepwise Procedure . . . . .	80
Classification Functions for the	
Linear Models . . . . .	83
Cases Misclassified by the Linear Models . . . . .	85
Selection of the "Best" Model . . . . .	87
Test of the Null Hypothesis . . . . .	92
Results of Structural Sensitivity Analyses . . . . .	94
Tests of Stability Over Time . . . . .	94
Regular Tax Court Versus Tax Court	
Memorandum Decisions . . . . .	95
Identification of Tax Court Judges . . . . .	96
Results of Data Sensitivity Analyses . . . . .	98
Sensitivity to Measurement Error . . . . .	98
Costs of Misclassification . . . . .	102
Summary . . . . .	104
6. CONCLUSION . . . . .	106
Review of the Chapters . . . . .	106
Summary of the Substantive Issues . . . . .	108
Identification of the Major Factors . . . . .	108
The "Best" Model . . . . .	110
The Discriminant Function . . . . .	113
Test of the Null Hypothesis . . . . .	113
Sensitivity Analyses . . . . .	114
Structural Sensitivity . . . . .	114
Data Sensitivity . . . . .	115
Implications of the Research . . . . .	116
For Taxpayers . . . . .	117
For Tax Practitioners . . . . .	118
For Courts and Judges . . . . .	118
For Congress and the Treasury Department . . . . .	118
Scope and Limitations . . . . .	119
Suggestions for Future Research . . . . .	119
APPENDICES	
A. Tax Court Cases in the Research Sample . . . . .	121
B. Coding Sheets . . . . .	126
C. Multivariate F-Statistics for	
Classification Models . . . . .	132
BIBLIOGRAPHY . . . . .	133

## LIST OF EXHIBITS

Exhibit	Page
2-1 List of the Major Factors . . . . .	20
3-1 Independent Variables Used in the Discriminant Model Incorporating All Variables . . . . .	41
3-2 Research Sample . . . . .	43
3-3 Classification Information for the "Best" Model . . . . .	50
5-1 Distributions of Observations - 89 Tax Court Cases . . . . .	75
5-2 Frequency Distribution of Observations - 89 Tax Court Cases . . . . .	77
5-3 Forward Stepwise Ordering of Variables Based on Multivariate F-Statistic . . . . .	82
5-4 Classification Functions for Linear Models .	84
5-5 Misclassified Cases -- Linear Models . . . . .	86
5-6 Discriminant Scores for the Research Sample Using the "Best" (4-variable) Model . . . . .	89
5-7 Judges of Cases in the Research Sample . . . . .	97
5-8 Comparison of Results Using Original Data To Results Using the Three Percent Data Error . . . . .	101



## ACKNOWLEDGEMENTS

First and foremost I express my deepest love, appreciation, and gratitude to my sweet wife and companion Sheila who has sacrificed greatly that I might complete this dissertation. Her constant encouragement and love made the completion of graduate school possible. Her continual faith and prayers have been a source of comfort and support.

I am indebted to a number of individuals whose efforts contributed to the completion of this project. I have been lucky in my education, and if this dissertation has any merit, it is because of what I have learned from my teachers.

My sincere words of appreciation must first go to my dissertation committee for their advice and assistance in directing this research effort. I express my sincere gratitude to Dr. Richard W. Metcalf who served as chairman of the supervisory committee. His consideration, assistance, and moral support have been invaluable both during my doctoral studies and also during the dissertation stage. His outstanding editorial work became an integral part of this endeavor.

Special appreciation is expressed to Dr. Robert H. Michaelsen who played an instrumental role in helping me to develop the topic and provided me with the technical assistance necessary to complete this research. Without his direction, expertise, and personal encouragement, this

dissertation could not have been completed. Dr. Michaelsen has become a good friend and colleague.

In addition to Dr. Michaelsen, Dr. Kung H. Chen served as a member of my dissertation reading committee. The comments and suggestions made by Dr. Chen were especially helpful. I owe him a debt of thanks for increasing my interest in and knowledge of computers.

Dr. Keith L. Broman of the Department of Finance served as a member of my supervisory committee. He has been a reliable source of help at various stages in my program.

Prof. David A. Ludtke of the College of Law served as the outside member of my supervisory committee. His insight and enthusiasm contributed greatly to my interest in taxation. Whatever merit the analysis of Code section 117 in Chapter 2 may have can be attributed to Prof. Ludtke.

Other accounting faculty members outside my committee deserving special thanks for contributing to a rewarding doctoral experience are Dr. James F. Brown, Dr. George C. Holdren, Dr. Jon R. Nance, and Dr. Robert H. Raymond.

Special thanks must go to Dr. Thomas D. Hubbard, director of the School of Accountancy, for his support and encouragement. Dr. J. Clay Singleton, Associate Dean of the College of Business Administration, was a source of help and encouragement. I deeply appreciate his thoughts and support regarding my academic career after graduation.

Dr. George C. McCabe, a member of the faculty in the Finance Department, deserves special recognition. Prof.

William H. Lyons of the College of Law was a source of inspiration through his intimate knowledge of the tax law.

I express my sincere gratitude, appreciation, and admiration to Dr. L.E. Krueger and Dr. Charles E. Carter of the University of Missouri-Kansas City. It was their friendship, concern, and sincerity that gave me the confidence to embark on a doctoral program.

I am deeply indebted to Dr. Dennis R. Schmidt of the University of Wyoming for his help in developing the statistical portion of this research. His encouragement and optimism during the final stages of this project was essential for its completion.

My association with the fellow doctoral students has been most rewarding. To express my gratitude in the proportion that each deserves would be almost impossible. A blanket expression of thanks, therefore, must go to those who, knowingly or otherwise, helped to make this dissertation possible.

The secretarial staff in the School of Accountancy deserves special mention. I am greatly indebted to our secretaries whose dedication to the School of Accountancy and cheerful attitude made my doctoral studies much easier. Carolyn J. Wilson was an invaluable source of information concerning the intricacies of the bureaucracy. The expert and professional typing by Susan K. Simpson of Exhibit 5-4, Exhibit 5-5, and Appendix C of the dissertation is gratefully acknowledged.

Comments and suggestions from many sources were collectively incorporated into the final version of this manuscript. Of course, the final responsibility for error is strictly mine.

## CHAPTER 1

### INTRODUCTION

No section specifically applied to scholarships and fellowship grants under the Internal Revenue Code (Code) of 1939 [S. REP. NO. 1622; H.R. REP. NO. 1337]. Scholarships and fellowship grants were excluded from gross income only when they could be categorized as gifts.<sup>1</sup> When the payments were determined to be compensation for services,<sup>2</sup> they were treated as income. With the adoption of section 117 of the Internal Revenue Code of 1954, scholarships and fellowship grants were specifically excluded from income [I.R.C. sec. 117]. This section stated "[g]ross income does not include any amount received as a scholarship . . . or as a fellowship grant . . ." The legislative history shows the intent of Congress in drafting a specific code section excluding scholarships and fellowship grants was to simplify the determination of whether a grant was nontaxable. The House Report described the purpose of section 117 as follows:

Your committee's bill sets forth rules for determining the extent to which scholarship and fellowship grants are to be included in gross income and eliminates the existing confusion as to whether such payments are to be treated as income or as gifts [H.R. REP. NO. 1337].

By enacting a specific guideline that could be applied to all scholarships and fellowship grants, Congress wanted to eliminate the gift versus income approach.

The present statute and regulations do not cover these grants. The basic ruling of the Internal Revenue Service which states the amount of the grant or fellowship is includible in gross income unless it can be established to be a gift provides no clear-cut method of distinguishing between taxable and non-taxable grants. Hence, the tax status of these grants presently must be decided on a case-by-case method [S. REP. NO 1662].

Several regulations interpreting section 117 were adopted in 1956. Three major fact situations were given when a grant would not qualify for the exclusion. The first situation occurs when the grantee is an employee of the grantor and the grant represents "compensation for past, present, or future employment services."<sup>3</sup> Second, when the grantee is under excessive control or supervision by the grantor.<sup>4</sup> Third, when the studies and research conducted under the grant primarily benefits the grantor rather than the grantee.<sup>5</sup> These three restrictions developed into three tests that have since provided the foundation for deciding the majority of the cases litigated concerning the section 117 exclusion. The tests are the primary purpose, compensation, and control tests.

Bingler v. Johnson [394 U.S. 741 (1969)] is the only Supreme Court case interpreting section 117. The subsequent interpretation of this case by the Tax Court, the Internal

Revenue Service (Service), and the federal courts has resulted in a decreased emphasis on section 1.117-4(c)(2) of the regulations outlining the primary purpose test. The focus has been on section 1.117-4(c)(1) addressing the question if "such amounts represents the compensation for past, present, or future employment services."

Later cases dealing with scholarships and fellowship exclusions have adopted the Bingler approach and have shifted away from the multiple test approach. The primary purpose, control, and compensation tests used from the adoption of the regulations in 1956 until the Supreme Court decision in 1969 have been replaced by the quid pro quo test. The Supreme Court in Bingler described scholarships as "relatively disinterested, 'no strings' educational grants, with no requirements of any substantial quid pro quo from the recipients." Only this type of grant was deemed eligible for the section 117 exclusion. Quid pro quo is defined as the mutual consideration that passes between parties to a contract.

However, the quid pro quo test is a result of all three tests and has elements from the purpose, control, and comparison tests. While generally a derivative of the compensation test, some attributes of the primary purpose and control analyses continue to be utilized in determining whether a return of service is made as a condition for the grant.

The Bingler decision has not been conclusive in determining the scope and effect of section 117. Commentators and judges have reflected on the problems created by the variety of grant provisions.<sup>6</sup> These authorities allude to the increased difficulty in<sup>7</sup> distinguishing between taxable and nontaxable grants. The confusion shown by the Code and the Tax Court results in increased litigation between taxpayers and the Service.

### Objectives

The primary objective of this dissertation is to identify the complex interrelationships of the major issues in the area of scholarship and fellowship grants. After isolating the peripheral issues, a description of the conditions for excluding from income scholarship and fellowship grants is developed. The criteria will be identified for determining the taxability of scholarship and fellowship grants.

Since objective factors are used in decisions as to the excludability of grant monies, the application of macro-case analysis to the scholarship and fellowship grant area is particularly appropriate. This methodology allows objective factors to be used as inputs reducing the subjectivity usually inherent in traditional research and allowing for replication of the findings.



The Treasury Department and commentators have proposed various factors as being relevant to determining the excludability of scholarships and fellowship grants. A question to be investigated is whether jurists actually use these factors to differentiate between the exclusion or nonexclusion of scholarship and fellowship grants. Accordingly, the null hypothesis tested in this study is:

H : The independent variables in the "best"  
 O model are no more effective than random estimates (based on chance) in discriminating between court-determined taxability or nontaxability of scholarships or fellowship grants.

Rejection of the null hypothesis would imply that the factors have discriminatory power. With this result, the relative importance of the factors used by the Tax Court will be assessed.

### Overview of the Research Project

#### Chapter 2: Background of the Taxability of Scholarships and Fellowship Grants

Chapter 2 presents an outline of the development, rationale, and constraints of the exclusion of scholarship and fellowship grants.

#### Chapter 3: Literature Review

This chapter discusses the use of discriminant analysis by tax researchers. A discussion of their analyses is presented.

#### Chapter 4: Research Methodology

Chapter 4 restates the major questions and associated issues to be addressed by the dissertation. This is followed by a description of the research design, research sample, identification and measurement of the independent variables, and the statistical procedures and sensitivity analyses to be conducted in the study.

#### Chapter 5: Results of Analysis

This chapter presents the results of the study. Both univariate and multivariate analyses of the variables are presented. Additionally, the "best" model is selected and the results of the sensitivity analyses are described.

#### Chapter 6: Conclusion

Chapter 6 is the concluding chapter of the dissertation. This chapter presents a summary of the research, a discussion of the major results, the implications and limitations of the findings, and suggestions for future research.

Notes

1  
Income Tax Ruling (I.T.) 4056, 1951-2 C.B. 8, declared obsolete by Revenue Ruling (Rev. Rul.) 69-43, 1961-1 C.B. 310, stated that when a grant or fellowship award was made for training and education of the taxpayer, either as a part of the degree program or in otherwise furthering his educational development with no services being rendered as consideration, the amount of the grant was excludable from gross income. When the recipient applied his skill and training to advance the research, the essential elements of a gift were lacking and the amount was includable in gross income.

2  
The gift versus compensation test was applied in a 1951 ruling [I.T. 4056, 1951-2 C.B. 8] in which the Service stated:

When the recipient of a grant or fellowship applies his skill and training to advance research, creative work, or some other project or activity, the essential elements of a gift as contemplated by section 22(b)(3) of the Internal Revenue Code are not present, and the amount of the grant or fellowship is includable in the recipient's gross income.

. . . To the extent there is any donative intent present in the making of an award, it appears that the beneficiary is society at large and not the recipient of the award whose services are expected in return for the grant.

Section 22 of the Internal Revenue Code of 1939 defined what was includable in gross income. This was the predecessor to section 61 of the present Code.

3  
Regulations section 1.117-4(c) (1956):

Amounts paid as compensation for services or primarily for the benefit of the grantor. (1)  
Except as provided in paragraph (a) of section 1.117-2, any amount paid or allowed to, or on behalf of, an individual to enable him to pursue studies or research, if such amount represents either compensation for past, present, or future employment services.

4 Regulations section 1.117-4(c) (1956):

Amounts paid as compensation for services or primarily for the benefit of the grantor. (1) Except as provided in paragraph (a) of section 1.117-2, any amount paid or allowed to, or on behalf of, an individual to enable him to pursue studies or research, if such amount . . . represents payment for services which are subject to the direction or supervision of the grantor.

5 Regulations section 1.117-4(c)(2) (1956):

Any amount paid or allowed to, or on behalf of, an individual to enable him to pursue studies or research primarily for the benefit of the grantor.

See Reese v. Commissioner [45 TC 407 (1966), aff'd per curiam, 373 F.2d 742 (4th Cir. 1967)]:

The primary purpose test requires a determination of a *raison d'etre* of the payment—was it to further the education and training of the recipient or was it, in reality, payment for services which directly benefited another person?

6 Zolnay v. Commissioner [49 TC 389 (1968)] (Judge Tannenwald stated: "Suffice it to say that the decided cases run the gamut of the full spectrum with all its shadings, making precisional line-drawing [under section 117] impossible.").

7 The enactment of section 117 and the subsequent Treasury Regulations has done little to clarify the law. For instance, Regulation section 1.117-4(c)(1956) has been held both valid and invalid. See Bingle v. Johnson [394 U.S. 741 (1969)] (valid), rev'g 396 F.2d 258 (1968) (invalid); Ussery v. United States [296 F.2d 582 (5th Cir. 1961)] (valid).

## CHAPTER 2

### BACKGROUND OF THE TAXABILITY OF SCHOLARSHIPS AND FELLOWSHIP GRANTS

This chapter presents an overview of the tax law relating to the excludability of scholarships and fellowship grants and a description of the independent variables used in the study. The first part of the chapter develops the tax law beginning with the Internal Revenue Code of 1939, the enacting of section 117 in the Internal Revenue Code of 1954, and concludes with the tests used by the courts in applying section 117. The second part of the chapter identifies and discusses the factors most frequently considered in deciding if the scholarship or fellowship grant qualifies for the section 117 exclusion.

#### History of the Scholarship and Fellowship Grant Exclusion

##### Law Prior to Enactment of Section 117

There was no specific Internal Revenue Code (Code) section applicable to scholarships and fellowship grants prior to the enactment of section 117 in 1954. The amount was excludable from gross income if the item was classified as a gift under section 22(b)(3) of the Internal Revenue

Code of 1939. If the grant was not so classified, the amount received was taxable compensation.<sup>1</sup>

In 1951, the Internal Revenue Service (Service) issued Income Tax Ruling (I.T.) 4056 [1951-2 C.B. 8],<sup>2</sup> to set forth its general test of excludability in this area. This pronouncement provided:

If a grant or fellowship award is made for the training and education of an individual, either as a part of his program in acquiring a degree or in otherwise furthering his educational development, no services being rendered as consideration therefore the amount of the grant or award is a gift excludable from gross income. However, when the recipient of a grant or fellowship applies his skill and training to advance research, creative work, or some other project or activity, the essential elements of a gift as contemplated by section 22(b)(3) of the Internal Revenue Code are not present, and the amount of the grant or fellowship is includible in the recipient's gross income.

Three years after the issuance of I.T. 4056, the Tax Court decided Stone v. Commissioner [23 TC 254 (1954), acq., 1957-1 C.B. 5]. In Stone, the grant provided that the foundation receive no benefit from the research and no interest was to be retained in the research findings. The only constraint was that the recipient could not engage in employment during the life of the grant. The Tax Court held that the fellowship paid by a foundation to conduct research for dramatic performances was held to be a gift excludable from gross income.

The Tax Court rejected the position argued by the Service that the purpose of the foundation was to "promote the advancement of knowledge through the employment of scholars and scientists." The Tax Court held that the foundation did not employ the recipients instead

[i]ts method [was] to make gifts to persons whose past achievements and present abilities, as shown by the foundation's investigation, merit financial assistance to enable them to carry out their own projects of creative work or self-improvement [23 TC at 261].

In Revenue Ruling (Rev. Rul.) 57-286, 1957-1 C.B. 497, the Service announced that the Stone case would be followed in similar cases governed by the 1939 Code.<sup>3</sup>

### Section 117

By enacting section 117 Congress intended to eliminate the necessity for case-by-case determination of the tax status of scholarship and fellowship grants necessary under the gift approach. Congress attempted to construct a statute that provided a "clear-cut" method of distinguishing between taxable and nontaxable grants [S. REP. NO. 1622; H.R. REP. NO. 1337]. The Tax Court noted because of the number of cases that have arisen under section 117, "it is questionable whether Congress wholly succeeded in providing greater certainty in this area."<sup>4</sup>

The congressional policy in drafting section 117 was to promote education by providing preferential tax treatment to

individuals receiving scholarships or fellowships. In enacting section 117, Congress increased the potential of such payments by allowing the amount otherwise paid in taxes to remain with the recipient.

Section 117 provides for the exclusion from gross income<sup>5</sup> amounts received as a "scholarship"<sup>6</sup> or a "fellowship grant."<sup>7</sup> The grantor of the scholarship or fellowship must qualify as one of the following:

1. a tax-exempt organization described in section 501(c)(3).
2. a foreign government.
3. an international organization, or a binational or multinational educational and cultural foundation or commission created or continued pursuant to the Mutual Educational and Cultural Exchange Act of 1961.
4. the federal government, or a state, or a possession of the United States or any political subdivision thereof, or the District of Columbia.

A number of limitations apply to the general exclusionary provision. For grants received by degree candidates, the Code provides that the exclusion does not apply to candidates who receive amounts that are actually payments for parttime employment.<sup>8</sup> This exclusion waiver applies unless the services performed are requirements for the degree<sup>9</sup> and all degree candidates in the same program<sup>10</sup> are required to perform the same services, whether all



degree candidates receive any financial assistance or not.  
 This situation occurs in cases involving teaching assistants  
 who are required to practice teach a certain number of  
 course hours in order to complete their degrees.<sup>12</sup>

The statute provides for an exclusion of up to \$300  
 per month from the gross income of individuals who are not  
 candidates for degrees [Code sections 117a and (b)(2)(B)].  
 Non-degree candidates are allowed the exclusion for a  
 maximum of thirty-six months.<sup>13</sup>

#### Regulations Under Section 117

The primary reason for the failure of section 117 to  
 provide a "clear-cut" method for determining whether the  
 exclusion applies is that Congress did not define crucial  
 terms. One must rely on the regulations for definitions of  
 such terms as "scholarship" [Regulations section 1.117-3(a)  
 (1960)], "fellowship" [Regulations section 1.117-3(c)  
 [1960]], "candidate for a degree,"<sup>14</sup> and "educational  
 institution."<sup>15</sup> These terms are essential for an accurate  
 interpretation of the code section. However, the failure of  
 recipients to prevail in Code section 117 litigation is due  
 primarily to two qualifying restrictions rather than to  
 definitional problems.

First, an "amount [that] represents either  
 compensation for past, present, or future employment  
 services or represents payment for services which are

subject to the direction or supervision of the grantor" may not qualify for the exclusion [Regulations section 1.117-4(c)(1) (1960)]. Second, any monies paid an individual "to enable him to pursue studies or research primarily for the benefit of the grantor" is not covered by section 117 [Regulations section 1.117-4(c)(2) (1960)]. However, "if the primary purpose of the [recipient's] studies or research is to further the education or training of the recipient in his individual capacity and the amount provided by the grantor for such purpose does not represent compensation or payment" for services, then the amounts received are considered a scholarship or fellowship grant under section 117 [Regulations section 1.117-4(c)(2) (1960)].

In 1968, the Third Circuit held that the regulations were invalid.<sup>16</sup> This was in opposition to other circuits<sup>17</sup> and the Court of Claims.<sup>18</sup> This conflict resulted in the Supreme Court examining section 117 for the only time in Bingler v. Johnson [394 U.S. 741 (1969)]. The Supreme Court declared "the definitions supplied by the Regulation [Regulations section 117-4] clearly are prima facie proper [394 U.S. at 751]." The Supreme Court stated "[i]n this area of limitless factual variations, 'it is the province of Congress and the Commissioner, not the courts, to make the appropriate adjustments.'<sup>19</sup>"

### Tests Under Section 117

The application of the tests and the factors weighed in applying the tests have demonstrated a conflict among the section 117 cases. Certain cases have relied on a test the courts have labeled the "primary purpose" test from the regulations. Other cases have used the "substantial quid pro quo" test from the wording used in Bingler.<sup>20</sup> Quid pro quo is defined as the mutual consideration that passes between parties to a contract. There are ambiguities in each of these tests.

There has been difficulty in determining if the substantial quid pro quo test and the primary purpose test were to be considered as separate and distinct tests. In McKenna v. Commissioner [39 TCM 135 (1979)] the Tax Court based its determination specifically on the substantial quid pro quo test.<sup>21</sup> The Tax Court referred to the primary purpose test as a separate test used in other Tax Court cases.<sup>22</sup> The Fourth Circuit has stated that the primary purpose test is subordinated to the substantial quid pro quo test.<sup>23</sup> These cases imply that the two tests are indeed considered separate and distinct.

#### Primary Purpose Test

The "primary purpose" test is used to determine if the "primary purpose for making the grant was to enable the recipient to further his education or training in his individual capacity or whether the

primary purpose was to compensate him for past, present, or future services."24

However, the test of primary purpose is ambiguous. The question arises as to whether the primary purpose of the grant is determined (1) with reference to the primary purpose of the grantor, (2) by examining the activities of the grantee pursuant to the grant, or (3) by weighing the benefits to the grantor against the benefits to the grantee to determine who obtained the greater benefit.

#### Substantial Quid Pro Quo Test

The "primary purpose" test is becoming less important because of the increased use of the substantial quid pro quo test. This test has been attributed to the Bingler decision.

In Bingler, the three petitioners were employees of Westinghouse Electric Corporation (WEC). They were on educational leave to devote full time to fulfilling the dissertation requirements for a doctoral degree in engineering. Each received a "stipend" from WEC based on prior salary and family size. They retained their seniority status and the right to receive employee benefits. Each of the petitioners was required to submit periodic progress reports. Two of the petitioners were required to promise to return to WEC and "assume . . . duties commensurate with his education and experience'" for at least two years

following the completion of their leaves. The other petitioner did not sign such an agreement. However, he was expected to return to WEC for a time equal to the duration of his leave [394 U.S. at 744].

The federal district court jury held the amounts received by the employees were taxable compensation and not excludable scholarships. The Supreme Court affirmed that decision. The Supreme Court explicitly approved the regulations under section 117:

[T]he definitions supplied by the Regulation clearly are prima facie proper, comporting as they do with the ordinary understanding of 'scholarships' and 'fellowships' as relatively disinterested, 'no-strings' educational grants, with no requirement of any substantial quid pro quo from the recipients [394 U.S. at 751].

The Supreme Court also noted that "[m]ost importantly, WEC unquestionably extracted a quid pro quo [393 U.S. at 757]." These statements are taken to indicate that the Supreme Court was adopting a substantial quid pro quo test in preference to the primary purpose test.

The courts readily adopted the new test. The "primary purpose" test is a more complex determination than making a finding of a substantial quid pro quo. In Parr v. United States [469 F.2d 1156 (5th Cir. 1972)] the Fifth Circuit stated the quid pro quo language suggested the Supreme Court was taking a "common sense approach." The Fourth Circuit, in Hembree v. United States [464 F.2d 1262 (4th Cir. 1972)]

noted that "[i]f there is any substantial quid pro quo, i.e., compensation for services, the payments cannot qualify for exclusion from income as 'fellowship' funds." A specific test for "substantiality" has been left to the discretion of the courts.<sup>25</sup>

The substantial quid pro quo test is also preferred because of the "question begging structure"<sup>26</sup> of the "primary purpose" test. The regulations [Regulations section 1.117-4(c) (1960)] provide that "[p]ayments made for the 'primary purpose-to further the education and training of the recipient' are fellowship grants unless-and the unless is a big unless-the amount provided for such purpose represents compensation."<sup>27</sup> The answer is not definite in the situation where the primary purpose of the payments is to further the education or training of the recipient and, simultaneously, are payments for compensation. This ambiguity is present because when the main reason for the payments is to compensate the recipient for services, the payments fail the "primary purpose" test. This result precludes the application of the "unless" clause.

In Phillips v. Commissioner [57 TC 420 (1971)] the Tax Court suggested the primary purpose and the quid pro quo tests were interchangeable.<sup>28</sup> However, most courts use only the latter test.<sup>29</sup> In Rockwold v. United States [620 F.2d 166 (8th Cir. 1980)] the Eighth Circuit affirmed the

district court decision in denying the section 117 exclusion. The Eighth Circuit stated that "[t]he threshold question is whether the payment was made as quid pro quo for the services rendered."<sup>30</sup>

### Factors Considered Under Section 117

In view of the discussion of the judicial and administrative holdings of section 117, certain factors are evident as having particular significance in determining the taxability of a grant. Fourteen characteristics of scholarship and fellowship grants are discussed below. These characteristics are the most frequently considered in deciding if the grant qualifies for the section 117 exclusion. The fourteen factors are presented in Exhibit 2-1.

### Characterizations of the Grant by Grantor

One commentator states that the characterization of the grant by the grantor is "highly influential, and perhaps even conclusive as far as the Service is concerned."<sup>31</sup> When the money used to pay the grant is not earmarked specifically for scholarships or fellowships, the ruling has been against the taxpayer.<sup>32</sup> However, payments made from "fellowship funds" do not conclusively establish the existence of a nontaxable grant if the essential nature of the transaction is in fact an employer-employee

Exhibit 2-1  
List of the Major Factors

<u>Factor Number</u>	<u>Factor Description</u>	<u>Factor Name</u>
1	Characterization of the Grant by Grantor	CHARACTER
2	Withholding of Taxes by Grantor	WITHHOLD
3	Receipt of Fringe Benefits by Grantee	FRINGES
4	Grant Amount Increases with Experience	EXPERIENCE
5	Grant Based on Need	NEED
6	Grant Based on Academic Achievement	ACADEMICS
7	Magnitude of Grant	MINIMAL
8	Grant Less Than Earnings for the Same Work	LESS EARN
9	Grant Computed on an Hourly Basis	HOURS
10	Grant Dependent on Future Services	OBLIGATION
11	Type of Facility	FACILITY
12	Preparation of Progress Reports by Grantee	REPORTS
13	Degree of Control Exercised by Grantor	SUPERVISED
14	Grantee Substitutes for an Employee	EMPLOYEE



relationship.<sup>33</sup> The Tax Court has held that if a scholarship or fellowship relationship actually exists, the characterization by the grantor prevents the grant from qualifying for the exclusionary treatment under section 117.<sup>34</sup>

In ruling in favor of the taxpayer in Krupin v. United States [439 F.Supp 440 (E.D. Mo. 1977)] the court considered as one factor the National Institute of Health guidelines applicable to the grant that stated the recipients were "fellows" not "employees." In a case denying an exclusion, Katz v. Commissioner [29 TCM 511 (1970)] the Tax Court noted that the recipient was not designated a "fellow" or the stipend a "fellowship grant."

#### Withholding of Taxes by Grantor

The Tax Court has held that whether or not the grantor withheld income taxes from the payment is not conclusive with respect to the applicability of section 117.<sup>35</sup> However, withholding is a factor cited by the Tax Court in decisions against taxpayers.<sup>36</sup> Krupin v. United States [439 F.Supp. 440 (E.D. Mo. 1977)] noted the failure of the grantor to withhold as a factor in its decision holding for the taxpayer.<sup>37</sup>

The taxpayer prevailed in Bhalla v. Commissioner [35 TC 13 (1960), acq., 1951-1 C.B. 4] despite the fact the grantor withheld taxes. The Tax Court noted that the actions by the

grantor could not damage the case of the taxpayer because a refund could be applied for.<sup>38</sup> However, in Turem v. Commissioner [54 TC 1494 (1970)], the grantor withheld taxes and the Tax Court denied the exclusion. The Tax Court held that withholdings of taxes is indicative of employee status.<sup>39</sup> Therefore the presence or absence of withholding does not necessarily result in a favorable decision for the taxpayer.<sup>40</sup>

#### Receipt of Fringe Benefits by Grantee

The receipt of stock options,<sup>41</sup> accrued vacation and sick leave,<sup>42</sup> medical insurance,<sup>43</sup> and retained seniority status<sup>44</sup> with the grant has allowed courts to hold that the grant is not excludable from income. The benefits are treated as employee fringe benefits and, therefore, indicate the existence of an employment relationship between the grantor and grantee. Payments are held to be compensation rather than scholarship or fellowship grants.

The absence of fringe benefits was a factor used by the courts in Krupin v. United States [439 F.Supp. 440 (E.D. Mo. 1977)] and Steiman v. Commissioner [56 TC 1350 (1971), acq., 1971-2 C.B. 3] in finding the grant qualified under section 117 and excluded from income.

#### Grant Amount Increases with Experience

A grant is considered compensation when the amount of the grant is increased solely with experience gained on the

job. The Tax Court suggests that increase pay is commensurate with the increased value of the grantee to the grantor.<sup>45</sup>

#### Grant Based on Need

The case for the taxpayer is strengthened when the grantee can show that they were selected on the basis of need for financial assistance rather than on merit. The Tax Court has held that when need was not considered in selecting the recipient, the grant appears to be compensation.<sup>46</sup>

#### Grant Based on Academic Achievement

When the grant is not presented as a result of academic achievement, the courts have usually disallowed the taxpayer an exclusion.<sup>47</sup> Scholarships and fellowships are viewed by the Tax Court as awards for academic performance.

#### Magnitude of Grant

Courts have noted that a large stipend is indicative of compensation.<sup>48</sup> Specific amounts are not used as benchmarks. The terms "minimal" and "substantial" are employed to describe the magnitude of the grant.

#### Grant Less Than Earnings for the Same Work

While a large stipend has been cited in order to deny section 117 treatment the opposite does not necessarily

hold. The fact the taxpayer was receiving less money than he could have earned had he been performing the same services in the private sector has been rejected by courts<sup>49</sup> as an argument by the grantee to support an exclusion.

#### Grant Computed on an Hourly Basis

Courts generally determine that a stipend based on an hourly rate is suggestive of compensation. Grants paid on a hourly basis have not been excluded by Code section 117.<sup>50</sup>

#### Grant Dependent on Future Services

The existence of past, present, or prospective employment relationship between grantor and grantee has been detrimental to the taxpayer.<sup>51</sup> Such an agreement suggests to the Tax Court that the payment is taxable compensation rather than a tax-free grant.<sup>52</sup>

Subject to the special rules for federal programs contained in section 117(c), when the grant requires the recipient to agree to work for the grantor in the future courts have placed weight on that fact and held for the government.<sup>53</sup> This is also the finding when the recipient fails to meet the terms of the contract for future services.<sup>54</sup> However, the contract for future services need not be written.<sup>55</sup> The grantor only needs to expect to receive future services.

### Type of Facility

The nature of the facility where the grantee performs services has been a consideration in cases involving medical interns and residents. The Tax Court is more likely to hold the grant as nontaxable if the recipient is working at a teaching hospital.<sup>56</sup> This determination of nontaxability is based on the primary purpose test. When the primary purpose of the internship or residency program is educational, the exclusion is more likely to be obtained. The use of this factor was weakened by the case of Hembree v. United States.<sup>57</sup> The Fourth Circuit Court of Appeals reversed a district court decision in this case by holding that whether the facility was a teaching hospital or not would not be determinative of the tax consequences of the grant.

### Preparation of Progress Reports by Grantee

The fact that the grantor requires the recipient to prepare progress reports on their research under the grant is sometimes cited as a reason for holding the grant taxable. The Tax Court holds that the degree of<sup>58</sup> accountability exceeds the typical fellowship situation. This determination is contrary to the regulations that state such reports do not deprive the grantee of exclusionary treatment.<sup>59</sup> However, courts have held that the absence of any requirement for a report does not necessarily strengthen

the argument by the grantee that the payment is a nontaxable scholarship or fellowship.<sup>60</sup>

#### Degree of Control Exercised by Grantor

Generally, as the control by the grantor over the work of the grantee increases, so does the likelihood that the grant will be considered as payment for services. There is authority stating the contrary view with respect to grants to teaching assistants. They reason that if the practice teaching is closely supervised, the supervision is indicative of a teaching rather than working experience.<sup>61</sup> However, most decisions have taken the approach that a more tightly controlled program indicates an employer-employee relationship. This supervisor-employee relationship makes the payments taxable.<sup>62</sup>

#### Grantee Substitutes for an Employee

One of the most commonly cited reasons for holding a grant taxable is that if the recipient was not performing duties under the grant, someone has to be hired in their place.<sup>63</sup> This consideration arises in conjunction with the application of the primary purpose test. Since the recipient is taking the place of the potential employee, the primary beneficiary of his services is the grantor. Thus, the grantor is saved the expense of hiring an employee. This holding states that the payment must have been compensation for services rendered.<sup>64</sup>

### Summary

This chapter presented an overview of the taxability of scholarships and fellowship grants. The major cases relating to the exclusion of scholarships and fellowships were discussed in the context of the historical development of the issue.

The final section of this chapter presented the 14 major factors used by the courts in decisions concerning the taxing of scholarships and fellowships. By identifying these factors taxpayers can be made aware of the important elements used by the Tax Court in decisions regarding section 117. The factors listed below represent the independent variables that are used in the empirical testing of the hypothesis.

1. CHARACTER - Did the grantor characterize the monies as a grant?
2. WITHHOLD - Did the grantee receive the grant without the taxes being withheld?
3. FRINGES - Did the grantee forego fringe benefits available from the grantor?
4. EXPERIENCE - Did the grant remain constant with the experience of the grantee?
5. NEED - Did the grantee receive the grant because of need?
6. ACADEMICS - Did the grantee receive the grant because of academic achievement?

7. MINIMAL - Did the grantee receive a minimal amount of money?
8. EARN LESS - Did the grantee receive less money than he could have otherwise earned?
9. HOURS - Did the grantee receive the grant monies regardless of the number of hours doing grant-related work?
10. OBLIGATION - Did the grantee receive the grant without an obligation to become an employee of the grantor?
11. FACILITY - Did the grantee work at an educational institution?
12. REPORTS - Did the grantee receive the grant without the filing of progress reports?
13. SUPERVISED - Did the grantee work without the supervision or control of the grantor?
14. EMPLOYEE - Did the recipient serve in the capacity of a grantee and not as a substitute for an employee of the grantor?



Notes

1

All section references hereinafter are to the Internal Revenue Code of 1954, and the regulations promulgated thereunder unless otherwise noted.

The excludability of prizes and awards is now covered in section 74. See Rev. Rul. 57-50, 1957-1 C.B. 74.

2

I.T. 4056 developed from Robertson v. United States [190 F. 2d 680 (10th Cir. 1951), aff'd, 343 U.S. 171 (1952)].

Rev. Rul. 69-43, 1969-1 C.B. 310, declared I.T. 4056 obsolete.

3

See Loo v. Commissioner [22 TC 220 (1954)]; Banks v. Commissioner [17 TC 1386 (1952)]; Doerge v. Commissioner [11 TCM 475 (1952)]. In these cases the grantor (government) sought substantive results in specific areas of research. The grantor regulated many aspects of the work performed by the recipients.

4

Elmer L. Reese [45 TC 407, 412 (1966), aff'd per curiam, 373 F. 2d 742 (4th Cir. 1967)].

5

Code section 117(a) provides:

In the case of an individual, gross income does not include-

(1) Any amount received-

(A) as a scholarship at an educational institution . . . or

(B) as a fellowship grant, including the value of contributed services and accommodations; and

(2) Any amount received to cover expenses for-

(B) research . . .

which are incident to such a scholarship or to a fellowship grant, but only to the extent that the amount is so expended by the recipient.

6

Regulations section 1.117-3(a) (1960):

Scholarship. A scholarship generally means an amount paid or allowed to, or for the benefit of,

a student, whether an undergraduate or a graduate, to aid such individual in pursuing his studies. The term includes the value of contributed services and accommodations (see paragraph (d) of this section) and the amount of tuition, matriculation, and other fees which are furnished or remitted to a student to aid him in pursuing his studies. The term also includes any amount received in the nature of a family allowance as a part of a scholarship. However the term does not include any amount provided by an individual to aid a relative, friend, or other individual in pursuing his studies where the grantor is motivated by family or philanthropic considerations. If an educational institution maintains or participates in a plan whereby the tuition of a child of a faculty member of such institution is remitted by any other participating educational institution attended by such child, the amount of the tuition so remitted shall be considered to be an amount received as a scholarship.

7

Regulations section 1.117-3(c) states:

Fellowship grants. A fellowship grant generally means an amount paid or allowed to, or for the benefit of, an individual to aid him in the the pursuit of study or research. The term includes the value of contributed services and accommodations (see paragraph (d) of this section) and the amount of tuition, matriculation, and other fees which are furnished or remitted to an individual to aid him in the pursuit of study or research. The term also includes any amount received in the nature of a family allowance as a part of the fellowship grant. However, the term does not include any amount provided by an individual to aid a relative, friend, or other individual in the pursuit of study or research where the grantor is motivated by family or philanthropic consideration.

8

See *Smith v. Commissioner* [60 TC 279 (1973)] (holding that students at the General Motors Institute who spent part of their time in a work training program in addition to time spent in the classroom were employees). Also, payments received for participation in a work-study program conducted by universities have been regarded as

compensation for services. Rev. Rul. 73-218, 1973-1 C.B. 53; Rev. Rul. 72-607, 1972-2 C.B. 82.

9

See Rev. Rul. 64-54, 1964-1 (Part 1) C.B. 81 (holding that the value of tuition and payments received by students enrolled at a college which required no tuition, but requiring all students to participate in a work program, were excludable).

10

See *Steinman v. Commissioner* [56 TC 1350 (1971), acq., 1971-2 C.B. 1] (the Tax Court held that the payments received by graduate students were tax-free grants when the services they performed were identical to those required of all similarly situated students).

11

Code section 117(b)(1) provides:

Individuals who are candidates for degrees. In the case of an individual who is a candidate for a degree at an educational institution . . ., subsection (a) shall not apply to that portion of any amount received which represents payment for teaching, research, or other services in the nature of part-time employment required as a condition to receiving the scholarship or fellowship grant. If teaching, research, or other services are required of all candidates (whether or not recipients of scholarship or fellowship grants) for a particular degree as a condition to receiving such degree, such teaching, research, or other services shall not be regarded as part-time employment within the meaning of this paragraph.

12

See *Logan v. United States* [518 F.2d 143 (6th Cir. 1975)]. (the court held that stipends received by a graduate assistant were tax free where all students involved in the same program were required to teach).

13

See Code section 117(b)(1) for limitations pertaining to degree candidates. See also *Wijsman v. Commissioner* [54 TC 1539, 1545 (1970)]; *Proskey v. Commissioner* [51 TC 918 (1969)]. See also S. REP. NO. 1622, 83d Cong., 2d Sess. 189-190 (1954).

14

Regulations section 1.117-3(e):

Candidate for a degree. The term "candidate for a degree" means an individual, whether an undergraduate or a graduate, who is pursuing studies or conducting research to meet the requirements for an academic or professional degree conferred by colleges or universities. It is not essential that such study or research be pursued or conducted at an educational institution which confers such degrees if the purpose thereof is to meet the requirements for a degree of a college or university which does confer such degrees. A student who receives a scholarship for study at a secondary school or other educational institution is considered to be a "candidate for a degree."

15

Regulations section 1.117-3(b) (1960):

Educational institution. For a definition of "educational institution" section 117 adopts the definition of that term which is prescribed in section 151(e)(4). Accordingly, for purposes of section 117, the term "educational institution" means only an educational institution which normally maintains a regular faculty and curriculum and normally has a regular organized body of students in attendance at the place where its educational activities are carried on. See section 151(e)(4) and regulations thereunder.

16

Johnson v. Bingler [396 F.2d (3d Cir. 1968), rev'd, 394 U.S. 741 (1969)].

17

See Reese v. Commissioner [373 F.2d 742 (4th Cir. 1967), aff'g 45 TC 407 (1966)]; Stewart v. United States [363 F.2d 355 (6th Cir. 1966)]; Woddail v. Commissioner [321 F.2d 721 (10th Cir. 1963)]; Ussery v. United States [296 F.2d 582 (5th Cir. 1961)].

18

Reiffen v. United States [376 F.2d 883 (Ct. Cl. 1967)].

19

See United States v. Carrell [389 U.S. 299 (1967)].

20

See *Rockwold v. United States* [620 F.2d 166 (8th Cir. 1980)] (which refers to a third test used prior to 1969. The "control" test was derived from language in Regulations section 1.117-4(c)(1)). This test is no longer used as a result of Bingler.

21

"The starting point . . . is the fact that the petitioner was required to render her services -a quid pro quo- in order to receive the payments. Thus, the only question is whether the quid pro quo was substantial." 39 TCM at 137.

22

"Our conclusion that the payments received by the petitioner do not qualify as a scholarship or fellowship grant is also supported by the precedents which have applied the primary purpose test of the regulations to similar factual situations. See *Meehan v. Commissioner* [66 TC 794 (1976)]; *Zolnay v. Commissioner* [49 TC 389 (1968)]; *Reese v. Commissioner* [45 TC 407 (1966), aff'd per curiam, 373 F.2d 742 (4th Cir. 1967)]; *Steiman v. Commissioner* [56 TC 1350 (1971)]." 39 TCM at 138.

23

*Hembree v. United States* [464 F.2d 1262 (4th Cir. 1972)]; *Rockwold v. United States* [620 F.2d 166 (8th Cir. 1980)] (where the court stated: "[I]t is clear that, since Bingler, the primary emphasis in the cases dealing with section 117 has been to determine whether claimed scholarships are actually given in return for the services of a grantee. Any funds so given are outside the section 117 exclusion from income.").

24

*Brubakken v. Commissioner* [67 TC 249 (1976)]. See Regulations section 1.117-4(c)(2) (1960).

25

See *Bierberdorf v. Commissioner* [60 TC 114 (1973)] (petitioner spent only 20 to 25 percent of his training time performing clinical services. The Tax Court held such services were "incidental.").

26

See *Parr v. United States* [469 F.2d 1156 (5th Cir. 1972)]; *Adams v. Commissioner* [71 TC 477 (1978)].

27 Parr v. United States [469 F.2d at 1159]; Adams v. Commissioner [71 TC at 489].

28 [T]o qualify for the exclusion it must be shown that the "primary purpose of the payment[s] . . . [is] to further the education and training of the recipient rather than to compensate the recipient for services rendered or to be rendered which directly benefit the payor." . . . In other words, in order to fall within the exclusion provided by section 117, the payments must be "disinterested, 'no-strings' educational grants, with no requirements of any substantial quid pro quo from the recipients." 57 TC at 425.

29 See Rockwold v. United States [620 F.2d 166 (8th Cir. 1980)]; Marsh v. Commissioner [40 TCM 1242 (1980)].

30 620 F.2d at 169. See Meek v. United States [608 F.2d 368, 373 (9th Cir. 1979)] ("[T]he issue . . . is . . . whether the payments were made in exchange for services.").

31 See Stuart, "Tax Status of Scholarship and Fellowship Grants: Frustration of Legislative Purpose and Approaches to Obtain the Exclusion Granted by Congress," Emory Law Journal (Spring 1976), p. 391.

32 See Littman v. Commissioner [42 TC 503 (1964)] (petitioner claimed he received a fellowship grant. The Tax Court disagreed and cited from his contract with the university numerous references which indicated his status as an employee. The payment was referred to as "salary"; he applied for the program on an "application for employment"; he was referred to as an "employee"; and the federal money paid to him was not earmarked for students). Also Rev. Rul. 60-274, 1960-2 C.B. 39; Rev. Rul. 61-174, 1961-2 C.B. 28.

33 Rev. Rul. 64-213, 1964-2 C.B. 40.

34 See Vaccaro v. Commissioner [58 TC 721 (1972)] (the court made the following statement in ruling for the taxpayer despite the grantor's characterization of the payment as salary:

The bookkeeping procedures employed by the university to make the stipend payments to petitioner, plus consideration of the ultimate source of fellowship funds, present strong circumstantial evidence that petitioner was a university employee. Nevertheless, we found this evidence deceiving. Normal fellowship disbursement procedures could not have been used to make HEW funds available to petitioner because of the very requirements written into the cost reimbursement contract between the U.S. Office of Education and the University of Oregon . . . [b]ecause its personnel may have been using earmarked funds for non-authorized purposes does not change the substance of the fellowship arrangement, which was to provide funds to post-doctoral fellows while they studied and improved their research skills).

35

See *Reese v. Commissioner* [45 TC 407 (1966), aff'd, 373 F.2d 742 (4th Cir. 1967)]; *Saber v. Commissioner* [42 TCM 945 (1981)]; *Nino v. Commissioner* [40 TCM 470 (1980)].

36

See *Cooney v. United States* [630 F.2d 438 (6th Cir. 1980)]; *Adams v. Commissioner* [71 TC 477 (1978)]; *Brubakken v. Commissioner* [67 TC 249 (1976)]; *Sorensen v. Commissioner* [44 TCM 1055 (1982)].

37

See *Wolfson v. Commissioner* [37 TCM 1847 (1978), aff'd, 651 F.2d 1288 (6th Cir. 1981)] (no exclusion but stated that failure to withhold was a factor in the taxpayer's favor).

38

See *Mizell v. United States* [663 F.2d 772 (8th Cir. 1981), reh. denied, 669 F.2d 552 (8th Cir. 1982)] (exclusion allowed, withholding was held to be protective on part of grantor).

39

See *Weinberg v. Commissioner* [64 TC 771 (1975)]; *Moll v. Commissioner* [57 TC 579 (1972)]; *Leving v. Commissioner* [36 TCM 264 (1977)].

40

*Fielding v. Commissioner* [57 TC 761 (1972)]. See *Nino v. Commissioner* [40 TCM 470 (1980)]; *Herrera v. Commissioner* [38 TCM 1354 (1979)].

- 41 Bingler v. Johnson [394 U.S. 741 (1969)].
- 42 Woddail v. Commissioner [321 F.2d 721 (1963)].
- 43 Helms v. Commissioner [31 TCM 442 (1972)]; Bingler v. Johnson [394 U.S. 741 (1969)].
- 44 Helms v. Commissioner [31 TCM 442 (1972)].
- 45 See Johnson v. Commissioner [507 F.Supp. 663 (D. Minn. 1981)]; Yarlott v. Commissioner [78 TC 585 (1982)]; Dietz v. Commissioner [62 TC 578 (1974)]; Gomes v. Commissioner [46 TCM 239 (1983)] (more important than large size of grant); Towns v. Commissioner [33 TCM 632 (1974)] (factor emphasized).
- 46 Bingler v. Johnson [374 U.S. 741 (1969)]; Stougarard v. Commissioner [30 TCM 1331 (1971)].
- 47 See Adams v. Commissioner [71 TC 477 (1978)]; Weinberg v. Commissioner [64 TC 771 (1975)]; D'Aconti v. Commissioner [42 TCM 369 (1981)]; Saber v. Commissioner [42 TCM 945 (1981)] (not determinative by itself); Chancellor v. Commissioner [35 TCM 1740 (1976)].
- 48 See Zolnay v. Commissioner [49 TC 389 (1968)]; Gomes v. Commissioner [46 TCM 239 (1983)]; Nino v. Commissioner [40 TCM 470 (1980)] (magnitude of stipend is suggestive of compensation).
- 49 See Cooney v. United States [630 F.2d 438 (6th Cir. 1980)]; Proskey v. Commissioner [51 TC 918 (1969)]; Ferrill v. Commissioner [34 TCM 773 (1975)].
- 50 See Howard v. Commissioner [33 TCM 869 (1974)]; Kagan v. United States [28 TCM 617 (1969)].
- 51 Regulations section 1.117-4(c)(1) (1956).



52

See *Bingler v. Johnson* [394 U.S. 741 (1969)]; *Bonn v. Commissioner* [34 TC 64 (1960)]; *Bachmura v. Commissioner* [32 TC 1117 (1959)]. Also see *Wells v. Commissioner* [40 TC 40 (1963), acq., Rev. Rul. 65-59, 1965-1 C.B. 67] (where the court refused to find blindly that where an employment relationship exists the payment must have been compensation. Also *Evans v. Commissioner* [34 TC 720 (1960)] (a grant was found to be non-taxable even though received from a grantor with whom the grantee had a future employment commitment. However, *Evans* has been declared an unsound precedent in *Ward v. Commissioner* [55 TC 308, 311 (1970)], and the Service has withdrawn its acquiescence. Rev. Rul. 70-283, 1970-1 C.B. 26.

53

See *Fielding v. Commissioner* [57 TC 761 (1972)]; *Ward v. Commissioner* [55 TC 308 (1970), aff'd per curiam, 449 F.2d 766 (8th Cir. 1971)]; *Brenneise v. Commissioner* [33 TCM 1 (1974)].

54

*Lannon v. Commissioner* [35 TCM 1585 (1976)].

55

*Brubakken v. Commissioner* [67 TC 249 (1976)]; *Koch v. Commissioner* [38 TCM 650 (1979)].

56

*Wells v. Commissioner* [40 TC 40 (1963)]; *Chesmore v. Commissioner* [33 TCM 1226 (1974)].

57

*Hembree v. United States* [464 F.2d 1262 (4th Cir. 1972)]. Here the court stated:

On the facts of this case, however, we conclude that the district court erred in using the primary purpose of the hospital facility as the criterion for the test enuciated in the Regulations. It is not the purpose of the facility to which the Regulation refers, but the primary purpose of the payment made to the taxpayer that is controlling.

58

*Bingler v. Johnson* [394 U.S. 741 (1969)].

59

Regulations section 1.117-4(c)(2) (1956):

Neither the fact that the recipient is required to furnish a report of his progress to the grantor,

nor the fact that the results of his studies or research may be of some incidental benefit to the grantor shall, of itself, be considered to destroy the essential character of such amount as a scholarship or fellowship grant.

60

Stougaard v. Commissioner [30 TCM 1331 (1971)].

61

Worthington v. Commissioner [476 F.2d 589 (10th Cir. 1973), aff'g 31 TCM 447 (1972)]; Jamieson v. Commissioner [51 TC 635, 636 (1969)]. See Steiman v. Commissioner [46 TC 1350 (1971)] (where the Tax Court held the grant nontaxable, partially basing its opinion on the close supervision).

62

Bonn v. Commissioner [34 TC 64 (1960)]; Woddail v. Commissioner [21 TCM 1248 (1962), aff'g 321 F.2d 721 (10th Cir. 1963)].

63

Rev. Rul. 60-130, 1960-1 C.B. 46, involving grants to cancer research physicians. Because the recipients performed no teaching or administrative duties for the institutions where they were affiliated and did not replace current or former employees, the grants were nontaxable.

64

Steiman v. Commissioner [56 TC 1350 (1971)]; Jamieson v. Commissioner [51 TC 635 (1969)]; Littman v. Commissioner [42 TC 503 (1964)].

## CHAPTER 3

### LITERATURE REVIEW

This chapter describes tax research studies by Bond [1977], Oatsvall [1978], Taylor [1978], Madeo [1979], Whittington and Whittenburg [1980], Lett [1981], Pollard [1981], and Burns and Groomer [1983]. These studies applied discriminant analysis to analyze the fact patterns of court cases. The major issues discussed in this chapter include the dependent variable, the independent variables, sample selection, the relationship between the independent variables, model reduction, significance of the findings, and tests of stability.

#### Discriminant Analysis

##### The Dependent Variables

In the studies, the dependent variable was scaled as a nominal value. Every study had a dichotomous dependent variable except Madeo [1979]. The dependent variable classified the cases as either won or lost by the taxpayer. Madeo [1979] scaled measures of the improperly accumulated earnings tax as three discrete groupings of "winners," "losers," and "split decisions." The dependent variables examined by Oatsvall [1978] and Taylor [1978] related to

capital gain and ordinary income treatment in real estate sales transactions. Bond [1977] and Whittington and Whittenburg [1980] distinguished corporate debt from equity. Lett [1981] and Burns and Groomer [1983] had the dichotomous groupings of "business" or "hobby" loss. Pollard [1981] analyzed travel expense deductions as they relate to the "tax home."

### The Independent Variables

The independent variables used in the studies were identified from government publications, court determinations, and tax articles. A larger number of independent variables were usually identified than were used in the subsequent discriminant analysis. Some of the independent variables were eliminated, directly combined, or combined through the use of varimax factor rotation. The majority of the independent variables were qualitative with a minority quantitative. The number and type of independent variables used in the discriminant model incorporating all the variables ("full" model) for each of the studies is listed in Exhibit 3-1.

Madeo [1979] scaled the qualitative variables as 0 (absent) and 1 (present). The qualitative variables examined by the other researchers were divided into three scaling categories. The first categories were for each of the two dichotomous groupings and one category for the

## Exhibit 3-1

**Independent Variables Used in the Discriminant Model  
Incorporating All Variables**

<u>Researcher</u>	<u>Total</u>	<u>Qualitative</u>	<u>Quantitative</u>
Bond [1977]	20	20	0
Oatsvall [1978]	15	12	3
Taylor [1978]	20	17	3
Madeo [1979]	19	17	2
Whittington and Whittenburg [1980]	4	4	0
Lett [1981]	25	22	3
Pollard [1981]	18	18	0
Burns and Groomer [1983]	38	38	0

missing data.<sup>1</sup> Bond [1977] used a 10, 00, and 01 coding scale. Oatsvall [1978], Taylor [1978], Whittington and Whittenburg [1980], Lett [1981], Pollard [1981], and Burns and Groomer [1983] used a +1, 0, and -1 coding scale.

Quantitative variables were included at their values presented in the cases. In all the studies, missing values were assigned a value equal to the mean of the non-missing values for that variable.

The number of variables in relation to the number of cases in the research sample can influence the probabilities of misclassification [Pinches, 1980]. In comparing the number of variables in each study to the number of cases, the variable-to-case ratio is greater than 1 to 4 for all the studies.

#### Sample Selection

The research samples used are shown in Exhibit 3-2. In the four studies using exclusively Tax Court cases, the lack of homogeneity was cited as the reason Tax Court cases should not be integrated with District Court cases. The comparison between courts was considered inappropriate because of the expertise of the Tax Court judges in tax matters and the more consistent fact patterns in Tax Court cases.

Exhibit 3-2  
Research Sample

<u>Researcher</u>	<u>Number of Cases</u>	<u>Type of Court</u>
Bond [1977]	101	Tax Court cases
Oatsvall [1978]	78	Tax Court and District Court cases
Taylor [1978]	108	Tax Court cases
Madeo [1979]	89	Tax Court cases
Whittington and Whittenburg [1980]	50	"judicial decisions" to develop the model, and
	30	"judicial decisions" to cross-validate the model
Lett [1981]	136	Tax Court cases
Pollard [1981]	100	Tax Court cases
Burns and Groomer [1983]	151	Tax Court cases

### Relationship Between the Independent Variables

Pinches [1980, p. 437] notes the effect of sample size on the relationship between the independent variables.

The larger the sample size, the more likely we will conclude that dispersion matrices are unequal, suggesting that quadratic instead of linear discriminant rules should be applied . . . Sample size appears to be a critical factor in choosing between linear and quadratic discriminant analysis.

When the assumption of equal dispersion matrices is violated, Eisenbeis [1977] recommends that classification based on quadratic functions be used because the quadratic function should include more information than the linear function. Gilbert [1968, 1969] conducted Monte Carlo simulation to determine the classification ability of quadratic versus linear functions for nominally scaled independent variables. She stated that the classification results from Fisher's linear discriminant factors compare favorably with the results from quadratic functions.

The hypothesis of equal group dispersion matrices was tested in all the studies, except Whittington and Whittenburg [1980]. Madeo [1979] did not find evidence of inequality for the models tested. Therefore only linear functions were employed. However, in all but one of the models tested by Taylor [1978] and in the models tested by Bond [1977], Oatsvall [1978], Lett [1981], Pollard [1981],



and Burns and Groomer [1983] the hypothesis of equal group dispersion matrices was rejected. Based on these results, Bond [1977], Taylor [1978], Lett [1981], and Pollard [1981] employed both linear and quadratic functions. Oatsvall [1978] and Burns and Groomer [1983] employed only linear functions.

Whittington and Whittenburg [1980] suggested that the assumption of equal group dispersions might be violated. However, no test of this assumption was reported and only linear functions were performed.

#### Model Reduction

Eisenbeis [1977] suggests that when classification accuracy is pivotal, the results using all the variables should be calculated. The full-model results should be compared to the reduced models. The "best" model is the model that achieves the highest percentage of correct classifications.

Six methods for ranking variables for model reduction are suggested by Eisenbeis, Gilbert, and Avery [1973]. They are the (1) conditional deletion method, (2) scaled discriminant function coefficients method, (3) univariate F-statistic method, (4) stepwise forward procedures, (5) stepwise backward procedures, and (6) "complete" stepwise procedure developed from all possible combinations of the variables in each step.

Pollard [1981] was the only researcher to use the complete stepwise method. After the "full" eighteen variable model was tested, seventeen reduced models were constructed. The 7-variable model was used in performing the discriminant analysis.

Bond [1977] determined that four of the independent variables in the "full" 20-variable model were identically coded for all the members of one of the two groups. MULDIS program constraints caused the removal of these four variables from the analysis. From the resulting 16-variable model, a 2-variable reduced model was developed based on an analysis of the sign relationship and size of the betas.

Oatsvall [1978] also conducted forward stepwise procedures that were not used for model reduction. After the "full" 15-variable model was tested, a 9-variable model was developed through the use of varimax factor rotation. The multivariate F-statistics of the 9-variable model were calculated and a 4-variable model was selected which consisted of all variables with a multivariate F-statistic greater than two. Next, a 3-variable model was selected based on a multivariate F-statistic greater than five.

Both Taylor [1978] and Lett [1981] tested the "full" model and three reduced models. Both researchers conducted forward stepwise procedures and used the results of the ordering of variable entry to develop a reduced model. They also developed a 5-variable reduced model by selecting

the five variables with the highest univariate F-statistics. Taylor [1978] developed a 4-variable model by removing one of the variables from the 5-variable model. Lett [1981] developed a 5-variable reduced model by allowing the forward stepwise procedure to load all the variables and selecting the five variables with the highest F-statistics conditioned by all the other variables.

Madeo [1979] performed forward stepwise procedures. The ordering of variable entry generated by this procedure was not used for model reduction. The purpose of her study was to test the factors in Regulation sections 1.533-1(a)(2) and 1.537(b),(c) against the factors in the Internal Revenue Service Audit Guidelines.<sup>2</sup> Since the audit guidelines contain seven additional factors not listed in the regulations, the reduced model included only the factors listed in the regulations.

Whittington and Whittenburg [1980] identified twelve independent variables. They did not test the "full" 12-variable model. The researchers conducted a varimax factor rotation and reduced the model to four independent variables. This 4-variable reduced model was used in performing the discriminant analysis.

Burns and Groomer [1983] used the conditional deletion method to order the discriminatory power of the variables. Models were constructed for three time periods. Reduced

models of seven, six, and four variables were formed and compared to postulated models.

### Significance of the Findings

Lachenbruch and Mickey [1968] discuss several methods of estimating error rates in discriminant analysis. These methods included the "resubstitution" method, the "holdout" method, and the Lachenbruch U method. Pinches [1980, p. 440] evaluates each of these methods and concludes that

Three estimates of error rates are available that do not assume normality -- the resubstitution, holdout, and Lachenbruch U methods . . . Studies indicate that: 1) the resubstitution estimator provides biased downward estimates of the actual error rates and is greatly influenced by sample size; 2) the holdout estimator requires large samples and may provide inaccurate estimates of the actual error rates; and 3) the Lachenbruch U method yields almost unbiased estimates of the error rates in the population.

Bond [1977], Taylor [1978], Lett [1981], Pollard [1981], and Burns and Groomer [1983] used the Lachenbruch U method for linear classification functions. Bond [1977] used the Lachenbruch U method for quadratic classifications but found that MULDIS constraints prevented classifications beyond a 14-variable model. Oatsvall [1978] and Madeo [1979] used the "resubstitution" method for their analyses. Taylor [1978] and Lett [1981] used the "resubstitution" method for the quadratic classification functions. Whittington and Whittenburg [1980] used the "holdout" method. Burns and

Groomer [1983] used the Lachenbruch U and one "holdout" sample.

The classification function, the method of estimation of the classification error rate, and the classification accuracy of the "best" model for each study is shown in Exhibit 3-3.

The studies by Taylor [1978], Lett [1981], Pollard [1981], and Burns and Groomer [1983] stated a null hypothesis. The null hypothesis was tested by using the binomial test for the significance of a proportion. The studies also estimated the proportion of cases in the population correctly classified by chance by using the proportional chance criterion suggested by Pinches [1980]. In the four studies, the null hypothesis was rejected at the five percent significance level.

Bond [1977], Oatsvall [1978], Madeo [1979], and Whittington and Whittenburg [1980] did not test a null hypothesis.

#### Tests of Stability

All of the studies except Madeo [1979] performed from tests of stability. These tests included (1) stability over time, (2) stability between courts, (3) stability between statistical models, and (4) stability of the measurement process.

## Exhibit 3-3

## Classification Information for the "Best" Model

<u>Researcher</u>	<u>"Best" Model</u>	<u>Error Rate Method</u>	<u>Classification Percentage</u>
Bond [1977]			
Linear	2-variable	Lachenbruch U	93.8
Quadratic	n/a	Lachenbruch U	n/a
Oatsvall [1978]	3-variable	Resubstitution	96.2
Taylor [1978]			
Linear	4-variable	Lachenbruch U	96.3
Quadratic	4-variable	Resubstitution	98.2
Madeo [1979]			
Linear	Audit Guides	Resubstitution	94.9
Whittington and Whittenburg [1980]			
Linear	4-variable	Holdout	90.0
Lett [1981]			
Linear	Univariate F	Lachenbruch U	94.1
Quadratic	Univariate F	Resubstitution	94.9
Pollard [1981]			
Linear	7-variable	Lachenbruch U	88.0
Quadratic	3-variable	Lachenbruch U	85.0
Burns and Groomer [1983]			
Linear	7-variable	Lachenbruch U	98.0
Linear	6-variable	Lachenbruch U	97.4
Linear	4-variable	Lachenbruch U	97.1

### Stability Over Time

Tests for stability over time were conducted by Bond [1977], Oatsvall [1978], Taylor [1978], Whittington and Whittenburg [1980], Lett [1981], Pollard [1981], and Burns and Groomer [1983]. The cases in the research sample were divided into two or more chronological groups for each test. A discriminant function was derived from the cases in one of the groups and then tested on the cases in the other group(s). The models were found to be relatively stable over time in all the studies.

### Stability Between Courts or Types of Decisions

All the studies used Tax Court cases exclusively except for the studies by Oatsvall [1978] and Whittington and Whittenburg [1980]. Oatsvall [1978] conducted a test of stability between Tax Court and District Court decisions. The results concluded that the discriminant model performed equally well for both courts.

Lett [1981] and Pollard [1981] performed a test of stability between the regular Tax Court decisions and the Tax Court Memorandum decisions. They determined there was stability between the two types of Tax Court decisions.

### Stability Between Statistical Models

Oatsvall [1978] and Pollard [1981] conducted a test of stability between the statistical models. Linear discriminant and probit models were used to classify the

reduced models. The classification accuracy of the two models was compared. The results showed evidence of stability between the statistical models.

#### Stability of the Measurement Process

Based on the recommendations of Copeland, Taylor, and Brown [1981], Lett [1981] conducted audits of the measurement (or coding) process to ensure that the independent variables were measured accurately and to estimate the consequences of any errors. Three auditor groups consisting of tax students, tax practitioners, and Lett independently measured the variables. The codings of the independent variables by the three auditor groups were compared. Differences in codings were resolved by consensus of the groups. Lett [1981] found that the students and practitioners produced measurement errors. However, the classification accuracy of the discriminant "error" models was relatively high, but not as high as the consensus models.

#### Other Tests of Stability

Bond [1977], Taylor [1978], Lett [1981], and Pollard [1981] performed tests of stability between linear and quadratic functions. The results were previously discussed in this chapter. Bond [1977] and Pollard [1981] reported the Tax Court judges that tried the cases in the research



sample. Taylor [1978] and Pollard [1981] reported any case in the research sample that was subsequently appealed and reversed. Lett [1981] conducted a test of stability between farming and other hobbies.

#### Summary

This chapter described tax research studies by Bond [1977], Oatsvall [1978], Taylor [1978], Madeo [1979], Whittington and Whittenburg [1980], Lett [1981], Pollard [1981], and Burns and Groomer [1983]. In these studies the methodology of discriminant analysis was used to statistically analyze variables in court case fact patterns. Among the issues discussed in this chapter were the (1) dependent variable for each study, (2) independent variables, (3) sample selection, (4) relationship between the independent variables, (5) model reduction, (6) significance of the findings, and (7) tests of stability.

Notes

1 "Missing" data resulted from the omission of the variable in the case.

2 The Internal Revenue Service Audit Guidelines were first published in 1975 under the 1967 Freedom of Information Act.

## CHAPTER 4

### RESEARCH METHODOLOGY

This chapter presents the statistical methodology used in the study. The major issues discussed in this chapter include the (1) research design, (2) research sample, (3) dependent variable, (4) independent variables, (5) statistical tests, and (6) sensitivity analyses.

#### Statement of the Problem

The traditional tax methodology described by Hoffman and Willis [1984, p. 72] has been used by researchers to analyze the factors relating to the exclusion of scholarships and fellowship grants. Among these authors are Stuart [1976], Raabe and Willis [1977], Tipgos [1979], Mylan [1980], and Strong [1981]. With the number of cases and factors in the section 117 area, the need for additional methodological techniques has been suggested [Misiewicz, 1977].

The complexity in the taxability of scholarships and fellowship grants was discussed in Chapter 2. The amenability of these grants to empirical research is implied by the apparent interaction of the factors listed in Exhibit 2-1 and the decisions reached by the Tax Court. The

discriminant analysis model provides one basis for determining the exclusion from income of scholarships and fellowship grants.

The null hypothesis tested in this study is:

H<sub>0</sub> : The independent variables in the "best" model are no more effective than random estimates (based on chance) in discriminating between court-determined taxability or nontaxability of scholarships or fellowship grants.

Rejection of the null hypothesis will imply that the factors have discriminatory power. In this case, the relative importance of the factors used by the Tax Court will be assessed.

### Research Design

The purpose of this research is to empirically examine the criteria used by the judiciary when the court determines if scholarship and fellowship grants are excludable from income for federal income tax purposes. Discriminant analysis is applied to a sample of cases heard in the Tax Court to develop a model to ascertain the variables considered important to the judiciary.

Discriminant analysis was used in other tax studies by Bond [1977], Oatsvall [1978], Taylor [1978], Madeo [1979], Whittington and Whittenburg [1980], Lett [1981], Pollard [1981], and Burns and Groomer [1983]. These studies were

discussed in Chapter 3. This research aggregates the various statistical techniques in the previous studies.

### Research Sample

Determination of the excludability of scholarships and fellowship grants is applicable to a variety of taxpayers. Although tax cases may be litigated in the Tax Court, the District Court, or the United States Claims Court, the research is limited to those cases adjudicated in the Tax Court. The Tax Court cases were selected for three reasons. First, the Tax Court decisions usually provide more detailed information than do the decisions of the other two courts. Second, the majority of all reported tax cases are heard in the Tax Court.<sup>2</sup> Third, there is a single Tax Court while there are several District Courts. The one-court concept allows for uniform Tax Court decisions regardless of the situs of the taxpayer.<sup>3</sup>

The analysis is designed to include a random sample of the scholarship and fellowship grant cases litigated in the Tax Court between January 1, 1954, and February 28, 1985. The principal source used to compile a list of cases was LEXIS.<sup>4</sup> LEXIS is a computer-accessible data base of legal information. LEXIS was valuable in locating the most recent cases since there is only a minimal interval of time between the date a case is tried and the time the case is added to

the data base. Cases were omitted if there was missing data rendering those cases useless for analytical purposes.

The research sample consists of 89 cases. The criteria used for selection was that each case must contain litigation of the dependent variable which is the exclusion from income of scholarship or fellowship grants. Of these cases, 17 were decided in favor of the taxpayer and 72 were decided in favor of the government. In each case decided in favor of the taxpayer, the claimed scholarship or fellowship grant exclusion by the taxpayer was allowed due to meeting the criteria required for excludability as presented in Exhibit 2-1. In each case decided in favor of the government, the scholarship or fellowship grant was ruled to be taxable. The 89 cases in the research sample are listed in Appendix A.

### Variable Selection

#### The Dependent Variable

The dependent variable in this study is the dichotomous outcome of the Tax Court decision for a given case. The cases in the sample (see Appendix A) involve taxpayers litigating various claimed exclusions of scholarships or fellowship grants. Each case has a dichotomous outcome listed below.

- (1) The claimed scholarship or fellowship grant exclusion by the taxpayer was allowed, or

- (2) The claimed scholarship or fellowship grant exclusion by the taxpayer was not allowed.

### The Independent Variables

Discriminant analysis assumes that the grouping of each case based on the outcome in favor of or against the taxpayer can be characterized by a common set of independent variables. The procedures used in identifying and measuring these independent variables are discussed below.

Identifying the independent variables. The independent variables in this study were isolated by examining government publications, tax articles, and Tax Court cases. These independent variables were identified and listed in Exhibit 2-1.

Measuring the independent variables. All the independent variables are expressed as qualitative variables. The majority of these variables will be mentioned directly or indirectly in the cases. Missing data is coded as "0"<sup>5</sup>. When information about a variable is present, the measurement scale requires that questions on the coding sheet answered in the affirmative indicate "favorable to the taxpayer," a "+1" should be recorded. Questions on the coding sheet answered in the negative indicate "favorable to the government," a (-1) should be recorded. A sample of the coding sheets used to code the cases is presented in Appendix B.

Unlike many tax issues, cases dealing with scholarships and fellowship grants are won or lost in total. This eliminates the difficulty of artificially declaring a partially successful taxpayer to have won or lost [Madedo, 1979].

Since the information was obtained from published Tax Court decisions, the coder knows whether the taxpayer won or lost the case before coding the data for each variable. The cases in this study were read and coded by both the author and a second trained investigator. Mutual agreement on any dissimilarly coded variable was reached before completion of the final coding. Identified variables were defined for analytical purposes so the data could be relatively free from bias. The majority of the data could be interpreted without being affected by prior knowledge of the outcome of the case.

### Statistical Tests

Discriminant analysis is used to identify specific variables which best explain the taxpayers' success or failure in the Tax Court. The following points are discussed in the section below. These issues include the (1) application of the discriminant analysis to the experimental setting, (2) evaluation of the discriminant models, (3) use of the Lachenbruch U method for classification error rates, (4) a priori probabilities of



group membership of observations, and (5) tests of statistical significance.

### Discriminant Analysis

The statistical procedure selected to analyze the cases is multiple linear discriminant analysis. A forward stepwise procedure will be performed [Dixon and Brown, 1979, p. 711-733] to determine the variables that are significant in their ability to discriminate between taxpayers receiving favorable rulings and taxpayers that did not receive favorable rulings. This procedure determines the linear composites of the variables that enable a separation of the successful from the unsuccessful taxpayers. The technique can also determine the statistical appropriateness of the model(s) and to provide for the unbiased measurement of the model(s) ability to classify known or future cases as successful and unsuccessful.

The use of linear discriminant analysis assumes that two statistical prerequisites were present. These prerequisites state that the discriminating variables should have a multivariate normal distribution and equal dispersion matrices within each group. The variables are coded in a manner that violates the normality assumption. However, Gilbert [1968] and Krzanowski [1975] indicate that the linear discriminant function is tolerant of deviations from the normality assumption.

Box's M-test, a multivariate test for the equality of group dispersion matrices, was used for each unique discriminant analysis [Nie, et al., 1975, pp. 434-467; Hull and Nie, 1979, p. 197]. For each analysis, an inequality was indicated by this test. <sup>7</sup> Box's M-test is very robust and infrequently fails to find a significant difference among dispersion matrices [Cooley and Lohnes, 1971, p. 228]. There is an even greater likelihood that the assumption of equal dispersion matrices will be rejected when there is a large number of cases [Eisenbeis and Avery, 1973, p. 487]. Lachenbruch [1975] stated that the linear discriminant function can tolerate some deviation from both of the prerequisites stated above.

The coding scheme allowed for the designation of "missing" data when the data item is not presented in the facts of the case. There are several statistical techniques for dealing with missing data [Jackson, 1968; Chan, Gilman, and Dunn, 1976, pp. 842-844]. The mean substitution procedure is used in this research. Analysis using only cases with completed data vectors may produce results that do not reflect the population.

#### Classification Accuracy

There are several procedures to measure the classification accuracy of the models. Two techniques are the holdout procedure and the Lachenbruch U procedure

[Lachenbruch, 1967, pp. 639-45]. These approaches are not affected by normality assumptions. The holdout technique requires that the research sample be divided into two parts. One part is used to estimate the models and the remaining part is used to evaluate the models. The Lachenbruch U method uses  $n - 1$  observations to estimate the discriminant function, and then classifies all the held-out cases. This procedure is repeated until all the cases are classified. This technique provides almost unbiased estimates of the classification error rate. Eisenbeis [1977] recommends this procedure when there is concern over the availability of cases. The Lachenbruch U method [Eisenbeis, 1977, p. 895; Dixon and Brown, 1979, p. 731] was the primary approach to measuring the classification accuracy of the discriminant models.

#### A Priori Probabilities

In discriminant analysis, the a priori probability of group membership of an observation is assumed to be known. This a priori probability of group membership should be used in determining the discriminant function.

In this study, a priori probability of group membership of the observations is 20 percent for decisions in favor of the taxpayer and 80 percent for decisions in favor of the government. The a priori probabilities of the population are unknown. It is assumed that the composition of the

research sample reflects the population [Eisenbeis, 1977 and Pinches, 1980].

A priori probabilities are used in this study to determine the critical value (or cutting score) to be compared to the discriminant score for a particular case for classification into one of the two groups. To calculate the cutting score for unequal group sizes, Hair, et al. [1979, p.107] present the following formula:

$$Z_{CU} = \frac{N_T Z_T + N_G Z_G}{N_T + N_G}$$

- where:  $Z_{CU}$  = the critical cutting score value for unequal group sizes.
- $N_T$  = the number of cases in the research sample decided in favor of the taxpayer.
- $N_G$  = the number of cases in the research sample decided in favor of the government.
- $Z_T$  = the centroid for the taxpayer group.
- $Z_G$  = the centroid for the government group.

To incorporate prior probabilities, this formula is restated:

$$Z_{CU} = P_T Z_T + P_G Z_G$$

where:

$$P_T = \frac{N_T}{N_G + N_T} = \text{Prior Probability (i.e., a priori sample proportion) of a decision in favor of the taxpayer.}$$

$$P_G = \frac{N_G}{N_T + N_G} = \text{Prior Probability (i.e., a priori sample proportion) of a decision in favor of the government.}$$

### Tests of Statistical Significance

The null hypothesis in this study is:

H<sub>0</sub>: The independent variables in the "best" model are no more effective than random estimates (based on chance) in discriminating between court-determined taxability or nontaxability of scholarships or fellowship grants.

This hypothesis is tested for the model that correctly classifies the most cases using the Lachenbruch U analysis. If the percentage of cases correctly classified is significantly greater than would be expected by chance, then group profiles as characterized by the respective independent variables will be considered meaningful.

The Lachenbruch U method for determining classification accuracy of the discriminant models is not based on the assumption of a multivariate normal distribution. Therefore, a nonparametric test may be used to test the significance of classification accuracy in relation to chance. The test used is a binomial test for significance

of a proportion [Cangelosi, Taylor, and Rice, 1976, p. 112].

The test statistic is:

$$Z^* = \frac{P - P_0}{\sqrt{\frac{P_0(1 - P_0)}{N}}}$$

where:  $P$  = The proportion of cases correctly classified.

$P_0$  = The proportion or prior probability of cases in the population correctly classified by chance.

$1 - P_0$  = The proportion or prior probability of cases misclassified by chance.

$N$  = The total number of cases in the sample.

For large samples, the binomial  $Z^*$  is approximated by the normal distribution [Siegel, 1956, p. 40]. The proportion of cases in the population correctly classified by chance ( $P_0$ ) is estimated by the proportional chance criterion calculated as follows:

$$P_0 = \frac{(C_1)^2}{(C_1)^2 + (C_2)^2}$$

where:  $C_1$  = The proportion or prior probability of cases in the sample decided in favor of the taxpayer.

$C_2$  = The proportion or prior probability of cases in the sample decided in favor of the government.

This proportional chance criterion is appropriate for establishing the number of correct classifications expected

by chance when the focus is on the percent classified over all of the groups simultaneously [Pinches, 1980].

The null hypothesis will be tested as follows:

$$H_0 : P \leq P_0$$

$$H_A : P > P_0$$

with the decision rule being:

$$\text{If } Z \leq Z_{(1-\alpha)}^* \text{ , Accept } H_0$$

$$\text{If } Z > Z_{(1-\alpha)}^* \text{ , Reject } H_0$$

The null hypothesis will be rejected if  $Z^*$  is significant at the  $\alpha = .05$  level.

### Sensitivity Analysis

This section discusses the sensitivity analyses used to evaluate the stability of model parameters. The two major areas of investigation are (1) structural sensitivity, and (2) data sensitivity.

#### Structural Sensitivity

To investigate structural sensitivity, a test of stability over time, and a test of stability between regular Tax Court and Tax Court Memorandum decisions were performed.

The Tax Court judges for the cases in the sample were also identified.

Test over time. The case trial dates for the research sample cover a period from February 26, 1959, to May 25, 1983. To test the stability of the "best" model over time, the research sample was divided as follows:

Group I: 70 cases tried on or after January 1, 1970.

Group II: 19 cases tried before January 1, 1970.

Bingler v. Johnson [394 U.S. 741 (1969)], the only Supreme Court case interpreting section 117, was decided in 1969. Cases decided after January 1, 1970 should reflect additional information the Bingler decision added to section 117.

The discriminant function with the reestimated coefficients derived from the cases in Group I was then used to classify Group II. The cases misclassified under this analysis were then compared to the cases misclassified by the "best" model constructed from all the cases.

Regular Tax Court and Tax Court Memorandum decisions. More information is generally provided in a regular Tax Court decision than in a memorandum decision. The Chief Judge of the Tax Court reviews the cases and determines if the case fact pattern presents an original issue that warrants a regular Tax Court decision that should be reviewed by the entire Tax Court. If no original issue is



presented and the fact pattern of the case appears to involve situations that only necessitate the application of previously established principles of law, only a memorandum decision is issued [Hoffman and Willis, 1984].

The sensitivity of the "best" model as related to regular Tax Court and Tax Court Memorandum decisions was tested by dividing the research sample into the following groups:

Group I: 48 cases with Tax Court Memorandum decisions.

Group II: 41 cases with regular Tax Court decisions.

The discriminant function with the reestimated coefficients derived from the Tax Court Memorandum cases in Group I was then used to classify Group II. The Tax Court (Group II) cases misclassified by this analysis were compared to the Tax Court cases misclassified by the "best" model constructed from all the cases.

Identification of the Tax Court judges. The cases in the research sample were tried by different judges. The relationship between individual judges and the misclassified cases was examined. An exhibit is presented that identifies the cases tried by each judge. The information in this exhibit should indicate whether certain judges reached decisions on a basis dissimilar to the other judges.

### Data Sensitivity

To investigate data sensitivity, a test of sensitivity to measurement errors, and a test of sensitivity to the costs of misclassification were performed.

Measurement errors. Copeland, Taylor, and Brown [1981] suggest that the measurement process be audited to ensure reliability. Therefore, the cases in this study were read and coded by both the author and a second trained investigator. This should markedly reduce coding errors by focusing attention on discrepancies. A mutual agreement on dissimilarly coded variables was reached before completion of the final coding.

To test the sensitivity of the model to coding errors, a three percent error rate [Lett, 1981] was randomly introduced into the data. Three percent of the codings were randomly selected and changed from the original code to an erroneous code based on the following decision rule:

If the original code is		and the random number is		change to
..... 0	0	..... 0 - 4	0 - 4	..... 1
..... 0	0	..... 5 - 9	5 - 9	..... -1
.	.	.	.	.
..... 1	1	..... 0 - 4	0 - 4	..... -1
..... 1	1	..... 5 - 9	5 - 9	..... 0
.	.	.	.	.
..... -1	-1	..... 0 - 4	0 - 4	..... 0
..... -1	-1	..... 5 - 9	5 - 9	..... 1

Based on the three percent data error, the forward stepwise and model reduction procedures previously presented in this chapter were performed. A comparison was made

between variable ordering, classification accuracy, and cases misclassified by the three percent data error and the original data.

Costs of misclassification. Cooley [1975] recommends adjusting for misclassification costs by revising the critical value of  $Z$  to reflect the costs of misclassification. To adjust the critical value of  $Z$ , Pinches [1980] suggests modification of the prior probabilities to identify the misclassification costs activity. Pinches [1980] also states that the ratio of the costs are more important than the costs themselves.

In this study, the costs of misclassification were the taxes owed on the litigated amounts of scholarships and fellowships. Misclassification costs are of less concern when the research attempts to construct an historical model than when the research is used for decision making purposes. Since this research is concerned with identifying the criteria used by the Tax Court to determine the taxability of scholarships and fellowships, no adjustment was made for misclassification costs in the primary model analysis.

In order to test the sensitivity of the "best" model to the costs of misclassification, the prior probabilities of the two groups were adjusted until all of the decisions in favor of the taxpayer were correctly classified. Even though the costs themselves were not available, some evidence of the misclassification cost ratio necessary to

correctly classify all the taxpayer decisions was identified.

### Summary

This chapter discussed the adaptation of the multiple discriminant analysis model to the analysis of factors relating to the excludability of scholarships and fellowship grants. Issues that were discussed include the (1) research design, (2) research sample, (3) selection of the dependent and independent variables, (4) statistical tests, and (5) sensitivity analysis.

The following methodology is used in this study:

1. a two group nominally scaled dependent variable,
2. a three category (i.e., +1, 0, -1) scaling for the independent variables (all of which are qualitative in this study),
3. an approximate variable-to-case ratio of 1 to 6,
4. use of the forward stepwise procedure for model reduction,
5. use of the Lachenbruch U method for estimating error rates for linear classification functions,
6. statement and testing of a null hypothesis at the five percent significance level using the binomial test for the significance of a proportion with the proportion of cases in the population correctly classified by chance estimated by using the proportional chance criterion as suggested by Pinches [1980], and
7. performance of tests of stability. These tests include tests of stability over time, stability between regular Tax Court and Tax Court Memorandum decisions, and stability of the measurement process.

Notes

1 Hoffman and Willis [1984] suggest a six step approach to traditional tax research.

1. Identify and refine the problem.
2. Locate the appropriate tax law sources.
3. Assess the validity of the tax law sources.
4. Arrive at the solution or alternative solutions.
5. Effectively communicate the solution to the taxpayer.
6. Follow up on the solution in light of new developments.

2 During the 1970's 62 percent of all trial court tax decisions were heard in the Tax Court [U.S. Commissioner of Internal Revenue, 1971-80].

3 When two circuits of the Court of Appeals disagree, the Tax Court follows the circuit that has jurisdiction over the case.

4 LEXIS is a computerized legal document retrieval system maintained by Mead Data Central of Dayton, Ohio.

5 "Missing" data coded as "0" is used when no mention of the variable occurred in the case.

6 Copeland, Taylor, and Brown [1981] state that the coding can be influenced by knowledge of whether the taxpayer won or lost the case.

7 Gilbert [1968, p. 1410] has shown that a linear discriminant function produces satisfactory results when compared to a quadratic function in populations having discrete variables and unequal group dispersions. There has been no definitive evidence to show that the quadratic discrimination procedure is superior to the linear procedure when dichotomous variables are used.

## CHAPTER 5

### RESULTS OF THE ANALYSIS

This chapter contains the results of the study. The following models were utilized:

- (1) A univariate analysis of the frequencies of the coding attributes for the variables.
- (2) Twelve reduced models determined by the forward stepwise procedure developed in Chapter 4.
- (3) The fourteen-variable model.

The "best" model was identified by determining the model that correctly classified the highest percentage of cases in the study. Also presented are the results of the various sensitivity analyses described in Chapter 4. Among these are: (1) comparisons of the classification results of linear functions, (2) tests of stability over time and between Tax Court and Tax Court Memorandum decisions, (3) identification of Tax Court judges, (4) tests of sensitivity of measurement error, and (5) misclassification costs.

#### Univariate Analysis

A summary is presented in Exhibit 5-1 of the number of observations of each independent variable for the 89 Tax

## Exhibit 5-1

Distributions of Observations  
89 Tax Court Cases

Independent Variable	<u>17 Decisions for Taxpayer</u>			<u>72 Decisions for Government</u>		
	R E S P O N S E S =====			R E S P O N S E S =====		
	Posi- tive (+1)	Nega- tive (-1)	Miss- ing* (0)	Posi- tive (+1)	Nega- tive (-1)	Miss- ing* (0)
1 CHARACTER	14	2	1	26	43	3
2 WITHHOLD	3	8	6	10	47	14
3 FRINGES	4	4	9	11	44	17
4 EXPERIENCE	7	7	3	8	57	7
5 NEED	4	13	0	0	72	0
6 ACADEMICS	8	9	0	13	59	0
7 MINIMAL	0	4	13	0	26	46
8 EARN LESS	0	5	12	9	28	35
9 HOURS	16	1	0	68	4	0
10 OBLIGATION	14	3	0	40	19	13
11 FACILITY	16	1	0	52	20	0
12 REPORTS	1	4	12	4	13	55
13 SUPERVISED	3	10	4	13	54	5
14 EMPLOYEE	6	8	3	6	51	15

\* A missing response indicates that a variable was not discussed in the case.

Court cases in the research sample. In this exhibit, there is a row for each of the fourteen independent variables. The two major columns consist of three subcolumns for the possible coding responses (i.e., positive, negative, or missing). For example, the first variable, CHARACTER, had 14 positive (+1), two negative (-1), and one missing (0) response for the 17 cases decided in favor of the taxpayer, and 26 positive, 43 negative, and three missing responses for the 72 cases decided in favor of the government. This distribution provides the data used in a univariate analysis presented below.

The frequency distributions for the coding responses for the 89 Tax Court cases in the research sample are presented in Exhibit 5-2. In this exhibit, each of the fourteen rows contains an independent variable, and each of the three major columns presents a possible coding response (i.e., positive, negative, or missing). The subcolumns for each coding response contain the total number of responses for the variable with the percentage distribution of these responses between cases decided in favor of the taxpayer and cases decided in favor of the government. For example, the first variable, CHARACTER, had a total of 40 positive responses. Of these 35 percent (14 of the 40 responses) were from cases decided in favor of the taxpayer and 65 percent (26 of the 40 responses) were from cases decided in favor of the government. Thus, a "+1" response implies a 35



## Exhibit 5-2

Frequency Distribution of Observations  
89 Tax Court Cases

Independent Variable	No.	Positive Responses =====		No.	Negative Responses =====		Missing Data Points =====		
		(+1)			(-1)		(0)		
		<u>Percentage</u>			<u>Percentage</u>		<u>Percentage</u>		
		Taxp	Govt		Taxp	Govt	No.	Taxp	Govt
1 CHARACTER	40	35	65	45	4	96	4	25	75
2 WITHHOLD	13	23	77	55	15	85	20	30	70
3 FRINGES	15	27	73	48	8	92	26	35	65
4 EXPERIENCE	15	47	53	64	11	89	10	30	70
5 NEED	4	100	0	85	15	85	-	-	-
6 ACADEMICS	21	38	62	68	13	87	-	-	-
7 MINIMAL	-	-	-	30	13	87	59	22	78
8 EARN LESS	9	0	100	33	15	85	47	26	74
9 HOURS	84	19	81	5	20	80	-	-	-
10 OBLIGATION	54	26	74	22	14	86	13	0	100
11 FACILITY	68	24	76	21	5	95	-	-	-
12 REPORTS	5	20	80	17	24	76	67	18	82
13 SUPERVISED	16	19	81	64	16	84	9	44	56
14 EMPLOYEE	12	50	50	59	14	86	18	17	83

percent chance for a decision in favor of the taxpayer and a 65 percent chance for a decision in favor of the government. A "-1" response implies a 4 percent chance for a decision in favor of the taxpayer and a 96 percent chance for a decision in favor of the government. A "0" response implies a 25 percent chance for a decision in favor of the taxpayer and a 75 percent chance for a decision in favor of the government.

An examination of Exhibit 5-2 reveals that a "+1" response for NEED provides an unusually high probability (100 percent) of a decision in favor of the taxpayer. Many of the variables are approximately equally distributed. Among these are FRINGES (27 percent chance for a decision in favor of the government), OBLIGATION (26 percent), FACILITY (24 percent), WITHHOLD (23 percent), REPORTS (20 percent), and HOURS and SUPERVISED (each with 19 percent). Additionally, some variables with a "+1" response actually have an unexpectedly high probability of decision in favor of the government rather than for the taxpayer. The highest of these is EARN LESS (100 percent) followed by HOURS (81 percent), SUPERVISED (81 percent), REPORTS (80 percent), WITHHOLD (77 percent), WITHHOLD (77 percent), and FACILITY (76 percent). However, a "-1" response to these six variables also provides an unusually high probability of a decision in favor of the government. Thus, these six

variables were not useful in discriminating between the two groups.

In contrast to the findings when a "+1" is present, a "-1" response provides a high probability of a decision in favor of the government for many of the variables. Among those that are particularly high are the following: CHARACTER (96 percent), FACILITY (95 percent), FRINGES (92 percent), EXPERIENCE (89 percent), ACADEMICS (87 percent), MINIMAL (87 percent), OBLIGATION (86 percent), EMPLOYEE (86 percent), NEED (85 percent), EARN LESS (85 percent), and SUPERVISED (84 percent).

A missing response (0) indicates that a variable was not discussed in the case or was found to be insignificant. The fact that a response is missing could indicate a high probability of a certain decision. However, in this analysis, most significant "0" codings were found for variables where relatively few "0" codings were recorded. Note, however, that with five variables previously discussed (WITHHOLD, FRINGES, MINIMAL, EARN LESS, and SUPERVISED) the taxpayer's probability of a decision in his favor is actually greater with a "0" than with either a "+1" or a "-1".

Exhibit 5-2 shows that each variable has two sides that are not necessarily equal. A "+1" response to a variable except for NEED (100 percent) generally cannot provide the taxpayer with any particularly high probability for a

decision in his favor while a "-1" response can cause a high probability of a taxpayer loss.

A univariate analysis provides insight into the unique contribution of each variable. However, Cochran [1964] has shown that insignificant variables on a univariate basis may be very important when combined with other variables. Previous research indicates that court decisions are not usually decided on the basis of one variable but are multivariate in nature [Bond, 1977; Oatsvall, 1978; Taylor, 1978; Madeo, 1979; Lett, 1981; Pollard, 1981; and Burns and Groomer, 1983]. The following section presents the results of a linear multivariate analysis of the variables.

### Linear Multivariate Analysis

This section discusses the findings and tests of thirteen linear multivariate models. Included in this discussion are the results of the forward stepwise procedure, specification of the linear classification function for the full model and each of the twelve reduced models, identification of the cases misclassified by each of the linear multivariate models, selection of the "best" model, and a test of the null hypothesis.

#### Results of the Forward Stepwise Procedure

The forward stepwise procedure was conducted. This procedure produced a sequential ordering of the variables

based on the multivariate F-statistic. The forward stepwise ordering of the variables is presented in Exhibit 5-3. In this exhibit, the rows represent the ordering of variable entry into the stepwise procedure and the columns represent the rankings of the variables in each model.

As shown in Exhibit 5-3, the relative importance of the variables in one model can shift whenever a new model is formed with a larger number of variables. For example, the variable ACADEMICS was the third most important variable (third highest F-statistic) in model 3. However, ACADEMICS moved to second in importance in models 4 through 6 and dropped to third in importance in models 7 through 14. In contrast, the variable NEED entered model 1 as first in importance and did not shift, but maintained the rank of first from model 1 through model 14. Multicollinearity can cause this shift of relative importance among the variables in the stepwise procedures. However, Eisenbeis [1977, p. 883] states that multicollinearity is usually irrelevant in discriminant analysis.

From the results of the forward stepwise procedure (see Appendix C for the multivariate F-statistics which determined the forward stepwise ordering of each variable in each model), a total of twelve models with less than fourteen variables (2-variable through 13-variable, inclusive) were isolated. The full model and each of the reduced models were then analyzed.

## Exhibit 5-3

Forward Stepwise Ordering of Variables  
Based on Multivariate F-Statistic

Independent Variable Entered	Independent Variable Rankings In Models													
	1	2	3	4	5	6	M O D E L				10	11	12	13
5 NEED	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4 EXPERIENCE		2	2	4	4	6	6	5	4	4	4	4	5	5
6 ACADEMICS			3	2	2	2	3	3	3	3	3	3	3	3
1 CHARACTER				3	3	3	2	2	2	2	2	2	2	2
10 OBLIGATION					5	4	5	7	6	8	6	6	6	6
14 EMPLOYEE						5	4	4	5	5	5	5	4	4
13 SUPERVISED							7	6	7	9	9	8	9	9
11 FACILITY								8	8	10	10	10	10	10
3 FRINGES									9	6	7	9	8	8
2 WITHHOLD										7	8	7	7	7
7 MINIMAL											11	11	12	12
12 REPORTS												12	11	11
8 EARN LESS													13	13
9 HOURS														14

### Classification Functions for the Linear Models

The linear classification functions for the full and each multivariate reduced model are presented in Exhibit 5-4. In this exhibit, the columns represent the respective model and the rows contain (1) the unstandardized discriminant function coefficients for each of the variables (i.e.,  $b_1, b_2, \dots, b_{14}$ ), (2) the constant term for each discriminant function (i.e.,  $b_0$ ), (3) the cutting score for each function, and (4) the group centroid for each of the two groups for the function. For example, the discriminant function for the 4-variable model is as follows:

$$Z = 2.498 + 1.973 \text{ NEED} + .641 \text{ EXPERIENCE} \\ + .606 \text{ ACADEMICS} + .516 \text{ CHARACTER}$$

The group centroids for the two groups are used in determining the cutting score. The cutting score is the critical value against which the discriminant score for a particular case is compared for classification into one of the two groups. The cutting scores in Exhibit 5-4 are calculated based on the formula suggested by Hair, et al. [1979, p. 107] and previously discussed in Chapter 4. The cutting score for the 4-variable model is as follows:

$$Z_{CU} = (.20) (-.421) + (.80) (1.781) = 1.341. \\ \text{=====}$$

To classify a case into a particular group, first insert the values for the variables in a case (i.e., "+1",

Exhibit 5 - 4  
Classification Functions for Linear Models

Independent Variable	Model 14	Model 13	Model 12	Model 11	Model 10	Model 9	Model 8	Model 7	Model 6	Model 5	Model 4	Model 3	Model 2
1 CHARACTER	0.636	0.635	0.632	0.633	0.631	0.536	0.568	0.580	0.544	0.561	0.516		
2 WITHHOLD	-0.434	-0.435	-0.433	-0.423	-0.441								
3 FRINGES	0.389	0.391	0.386	0.417	0.412	0.208						0.881	0.955
4 EXPERIENCE	0.487	0.491	0.485	0.499	0.470	0.472	0.443	0.386	0.348	0.534	0.641	0.881	0.955
5 NEED	1.894	1.888	1.900	1.872	1.873	1.830	1.922	1.962	1.918	1.925	1.973	2.164	2.263
6 ACADEMICS	0.492	0.497	0.507	0.487	0.485	0.535	0.547	0.576	0.615	0.649	0.606	0.594	
7 MINIMAL	-0.194	-0.190	-0.263	-0.254									
8 EARN LESS	-0.091	-0.093											
9 HOURS	-0.060												
10 OBLIGATION	0.376	0.378	0.395	0.363	0.323	0.326	0.332	0.382	0.452	0.361			
11 FACILITY	0.236	0.237	0.251	0.255	0.238	0.224	0.215						
12 REPORTS	0.191	0.190	0.180										
13 SUPERVISED	-0.390	-0.385	-0.387	-0.388	-0.354	-0.382	-0.404	-0.357					
14 EMPLOYEE	0.552	0.546	0.530	0.507	0.505	0.501	0.526	0.573	0.406				
Constant	2.032	1.975	1.966	1.930	2.028	2.138	2.140	2.308	2.345	2.291	2.498	2.768	2.586
Outting Score	1.589	1.588	1.586	1.582	1.573	1.523	1.506	1.484	1.447	1.403	1.341	1.195	1.044
Group Centroid:													
Taxpayer	2.110	2.109	2.107	2.101	2.089	2.023	2.000	1.971	1.922	1.863	1.781	1.588	1.387
Government	-0.498	-0.498	-0.498	-0.496	-0.493	-0.478	-0.472	-0.465	-0.454	-0.440	-0.421	-0.375	-0.328





"-1", or "0") into the 4-variable discriminant function and calculate the value of Z. Next, compare Z to  $Z_{CU}$ . When Z is greater than  $Z_{CU}$  (1.341), classify the case as belonging to the "decision for taxpayer" group. When Z is less than  $Z_{CU}$ , classify the case as belonging to the "decision for government" group. For example, in the Vaccaro case the discriminant score would be calculated as follows:

$$\begin{aligned} Z &= 2.498 + 1.973 (-1) + .641 (+1) \\ &\quad + .606 (+1) + .516 (+1) \\ &= 2.288. \\ &==== \end{aligned}$$

By comparing the Z value of 2.228 to the cutting score ( $Z_{CU}$ ) of 1.341, the case is correctly classified as a decision for the taxpayer.

#### Cases Misclassified by the Linear Models

Exhibit 5-5 presents the cases misclassified by the 14-variable model and each of the multivariate reduced models using the Lachenbruch U classification procedure. The exhibit also lists the percentage of cases correctly classified by the models. In this exhibit, the columns identify (1) the number and name of each misclassified case (see Appendix A for case citations), (2) the decision (group membership) for each case, and (3) the respective model. All rows except the last two identify which model(s) misclassified the case (indicated by the "X" markings). The

Exhibit 5 - 5  
Misclassified Cases -- Linear Models

Case	Decision	M O D E L													
		14	13	12	11	10	9	8	7	6	5	4	3	2	
1. Isenberg	Taxpayer	x	x	x	x	x	x	x	x	x	x	x	x	x	x
5. Bhalla	Taxpayer	x	x	x	x	x	x	x	x	x	x	x	x	x	x
6. Wells	Taxpayer	x	x	x	x	x	x	x	x	x	x	x	x	x	x
7. Peiss	Taxpayer	x	x	x	x	x	x	x	x	x	x	x	x	x	x
8. Sweet	Government	x	x	x	x	x	x	x	x	x	x	x	x	x	x
10. Reese	Government	x	x	x	x	x	x	x	x	x	x	x	x	x	x
18. Ward	Government	x	x	x	x	x	x	x	x	x	x	x	x	x	x
22. Willie	Government	x	x	x	x	x	x	x	x	x	x	x	x	x	x
23. Phillips	Taxpayer	x	x	x	x	x	x	x	x	x	x	x	x	x	x
27. Vaccaro	Taxpayer	x	x	x	x	x	x	x	x	x	x	x	x	x	x
28. Carroll	Government	x	x	x	x	x	x	x	x	x	x	x	x	x	x
29. Bieberdorf	Taxpayer	x	x	x	x	x	x	x	x	x	x	x	x	x	x
34. Wiener	Taxpayer	x	x	x	x	x	x	x	x	x	x	x	x	x	x
36. Meehan	Government	x	x	x	x	x	x	x	x	x	x	x	x	x	x
37. Brubakken	Government	x	x	x	x	x	x	x	x	x	x	x	x	x	x
38. Adams	Government	x	x	x	x	x	x	x	x	x	x	x	x	x	x
39. Olick	Taxpayer	x	x	x	x	x	x	x	x	x	x	x	x	x	x
40. Rapoport	Government	x	x	x	x	x	x	x	x	x	x	x	x	x	x
42. Spruch	Taxpayer	x	x	x	x	x	x	x	x	x	x	x	x	x	x
44. Broniwitz	Taxpayer	x	x	x	x	x	x	x	x	x	x	x	x	x	x
47. Kreis	Government	x	x	x	x	x	x	x	x	x	x	x	x	x	x
63. Abrams	Taxpayer	x	x	x	x	x	x	x	x	x	x	x	x	x	x
79. Chen	Taxpayer	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<b>Total Cases Misclassified</b>		12	10	10	10	10	10	10	10	10	9	10	9	12	21
<b>Percentage Correctly Classified</b>		87%	89%	89%	89%	89%	89%	89%	89%	89%	90%	89%	90%	87%	76%

last two rows contain (1) the total number of cases misclassified by each model and (2) the classification accuracy of each model. For example, the first row shows that the Isenbergh case was decided in favor of the taxpayer and misclassified by all the models except model 4. The model 14 column shows that the 14-variable model misclassified Isenbergh, Bhalla, . . . , Abrams (i.e., a total of 12 cases identified by "X") for a classification accuracy of 87 percent. While this classification accuracy for the 14-variable model is higher than the 2-variable model (76 percent), eleven other reduced models have classification results equal to or greater than the 14-variable model. This finding (that a reduced model achieves an equal or higher classification accuracy than the full model) confirms similar findings of other researchers, as reported by Pinches [1978].

#### Selection of the "Best" Model

The "best" model can be identified as the model that achieves the highest percentage of correct classifications. The classification accuracy of each of the models is presented in Exhibit 5-5. The 4-variable, 6-variable, and 9-variable models have a classification accuracy of 90 percent. The 4-variable model is the "best" model since this model classifies 90 percent of the cases using the least number of variables. The following variables (in

descending order based on F-statistic values) are in the 4-variable model:

#### NEED, ACADEMICS, CHARACTER, AND EXPERIENCE

The discriminant function for the 4-variable model was previously discussed in this chapter. The 4-variable discriminant scores for all cases in the research sample are presented in Exhibit 5-6. In this exhibit, the cases in the research sample are arranged in descending order of their 4-variable discriminant scores. The columns contain the case number and name in the research sample (see Appendix A for case citations), the discriminant score, and the decision (group membership) of the case. The cutting score of the 4-variable model (1.341) is also shown. For example, the first case, Lange (see case number 84 in Appendix A for citation), has a discriminant score of 5.022. Lange was decided in favor of the taxpayer. Since the discriminant score is greater than the cutting score ( $5.022 > 1.341$ ), the 4-variable model also classified the case for the taxpayer.

In Exhibit 5-6, there are eight cases decided in favor of the taxpayer that are below the cutting score and one case decided in favor of the government that are above the cutting score. These cases were misclassified by the 4-variable model. Thus, a total of nine cases were misclassified by the 4-variable model using both the discriminant model and the Lachenbruch U method.

## Exhibit 5-6

Discriminant Scores for the Research Sample  
Using the "Best" (4-Variable) Model

No. of Case	Name of Case	Discriminant Score	Decision
84	Lange	5.0215	T
21	Steiman	3.9201	T
4	Evans	3.7401	T
31	Bailey	3.7401	T
23	Phillips	2.2868	T
27	Vaccaro	2.2868	T
40	Rapoport	2.2868	G*
1	Isenbergh	1.6461	T
5	Bhalla	1.6461	T
79	Chen	1.6461	T

CUTTING SCORE  
1.341

7	Peiss	1.0750	T*
8	Sweet	1.0750	G
18	Ward	1.0750	G
22	Willie	1.0750	G
29	Bieberdorf	1.0750	T*
34	Weiner	1.0750	T*
6	Wells	1.0054	T*
42	Spruch	1.0054	T*
89	Gomes	1.0054	G
14	MacDonald	.6143	G
47	Kreis	.6143	G
37	Brubakken	.5591	G
38	Adams	.5591	G
39	Olick	.5591	T*
19	Utech	.4895	G
3	Bonn	.4343	G
10	Reese	.4343	G
68	Turner	.4343	G
82	Sellingsloh	.4343	G
28	Carroll	.0432	G
36	Meehan	.0432	G
11	Zolnay	-.0264	G
20	Fisher	-.0264	G
50	Harper	-.0264	G
52	Helms	-.0264	G
53	Brown	-.0264	G
57	Jaeger	-.0264	G

## Exhibit 5-6 -- Continued

Discriminant Scores for the Research Sample  
Using the "Best" (4-Variable) Model

No. of Case	Name of Case	Discriminant Score	Decision
59	Larsen	- .0264	G
61	Workman	- .0264	G
2	Bachmura	- .2064	G
15	Haley	- .2064	G
16	Turem	- .2064	G
24	Moll	- .2064	G
25	Fielding	- .2064	G
32	Dietz	- .2064	G
33	Rosenthal	- .2064	G
41	Yalott	- .2064	G
49	Kyle	- .2064	G
62	Joy	- .2064	G
63	Abrams	- .2064	T*
64	Fisher	- .2064	G
66	Findler	- .2064	G
67	Haygood	- .2064	G
70	Wolfson	- .2064	G
77	Herrera	- .2064	G
80	Nino	- .2064	G
86	Saber	- .2064	G
9	Littman	- .5975	G
12	Jamieson	-1.2382	G
13	Proskey	-1.2382	G
17	Anderson	-1.2382	G
26	Ehrhart	-1.2382	G
30	Smith	-1.2382	G
35	Weinberg	-1.2382	G
43	DiBona	-1.2382	G
44	Broniwitz	-1.2382	T*
45	Kagan	-1.2382	G
46	Schwartz	-1.2382	G
48	Calick	-1.2382	G
51	Worthington	-1.2382	G
54	Wall	-1.2382	G
55	Bergeron	-1.2382	G
56	Kaufman	-1.2382	G
58	Gibb	-1.2382	G
60	Brenneise	-1.2382	G
65	Ferrill	-1.2382	G
69	Bogdan	-1.2382	G
71	Bharmota	-1.2382	G
72	Hof	-1.2382	G
73	Ulvestad	-1.2382	G

## Exhibit 5-6 -- Concluded

Discriminant Scores for the Research Sample  
Using the "Best" (4-Variable) Model

No. of Case	Name of Case	Discriminant Score	Decision
74	Hanson	-1.2382	G
75	Koch	-1.2382	G
76	Fulton	-1.2382	G
78	McKenna	-1.2382	G
81	Russell	-1.2382	G
83	Hamsher	-1.2382	G
85	D'Aconti	-1.2382	G
87	Flynn	-1.2382	G
88	Sorensen	-1.2382	G

\* Misclassified by both the Discriminant Model  
and the Lachenbruch U Method.

In this study, the best fact pattern for a decision in the taxpayer's favor would be that the taxpayer (1) received the grant based on need, (2) received the grant based on academic achievement, (3) received monies that were characterized by the grantor as a grant, and (4) received a grant that was not based on experience.

#### Test of the Null Hypothesis

The null hypothesis in this study is tested for the "best" (4-variable) model based on the highest classification accuracy using the Lachenbruch U analysis. The null hypothesis for the 4-variable model is as follows:

H<sub>0</sub> : The independent variables in the "best" model are no more effective than random estimates (based on chance) in discriminating between court-determined taxability or nontaxability of scholarships or fellowship grants.

If the 4-variable model correctly classified a significantly larger number of cases in the research sample than would be expected by chance, the null hypothesis can be rejected. The null hypothesis may be stated:

$$H_0 : P \leq P_0$$

$$H_A : P > P_0$$



where;  $P$  is the proportion of cases correctly classified by the 4-variable ("best") model, or 90 percent and  $P_0$  is estimated by the proportional chance criterion suggested by Pinches [1980] and described in Chapter 4. Thus,  $P_0$  is calculated as follows:

$$P_0 = (.20)^2 + (.80)^2 = .68.$$

The test statistic, the binomial test for the significance of a proportion [see Cangelosi, Taylor, and Rice, 1976, p. 112] was described in Chapter 4. For the 4-variable ("best") model, the test statistic is as follows:

$$Z^* = \frac{P - P_0}{\sqrt{\frac{P_0(1 - P_0)}{N}}} = \frac{.90 - .68}{\sqrt{\frac{.68(1-.68)}{89}}} = 4.449.$$

and the decision rule for the upper-tail testing situation [Lapin, 1973, p. 301] is as follows:

$$\begin{aligned} \text{If } Z &\leq Z_{(1-\alpha)}^*, & \text{Accept } H_0 \\ \text{If } Z &> Z_{(1-\alpha)}^*, & \text{Reject } H_0 \end{aligned}$$

The null hypothesis is rejected if  $Z^*$  is significant at an  $\alpha$  level of five percent. Accordingly,

$$Z_{(1-\alpha)} = Z_{(.95)} = 1.645.$$

Therefore,  $Z^* > Z_{(1-\alpha)^2}$  (i.e.,  $4.449 > 1.645$ ) and the null hypothesis is rejected.

### Results of Structural Sensitivity Analyses

To investigate structural sensitivity (stability), the following tests were performed: (1) tests of stability over time and (2) a test of stability between regular Tax Court and Tax Court Memorandum decisions. Additionally, the Tax Court judges for the cases in the research sample were identified to determine if there was a correlation between certain judges and the misclassified cases.

#### Tests of Stability Over Time

The trial dates for the cases in the research sample range from February 26, 1959, to May 25, 1983. To test the stability of the "best" (4-variable) model over time, the research sample was divided as follows:

Group I: 70 cases tried on or after January 1, 1970.

Group II: 19 cases tried before January 1, 1970.

Bingler v. Johnson [394 U.S. 741 (1969)], the only Supreme Court case interpreting section 117, was decided in 1969. Cases decided after January 1, 1970 should reflect

additional information the Bingler decision added to section 117.

The discriminant function with the reestimated coefficients derived from the cases in Group I correctly classified 63 percent (12 of the 19 cases) of the Group II cases. The seven cases misclassified were Isenbergh, Bhalla, Wells, Peiss, Sweet, Spruch, and Broniwitz. Wells, Peiss, Spruch, and Broniwitz were among the nine cases that were misclassified by the "best" 4-variable model constructed from all cases. The other three cases were misclassified by the other models as shown in Exhibit 5-5.

Since all the cases misclassified had been misclassified by the other models, these results indicate that the 4-variable model is stable over time. This stability implies that no major changes in the interpretation of Code section 117, when applied to the exclusion of scholarships or fellowship grants, have occurred during the time period of this study.

#### Regular Tax Court Versus Tax Court Memorandum Decisions

Regular Tax Court decisions generally provide more information than memorandum decisions. Additionally, regular Tax Court decisions may be reviewed by the entire Tax Court. To determine if this additional information and/or attention generated factors that were used by the judges in regular decisions that were different from factors

used in memorandum decisions, the following test of stability was performed on the "best" (4-variable) model.

The research sample was divided as follows:

Group I: 48 cases with Tax Court Memorandum decisions.

Group II: 41 cases with regular Tax Court decisions.

The discriminant function with the reestimated coefficients derived from the Tax Court Memorandum cases in Group I correctly classified over 76 percent (31 of the 41 cases) of the Tax Court cases in Group II. The ten cases misclassified were Bachmura, Bonn, Sweet, Reese, Haley, Turem, Moll, Dietz, Olick, and Rapoport. Peiss, Olick, and Rapoport were among the nine cases misclassified by the "best" 4-variable model constructed from all cases. Sweet and Reese were misclassified by the other models shown in Exhibit 5-5.

Since the majority of these cases had been misclassified by the other models, these results indicate that the factors used by the Tax Court are consistent between regular Tax Court and Tax Court Memorandum decisions.

#### Identification of the Tax Court Judges

The cases in the research sample were tried by different judges over the years under study. Exhibit 5-7 identifies the judges (or commissioners) that tried the

## Exhibit 5-7

## Judges of Cases in the Research Sample

Judge	Total Cases	Decision for Taxpayer	Decision for Government
Arundell	1	----	9
Bruce	1	----	17
Dawson	4	----	12,18,24,69
Drennen	4	4,27	36,83
Fay	2	79	82
Featherston	5	21,23	13,38,46
Fisher	1	1	----
Forrester	3	44**	3,60
Goffe	1	----	61
Hall	3	39**,84	40**
Hamblem	1	----	89
Hoyt	1	----	45
Ingolia*	2	----	48,49
Irwin	6	----	25,43,70,72,73,77
Kern	1	----	47
Mulroney	1	7**	----
Murdock	1	42**	----
Opper	1	6**	----
Parker	1	----	85
Pierce	1	5	----
Quealy	4	----	15,32,62,64
Raum	4	----	14,16,20,26
Scott	7	----	30,50,51,52,66,81,87
Simpson	8	31	28,35,37,53,54,55,78
Sterrett	8	----	19,41,57,67,68,71,74,88
Tannewald	8	63**	10,11,58,59,75,80,86
Tietjens	1	----	56
Turner	2	----	2,8
Wiles	5	29**,34**	33,65,76
Withey	1	----	22

\* Commissioners

\*\* Misclassified by the "Best" (4-variable) Model

cases in the study. In Exhibit 5-7, the columns identify, (1) the judge (or commissioner), (2) the total number of cases in the research sample tried by each of the judges, and (3) the cases in the research sample tried by each judge. The cases are subdivided into the decisions for the taxpayer and the decisions for the government (see Appendix A for case names and citations).

This exhibit shows that a different judge presided over each of the cases that were misclassified by the "best" 4-variable model, except for Judges Hall and Wiles, who presided over two misclassified cases each. However, Judges Hall and Wiles also presided over cases that were not misclassified by the model. Therefore, the results do not suggest a correlation between the judges and the misclassified cases.

#### Results of Data Sensitivity Analyses

To investigate data sensitivity, a test of sensitivity to measurement errors and a test of sensitivity to the costs of misclassification were performed.

#### Sensitivity to Measurement Errors

Auditing of the measurement or coding process to ensure reliability is suggested by Copeland, Taylor, and Brown [1981]. Therefore, the cases in this study were read and coded by both the author and a second trained investigator.

Mutual agreement on any dissimilarly coded variable was reached before completion of the final coding. This dual coding process should have markedly reduced coding errors by focusing attention on discrepancies.

To test the sensitivity of the results of the study to coding errors, a three percent error rate [see Lett, 1981] was introduced into the data. Since fourteen variables were coded for each of the 89 Tax Court cases in the research sample, 37 (three percent of 1246) 5-digit random numbers were selected. The first two digits were designated as the court case. The second two digits were designated as the variable number (with 00-06 = variable 1, 07-13 = variable 2, . . . , 91-97 = variable 14). The fifth digit was designated as the coding variable. The randomly selected variables were changed from their original code to an "incorrect" code based on the following decision rule:

If the original	and the random	change
code is .....	number is .....	to .....
..... 0	..... 0 - 4	..... 1
..... 0	..... 5 - 9	..... -1
.	.	.
..... 1	..... 0 - 4	..... -1
..... 1	..... 5 - 9	..... 0
.	.	.
..... -1	..... 0 - 4	..... 0
..... -1	..... 5 - 9	..... 1

Thus, the first four digits randomly selected the variable and the fifth digit designated the random change.

After the three percent error rate was introduced into the data, the analyses presented in the linear multivariate

analysis section of this chapter were recalculated. First, the forward stepwise procedure was performed. Then, the full model and each multivariate reduced model (based on the forward stepwise ordering) was used to classify the cases using the Lachenbruch U classification procedure. Finally, the classification accuracy of the various models was examined.

Presented in Exhibit 5-8 are the results of the ordering of variables by the forward stepwise procedure for both the original data and the three percent data error. In this exhibit, the two major columns (one for the original data and one for the three percent data error) each have subcolumns for the independent variables and the classification accuracy of the respective model. The rows contain the ordering of the entry of the variables into the respective model. The models are cumulative from row to row. For example, model 5 (i.e., the "5th" ordering of variable entry) consists of NEED, EXPERIENCE, ACADEMICS, CHARACTER, and OBLIGATION for the original data and CHARACTER, ACADEMICS, NEED, OBLIGATION, and EMPLOYEE for the three percent data error. Model 5 has a 89 percent classification accuracy for the original data and an 84 percent classification accuracy for the three percent data error.

The comparison in Exhibit 5-8 shows the ordering of variable entry into the 2-variable through 14-variable



## Exhibit 5-8

Comparison of Results Using Original Data  
To Results Using the Three Percent Data Error

Ordering of Variable Entry	ORIGINAL DATA Independent Variable	DATA Classifi- cation Accuracy*	THREE PERCENT DATA ERROR Independent Variable	DATA ERROR Classifi- cation Accuracy*
1st	# 5 NEED	85%	# 1 CHARACTER	81%
2nd	# 4 EXPERIENCE	76%	# 6 ACADEMICS	85%
3rd	# 6 ACADEMICS	87%	# 5 NEED	90%
4th	# 1 CHARACTER	90%	#10 OBLIGATION	84%
5th	#10 OBLIGATION	89%	#14 EMPLOYEE	84%
6th	#14 EMPLOYEE	90%	#13 SUPERVISED	87%
7th	#13 SUPERVISED	89%	#12 REPORTS	87%
8th	#11 FACILITY	89%	#11 FACILITY	87%
9th	# 3 FRINGES	90%	# 4 EXPERIENCE	85%
10th	# 2 WITHHOLD	89%	# 3 FRINGES	87%
11th	# 7 MINIMAL	89%	# 2 WITHHOLD	87%
12th	#12 REPORTS	89%	# 8 EARN LESS	84%
13th	# 8 EARN LESS	89%	# 7 MINIMAL	84%
14th	# 9 HOURS	87%	# 9 HOURS	82%

\* Determined by the Lachenbruch U classification procedure on cumulative models (i.e., Model 1 = NEED, Model 2 = NEED and EXPERIENCE, Model 3 = NEED, EXPERIENCE, and ACADEMICS, etc.)

models changed considerably. This volatility was not unexpected based on the relatively low multivariate F-statistics of these variables (see Appendix C). However, in Models 3 through 12 all but one of the variables was identical for the original and error models.

In Exhibit 5-8 the classification accuracy of each of the models using both the original and the three percent data error data is shown. Selection of the "best" model based on the three percent data error classification accuracy is not meaningful. However, the classification accuracy of the three percent error models was relatively high. Model 3 classified as well as the previously identified "best" model (4-variable "correct" model) with a classification accuracy of 90 percent.

#### Costs of Misclassification

Pinches [1980] states that the misclassification costs are less important if the ratio of the costs is known. Pinches suggests that the prior probabilities for the research sample might be modified to capture the misclassification costs activity.

In this study, it is assumed that the composition of the research sample reflects the population and that the sample proportions are accurate population estimates for prior probabilities [Eisenbeis, 1977, p. 890 and Pinches, 1980]. The prior probabilities for the research sample were

20 percent and 80 percent for the taxpayer and the government, respectively. Using these prior probabilities, the cutting score for the 4-variable "best" model is,

$$Z_{CU} = (.20)(-.421) + (.80)(1.781) = 1.341. \\ \text{=====}$$

As a test of the sensitivity of the 4-variable model to the costs of misclassification, the prior probabilities of the two groups were adjusted until fifteen out of seventeen of the taxpayers decisions were correctly classified. The prior probabilities required to accomplish this result were 62 percent for the taxpayer and 38 percent of the government. Based on these prior probabilities the cutting score would be,

$$Z_{CU} = (.56)(-.421) + (.44)(1.781) = .5479. \\ \text{=====}$$

The revised cutting score is between Olick and Utech resulting in the correct classification of all but two of the cases decided in favor of the taxpayer (see Exhibit 5-6). Based on these prior probabilities, the ratio of the costs of misclassification can be determined by the change in the priors. The taxpayer prior probabilities increased to 280 percent of their original amount (from 20 percent to 56 percent) and the government priors decreased to 55 percent of their original amount (from 80 percent to 44 percent).

The ratio of 280 to 55 percent is approximately equal to five.

Eight cases decided in favor of the taxpayer were misclassified when the misclassification cost ratio was equal to zero. All cases except Abrams and Broniwitz decided in favor of the taxpayer would have been classified correctly with a misclassification cost ratio equal to five. A ratio of five implies that the relative costs of modeling would have to be substantially increased (i.e., five times more important) for the model to do a better job of classification.

#### Summary

This chapter presented the results of the empirical study. The models presented included a univariate analysis of the frequencies of each coding attribute for each variable in the study and a linear multivariate analysis of the 14-variable model and twelve reduced models determined by the forward stepwise procedure. From these models, the "best" model was identified as the 4-variable model based on the classification accuracy of 90 percent. This chapter also presented the results of various sensitivity analyses. Among these were tests of stability over time and between regular Tax Court and Tax Court Memorandum decisions, tests to identify Tax Court judges, and tests of sensitivity to measurement errors and to costs of misclassification.

Notes

1 Unstandardized coefficients are used since the original discriminating variables are not in standard form (Z scores).

2 \*  
A Z of 4.449 is significant at an  $\alpha$  level of .00003.

3 If the second two random digits were 98 or 99, the entire 5-digit random number was eliminated from the analysis and a replacement was selected.

4 To correctly classify the Abrams and Broniwitz cases, the prior probability for a decision in favor of the taxpayer would be in excess of 100 percent.

## CHAPTER 6

### CONCLUSION

#### Review of the Chapters

The purpose of this research was to empirically examine the criteria used by the judiciary when the court determines if scholarship and fellowship grants are excludable from income for income tax purposes. After isolating the peripheral issues, a description of the major factors for excluding scholarships and fellowship grants from income was developed. Discriminant analysis was used to evaluate the descriptive criteria that were applied to the litigated cases to distinguish between cases when the scholarship or fellowship grant exclusion was ruled to be correct for tax purposes, and when the exclusion was ruled to be incorrect for tax purposes.

Chapter 1 contained a statement of the purpose and stated the following null hypothesis for the study:

H : The independent variables in the "best"  
0 model are no more effective than random estimates (based on chance) in discriminating between court-determined taxability or nontaxability of scholarships or fellowship grants.

Chapter 2 discussed the historical development of Code section 117 and the major cases in the scholarship and fellowship grant area. The major issues regarding scholarship and fellowship grant exclusion were presented. In the final section of Chapter 2, the independent variables used in the study were discussed.

Chapter 3 described previous tax research that applied discriminant analysis to statistically determine the variables in the case fact patterns that determined case outcome. Discussed were the various analyses by Bond [1977], Oatsvall [1978], Taylor [1978], Madeo [1979], Whittington and Whittenburg [1980], Lett [1981], Pollard [1981], and Burns and Groomer [1983].

Chapter 4 adapted the discriminant analysis model to the determination of the variables relating to the scholarship and fellowship grant issue. Among the topics discussed in Chapter 4 were the proposed research design, the research sample, the dependent variable, identification and measurement of the independent variables, and statistical procedures and sensitivity analyses to be performed in the study.

Chapter 5 presented the results of the study. Both univariate and multivariate analyses of the variables were presented. The "best" overall model was identified as the 4-variable linear discriminant model that attained a

Lachenbruch U classification accuracy of 90 percent. Chapter 5 also presented the cases misclassified by each of the models tested, the test of the null hypothesis, and the results of structural and data sensitivity analyses.

#### Summary of the Substantive Issues

The two substantive issues discussed in this dissertation are the (1) identification of the major factors used by the courts in determining scholarship and fellowship grant exclusions and (2) development and testing of the "best" model for differentiating between cases when the scholarship or fellowship grant exclusion was ruled to be correct from cases when the exclusion was ruled to be incorrect. These two issues are summarized in the sections below.

#### Identification of the Major Factors

The complexities of the major issues in the scholarship and fellowship grant area are presented in Chapter 2. Fourteen major factors were extracted from the court determinations. These variables were statistically analyzed in light of the litigated cases to distinguish between those cases when the scholarship or fellowship was included or excluded from income. The fourteen factors are listed below.



1. CHARACTER - Did the grantor characterize the monies as a grant?
2. WITHHOLD - Did the grantee receive the grant without the taxes being withheld?
3. FRINGES - Did the grantee forego fringe benefits available from the grantor?
4. EXPERIENCE - Did the grant remain constant with the experience of the grantee?
5. NEED - Did the grantee receive the grant because of need?
6. ACADEMICS - Did the grantee receive the grant because of academic achievement?
7. MINIMAL - Did the grantee receive a minimal amount of money?
8. EARN LESS - Did the grantee receive less money than he could have otherwise earned?
9. HOURS - Did the grantee receive the grant monies regardless of the number of hours doing grant-related work?
10. OBLIGATION - Did the grantee receive the grant without an obligation to become an employee of the grantor?
11. FACILITY - Did the grantee work at an educational institution?
12. REPORTS - Did the grantee receive the grant without the filing of progress reports?
13. SUPERVISED - Did the grantee work without the supervision or control of the grantor?

14. EMPLOYEE - Did the recipient serve in the capacity of a grantee and not as a substitute for an employee of the grantor?

The "Best" Model

The "best" model is identified as the model that achieves the highest percentage of correct classification with the least number of variables. Violation of the assumption of a multivariate normal distribution (see Chapter 4) precludes the development of an optimal model. However, the development of an optimal model is not the objective of this research based on dichotomous independent variables. The "best" overall model in this study was identified as the 4-variable linear discriminant model that attained a Lachenbruch U classification accuracy of 90 percent. A description of the variables in the 4-variable model listed in order of importance based on F-statistic values (see Appendix C) is as follows:

5. NEED - The grantee received the grant because of need.
6. ACADEMICS - The grantee received the grant because of academic achievement.
1. CHARACTER - The grantee characterized the monies as a grant.
4. EXPERIENCE - The grant remained constant with the experience of the grantee.

The NEED factor was mentioned in all of the cases in the research sample. The importance of this factor is evident in the four cases in the sample when the grant was based on need. In each of the cases the taxpayer received a favorable decision from the Tax Court. The evidence shows that a grant awarded based on need rather than merit strengthens the case for the taxpayer.

In the 85 sample cases when the grant was not based on need, the taxpayer increased his probability of receiving an unfavorable ruling. The probability of losing the case increased from 80 percent to 89 percent.

The ACADEMICS factor was also mentioned in all of the cases in the sample. This factor is closely associated with grants based on need. A grant awarded as a result of academic achievement increases the taxpayers probability by 18 percent of receiving a favorable ruling from the Tax Court. In the 21 cases in the sample when the grant was awarded for academic achievement, the taxpayer received a favorable ruling in 38 percent of the cases.

In the 68 sample cases when the grant was not based on academic achievement, the taxpayer increased his probability of having the grant included in gross income. The probability of receiving an unfavorable ruling increased by seven percent to 87 percent.

The CHARACTER factor was mentioned in 95.5 percent of the cases in the sample. As stated in Chapter 2, this

factor is considered "highly influential" in Tax Court determinations. In the 40 cases in the sample when the grantor characterized the monies as a grant, the taxpayer received a favorable ruling in 35 percent of the cases. This is an increase of 15 percent over the prior probability of receiving of favorable ruling of 20 percent.

In the 45 sample cases when the monies were not characterized as a grant, the taxpayer increased his probability of receiving an unfavorable ruling by 16 percent. The probability of losing the case increased from 80 percent to 96 percent.

The EXPERIENCE factor was mentioned in 88.8 percent of the cases in the sample. A grant remaining constant with the experience of the grantee increases the taxpayers probability by 27 percent of receiving a favorable ruling from the Tax Court. In the 15 cases in the sample when the grant remained constant with experience, the taxpayer received a favorable ruling in 47 percent of the cases.

In the 64 sample cases when the grant did not remain constant with the experience of the grantee, the taxpayer increased his probability of having the grant included in gross income. The probability of receiving an unfavorable ruling increased by nine percent to 89 percent.

### The Discriminant Function

The discriminant function for the "best" (4-variable) model is as follows:

$$Z = 2.498 + 1.973 \text{ NEED} + .641 \text{ EXPERIENCE} \\ + .606 \text{ ACADEMICS} + .516 \text{ CHARACTER}$$

The assumption of a multivariate normal distribution is often violated in business research that uses dichotomous variables. The violation of this assumption precludes the use of tests (i.e., t and F tests) to determine the statistical significance of the individual coefficients. However, the determination of the statistical significance of the individual coefficients is not an objective of this research.

The group centroids for the taxpayer and the government groups are 1.781 and -.421, respectively. The cutting score [Hair, et al., 1979, p. 107] is 1.341. Chapter 5 presents an example of how the 4-variable discriminant function and the cutting score were used to classify cases in the research sample.

### Test of the Null Hypothesis

The "best" (4-variable) model was used to test the null hypothesis of this study to determine if the results of the "best" model were statistically significant relative to the results expected by chance. The test statistic, the

binomial test for the significance of a proportion [Cangelosi, Taylor, and Rice, 1976, p. 112], resulted in a value of  $Z = 4.449$ . The proportion of cases in the sample correctly classified by chance was estimated by the proportional chance criterion [Pinches, 1980]. The null hypothesis was tested at an  $\alpha$  level of five percent. Accordingly,  $Z_{(1-\alpha)} = 1.645$ . Therefore, since  $Z > Z_{(1-\alpha)}$  (i.e.,  $4.449 > 1.645$ ), the null hypothesis was rejected.

### Sensitivity Analyses

Sensitivity analyses were performed to evaluate the stability of the model parameters. The areas of investigation were structural and data sensitivity.

Structural sensitivity. Structural sensitivity analyses were conducted by performing (1) tests of stability over time and (2) a test of stability between regular Tax Court and Tax Court Memorandum decisions. Additionally, the Tax Court judges for the cases in the research sample were identified.

To test the stability of the "best" (4-variable) model over time, the research sample was divided as follows:

Group I: 70 cases tried on or after January 1, 1970.

Group II: 19 cases tried before January 1, 1970.

The discriminant function with the reestimated coefficients derived from the cases in Group I was used to classify

Group II. The results indicate the "best" (4-variable) model is stable over time.

To test the stability of the "best" (4-variable) model between regular Tax Court and Tax Court Memorandum decisions, the research sample was divided as follows:

Group I: 48 cases with Tax Court Memorandum decisions.

Group II: 41 cases with regular Tax Court decisions.

The discriminant function with the reestimated coefficients derived from the Tax Court Memorandum cases in Group I was used to classify Group II. The results of this analysis indicate that the "best" (4-variable) model is stable between the two types of Tax Court decisions.

The Tax Court judges of the cases in the research sample were identified to determine if any correlation was present between the judges and misclassified cases. There did not appear to be any correlation between the judges and the misclassified cases.

Data sensitivity. Data sensitivity analyses were conducted by performing tests of sensitivity to (1) measurement errors and (2) misclassification costs.

To test the sensitivity of measurement errors, a three percent error rate was randomly introduced into the data. The linear multivariate analyses were reconducted using the "error" data. The classification accuracy of the three percent "error" models was found to be relatively high with

Model 3 classifying as well as the overall "best" model (4-variable "correct" model) with a classification accuracy of 90 percent.

To test the sensitivity to the costs of misclassification, the prior probabilities of the two groups were adjusted to incorporate the misclassification costs activity [Pinches, 1980]. With the misclassification costs ratio equal to zero, eight cases decided in favor of the taxpayer were misclassified. All cases except Abrams and Broniwitz decided in favor of the taxpayer would have been correctly classified with a misclassification costs ratio equal to five.

#### Implications of the Study

The area of scholarship and fellowship grant exclusions has been identified by the Comptroller General of the United States as a major source of controversy between taxpayers and the Internal Revenue Service. The findings of this study should have implications for (1) taxpayers, (2) tax practitioners, (3) courts and judges, and (4) Congress and the Treasury Department.

The research presented in this study should be used to complement other research in this area of taxation. The use of macro-case analysis is not a substitute for traditional legal research methodology [see Misiewicz, 1977]. However,



the use of macro-case analysis has the following advantages compared to traditional legal research. The incorporation of objectively determinable factors reduces the subjectivity present in traditional legal research. Replication of the findings is possible. Future developments can be included in the model by adding cases to the research sample or by testing the model on subsequent cases.

All the information included in this study, in addition to the information regarding the "best" 4-variable model, should be analyzed by the users of this research. For example, Exhibit 5-5 presents the classification accuracy of the thirteen models tested. The 3-variable model classified correctly 87 percent of the cases. This is three percent less than the classification accuracy of 90 percent for the 4-variable model. The factors in the 3-variable were NEED, EXPERIENCE, and ACADEMICS. The factor CHARACTER was added in the 4-variable model. The taxpayer should use this information in assessing the particular fact pattern present and the decision regarding litigation.

#### For Taxpayers

Taxpayers assessing the possible exclusion of a scholarship or fellowship should compare their particular fact pattern with the models tested in this study. While cases will continue to be tried on a "case-by-case" basis, the isolation of relevant factors and the determination of

the relative importance of these factors should assist taxpayers.

#### For Tax Practitioners

Tax practitioners should use this study as an alternate way to organize and analyze information on the scholarship and fellowship issue. For tax planning purposes, the identification of factors and the relative importance of the discriminating power of the factors should be especially useful.

#### For Courts and Judges

The consistency in the treatment of similar fact situations is desirable. The courts and judges should find this study useful since consistency is not always achieved. By identifying similarities in fact patterns and determining the discriminatory importance of the similarities, this study should provide a frame of reference on the scholarship and fellowship issue.

#### For Congress and the Treasury Department

Adequate regulations were not found when attempting to isolate and identify the important factors. This study should be beneficial to the writers of the Code and regulations. The study (1) highlights the need for clarification of the criteria used to determine the excludability of scholarships and fellowship grants, (2)

provides the identification of common factors in litigated cases, and (3) statistically analyzes these factors to determine the relative importance of their discriminating ability.

#### Scope and Limitations

In this study, fourteen independent variables were isolated. These fourteen variables were not intended to be exhaustive. Other researchers might identify different or additional variables.

The sample in this research study consisted of 89 Tax Court cases that were brought to trial from February 26, 1959 through May 25, 1983. The results of this study apply only to this sample and time period. The research was designed to describe historical events. Further generalization or use of the models for predictive purposes should be done with extreme care.

#### Suggestions for Future Research

This study analyzed the complexities of Code section 117 and presented an outline for examining the taxability of scholarships and fellowship grants. From this general overview, the issue was investigated in detail. Detailed investigations could be conducted on other issues in Federal taxation.

This study incorporated fourteen independent variables. Additional variables could be identified and applied to the cases under study.

Cases decided subsequent to this research could be classified using the "best" model to determine if there have been changes in judicial decision patterns in the Tax Court.

Appendix A  
Tax Court Cases in the Research Sample

No. of Case	Name of Case*	Citation	Year of Decision	Decision**
<u>Tax Court (Regular) Decisions</u>				
1	Max Isenbergh	24 TC 370	1959	T
2	Frank T. Bachmura	32 TC 1117	1959	G
3	Ethel M. Bonn	34 TC 64	1960	G
4	Aileene Evans	34 TC 720	1960	T
5	Chander P. Bhalla	35 TC 13	1960	T
6	William Wells	40 TC 40	1963	T
7	Clarence Peiss	40 TC 78	1963	T
8	Alex L. Sweet	40 TC 403	1963	G
9	Howard Littman	42 TC 503	1964	G
10	Elmer L. Reese	45 TC 407	1966	G
11	Stephen L. Zolnay	49 TC 389	1968	G
12	Edward A. Jamieson	51 TC 635	1969	G
13	Aloysius J. Proskey	51 TC 918	1969	G
14	John E. MacDonald	52 TC 386	1969	G
15	Marjorie E. Haley	54 TC 642	1970	G
16	Jerry S. Turem	54 TC 1494	1970	G
17	Irwin S. Anderson	54 TC 1547	1970	G
18	Lowell D. Ward	55 TC 308	1970	G
19	Harvey P. Utech	55 TC 434	1970	G

## Appendix A -- Continued

No. of Case	Name of Case*	Citation	Year of Decision	Decision**
20	Frederick Fisher	56 TC 1201	1971	G
21	Robert H. Steiman	56 TC 1350	1971	T
22	Robert W. Willie	57 TC 383	1971	G
23	Thomas P. Phillips	57 TC 420	1971	T
24	Jacob T. Moll	57 TC 579	1972	G
25	Leonard T. Fielding	57 TC 761	1972	G
26	Lawrence A. Ehrhart	57 TC 872	1972	G
27	Louis C. Vaccaro	58 TC 721	1972	T
28	Robert W. Carroll	60 TC 96	1973	G
29	Frederick Bieberdorf	60 TC 114	1973	T
30	Michael A. Smith	60 TC 279	1973	G
31	George L. Bailey	60 TC 447	1973	T
32	Geral W. Dietz	62 TC 578	1974	G
33	Sheldon A. Rosenthal	63 TC 454	1975	G
34	Melvin H. Weiner	64 TC 294	1975	T
35	Steven M. Weinberg	64 TC 771	1975	G
36	Merrill L. Meehan	66 TC 794	1976	G
37	David M. Brubakken	67 TC 249	1976	G
38	John E. Adams	71 TC 477	1978	G
39	Max D. Olick	73 TC 479	1979	T
40	Amos Rapoport	74 TC 98	1980	G
41	Melvin A. Yalott	78 TC 585	1982	G

## Appendix A -- Continued

No. of Case	Name of Case*	Citation	Year of Decision	Decision**
<u>Tax Court Memorandum Decisions</u>				
42	Lawrence Spruch	20 TCM 324	1961	T
43	Donald R. DiBona	27 TCM 1055	1968	G
44	Laurence Broniwitz	27 TCM 1088	1968	T
45	Jonathan M. Kagan	28 TCM 617	1969	G
46	Majorie Schwartz	28 TCM 762	1969	G
47	Larry L. Kreis	29 TCM 770	1970	G
48	Arthur Calick	31 TCM 69	1972	G
49	Robert H. Kyle	31 TCM 327	1972	G
50	James G. Harper	31 TCM 424	1972	G
51	Robert Worthington	31 TCM 447	1972	G
52	Eugene W. Helms	31 TCM 442	1972	G
53	H. Norman Brown	31 TCM 457	1972	G
54	Charles F. Wall	31 TCM 1069	1972	G
55	Richard F. Bergeron	31 TCM 1226	1972	G
56	Enrique Kaufman	32 TCM 525	1973	G
57	James M. Jaeger	32 TCM 732	1973	G
58	Frank C. Gibb	32 TCM 784	1973	G
59	Michael J. Larsen	32 TCM 1118	1973	G
60	Dennis D. Brenneise	33 TCM 1	1974	G
61	Allen J. Workman	33 TCM 16	1974	G
62	George M. Joy	33 TCM 632	1974	G

## Appendix A -- Continued

No. of Case	Name of Case*	Citation	Year of Decision	Decision**
63	Robert Abrams	33 TCM 722	1974	T
64	George A. Fisher	33 TCM 771	1974	G
65	T. Craig Ferrill	34 TCM 773	1975	G
66	Nicholas V. Findler	35 TCM 1602	1976	G
67	Fred D. Haygood	36 TCM 321	1977	G
68	Bruce I. Turner	37 TCM 722	1978	G
69	Richard Bogdan	37 TCM 1127	1978	G
70	William Q. Wolfson	37 TCM 1847	1978	G
71	Harjit S. Bharmota	38 TCM 112	1979	G
72	David G. Hof	38 TCM 221	1979	G
73	Rolf F. Ulvestad	38 TCM 238	1979	G
74	Mark T. Hanson	38 TCM 504	1979	G
75	Phillip E. Koch	38 TCM 650	1979	G
76	William R. Fulton	38 TCM 1046	1979	G
77	Henry R. Herrera	38 TCM 1354	1979	G
78	Charles McKenna	39 TCM 135	1979	G
79	Peter C. Chen	39 TCM 273	1979	T
80	Henry E. Nino	40 TCM 470	1980	G
81	Robert P. Russell	40 TCM 564	1980	G
82	William Sellingsloh	40 TCM 1293	1980	G
83	C. David Hamsher	41 TCM 1160	1981	G
84	Kenneth T. Lange	41 TCM 1421	1981	T



## Appendix A -- Concluded

No. of Case	Name of Case*	Citation	Year of Decision	Decision**
85	John S. D'Aconti	42 TCM 369	1981	G
86	Joseph M. Saber	42 TCM 945	1981	G
87	Neil M. Flynn	42 TCM 1179	1981	G
88	Kelly L. Sorensen	44 TCM 1055	1982	G
89	Antoinette S. Gomes	46 TCM 239	1983	G

\* Only the first petitioner's name has been listed in those cases with joint petitioners.

\*\* The letter "T" indicates that the decision was in favor of the taxpayer.

The letter "G" indicates that the decision was in favor of the government.

Appendix B  
Coding Sheets

CASE \_\_\_\_\_

CODEDEPENDENT VARIABLE

\_\_\_\_\_ 1. DECISION OF THE COURT

The court determined that the taxpayer's excluded scholarship or fellowship grant was nontaxable.

(DECIDED IN FAVOR OF THE TAXPAYER).....Enter +1

The court determined that the taxpayer's excluded scholarship or fellowship grant was taxable.

(DECIDED IN FAVOR OF THE GOVERNMENT).....Enter -1

INDEPENDENT VARIABLES

\_\_\_\_\_ 1. Were the monies characterized as a grant by the grantor?

NO, evidence of this factor is MISSING...Enter 0

YES, evidence of this factor is PRESENT --

DID THE GRANTOR CHARACTERIZE THE MONIES AS A GRANT?

YES.....Enter +1

NO.....Enter -1

## Appendix B -- Continued

Code

- \_\_\_\_\_ 2. Was the grant subject to withholding of taxes?
- NO, evidence of this factor is MISSING...Enter 0
- YES, evidence of this factor is PRESENT --
- DID THE GRANTEE RECEIVE THE GRANT WITHOUT THE TAXES BEING WITHHELD?
- YES.....Enter +1
- NO.....Enter -1
- 
- \_\_\_\_\_ 3. Was the grantee eligible for fringe benefits paid by the grantor?
- NO, evidence of this factor is MISSING...Enter 0
- YES, evidence of this factor is PRESENT --
- DID THE GRANTEE FOREGO FRINGE BENEFITS AVAILABLE FROM THE GRANTOR?
- YES.....Enter +1
- NO.....Enter -1
- 
- \_\_\_\_\_ 4. Was the grant amount increased with the experience of the grantee?
- NO, evidence of this factor is MISSING...Enter 0
- YES, evidence of this factor is PRESENT --
- DID THE GRANT REMAIN CONSTANT WITH THE EXPERIENCE OF THE GRANTEE?
- YES.....Enter +1
- NO.....Enter -1

## Appendix B -- Continued

Code

- \_\_\_\_\_ 5. Was the grant based on the need of the grantee?  
 NO, evidence of this factor is MISSING...Enter 0  
 YES, evidence of this factor is PRESENT --  
 DID THE GRANTEE RECEIVE THE GRANT BECAUSE OF NEED?  
 YES.....Enter +1  
 NO.....Enter -1
- \_\_\_\_\_ 6. Was the grant based on academic achievement?  
 NO, evidence of this factor is MISSING...Enter 0  
 YES, evidence of this factor is PRESENT --  
 DID THE GRANTEE RECEIVE THE GRANT BECAUSE OF ACADEMIC ACHIEVEMENT?  
 YES.....Enter +1  
 NO.....Enter -1
- \_\_\_\_\_ 7. How much was the amount of the grant?  
 NO, evidence of this factor is MISSING...Enter 0  
 YES, evidence of this factor is PRESENT --  
 DID THE GRANTEE RECEIVE A MINIMAL AMOUNT OF MONEY?  
 YES.....Enter +1  
 NO.....Enter -1

## Appendix B -- Continued

Code

- \_\_\_\_\_ 8. Was the grant less than what the grantee could otherwise have earned?
- NO, evidence of this factor is MISSING...Enter 0
- YES, evidence of this factor is PRESENT --
- DID THE GRANTEE RECEIVE LESS MONEY THAN HE COULD HAVE OTHERWISE EARNED?
- YES.....Enter +1
- NO.....Enter -1
- \_\_\_\_\_ 9. Was the grant computed on an hourly basis?
- NO, evidence of this factor is MISSING...Enter 0
- YES, evidence of this factor is PRESENT --
- DID THE GRANTEE RECEIVE THE GRANT MONIES REGARDLESS OF THE NUMBER OF HOURS DOING GRANT-RELATED WORK?
- YES.....Enter +1
- NO.....Enter -1
- \_\_\_\_\_ 10. Was the grant dependent on future services to be provided by the grantee for the grantor?
- NO, evidence of this factor is MISSING...Enter 0
- YES, evidence of this factor is PRESENT --
- DID THE GRANTEE RECEIVE THE GRANT WITHOUT AN OBLIGATION TO BECOME AN EMPLOYEE OF THE GRANTOR?
- YES.....Enter +1
- NO.....Enter -1

## Appendix B -- Continued

Code

- \_\_\_\_\_ 11. What was the type of facility funding the grant?
- NO, evidence of this factor is MISSING...Enter 0
- YES, evidence of this factor is PRESENT --
- DID THE GRANTEE WORK AT AN EDUCATIONAL INSTITUTION?
- YES.....Enter +1
- NO.....Enter -1
- 
- \_\_\_\_\_ 12. Was the grantee required to prepare progress reports?
- NO, evidence of this factor is MISSING...Enter 0
- YES, evidence of this factor is PRESENT --
- DID THE GRANTEE RECEIVE THE GRANT WITHOUT THE FILING OF PROGRESS REPORTS?
- YES.....Enter +1
- NO.....Enter -1
- 
- \_\_\_\_\_ 13. Was the grantee supervised by the grantor?
- NO, evidence of this factor is MISSING...Enter 0
- YES, evidence of this factor is PRESENT --
- DID THE GRANTEE WORK WITHOUT THE SUPERVISION OR CONTROL OF THE GRANTOR?
- YES.....Enter +1
- NO.....Enter -1

## Appendix B -- Concluded

Code

\_\_\_\_14. Was the grantee a substitute for a regular employee of the grantor?

NO, evidence of this factor is MISSING...Enter 0

YES, evidence of this factor is PRESENT --

DID THE RECIPIENT SERVE IN THE  
CAPACITY OF A GRANTEE AND NOT AS  
A SUBSTITUTE FOR AN EMPLOYEE OF  
THE GRANTOR?

YES.....Enter +1

NO.....Enter -1

Appendix C  
Multivariate F-Statistics for Classification Models

Independent Variable	Model 14	Model 13	Model 12	Model 11	Model 10	Model 9	Model 8	Model 7	Model 6	Model 5	Model 4	Model 3	Model 2
1 CHARACTER	10.813	10.931	10.989	11.141	11.180	8.767	10.239	10.670	9.462	9.911	8.236		
2 WITHHOLD	2.357	2.393	2.400	2.329	2.573								
3 FRINGES	2.113	2.158	2.143	2.683	2.641	.884							
4 EXPERIENCE	3.126	3.264	3.241	3.526	3.228	3.189	2.850	2.249	1.831	5.357	7.901	14.865	14.868
5 NEED	21.043	21.329	22.119	22.138	22.312	21.002	24.619	25.811	24.505	24.169	24.522	26.459	24.552
6 ACADEMICS	5.605	5.856	6.424	6.253	6.248	7.656	8.039	9.097	10.409	11.510	9.822	8.352	
7 MINIMAL	.174	.170	.486	.458									
8 EARN LESS	.074	.079											
9 HOURS	.028												
10 OBLIGATION	2.430	2.500	2.936	2.728	2.341	2.346	2.435	3.369	4.951	3.379			
11 FACILITY	1.275	1.301	1.554	1.627	1.454	1.264	1.169						
12 REPORTS	.256	.256	.235										
13 SUPERVISED	2.102	2.102	2.155	2.184	1.904	2.186	2.470	1.977					
14 EMPLOYEE	3.203	3.271	3.235	3.073	3.061	2.961	3.289	3.994	2.388				



## BIBLIOGRAPHY

Books and Periodicals

- Burns, Jane O. and S. Michael Groomer (1983), "An Analysis of Tax Court Decisions That Assess the Profit Motive of Farming-Oriented Operations," The Journal of the American Taxation Association (Fall 1983), pp. 23-39.
- Cangelosi, Vincent E., Phillip H. Taylor and Philip F. Rice (1976), Basic Statistics: A Real World Approach (West Publishing Co., 1976).
- Chan, Linda S., June A. Gilman and Olive J. Dunn (1976), "Alternative Approaches to Missing Values in Discriminant Analysis," Journal of the American Statistical Association (December 1976), pp. 842-44.
- Cochran, William G. (1964), "On the Performance of the Linear Discriminant Function," Technometrics (May, 1964), pp. 179-80.
- Cooley, Phillip L. (1975), "Bayesian and Cost Considerations for Optimal Classification with Discriminant Analysis," The Journal of Risk and Insurance (June 1975), pp. 277-87.
- Cooley, William W. and Paul R. Lohnes (1971), Multivariate Data Analysis (John Wiley & Sons, Inc., 1971).
- Copeland, Ronald M., Ronald L. Taylor and Shari H. Brown (1981), "Observation Error and Bias in Accounting Research," Journal of Accounting Research (Spring 1981), pp. 197-207.
- Dixon, Wilfrid J. and M.B. Brown (Eds.) (1979), BMDP-79, Biomedical Computer Programs, P-Series (University of California Press, 1979).
- Eisenbeis, Robert A. (1977), "Pitfalls in the Application of Discriminant Analysis in Business, Finance, and Economics," The Journal of Finance (June 1977), pp. 875-900.

- Eisenbeis, Robert A. and Robert B. Avery (1973), "Two Aspects of Investigating Group Differences in Linear Discriminant Analysis," Decision Sciences (October 1973), pp. 487-93.
- Eisenbeis, Robert A., Gary G. Gilbert and Robert B. Avery (1973), "Investigating the Relative Importance of Individual Variables and Variable Subsets in Discriminant Analysis," Communications in Statistics (September 1973), pp. 205-19.
- Gilbert, Ethel S. (1968), "On Discrimination Using Qualitative Variables," Journal of the American Statistical Association (December 1968), pp. 1399-1412.
- Gilbert, Ethel S. (1969), "The Effect of Unequal Variance-Covariance Matrices on Fisher's Linear Discriminant Function," Biometrics (September 1969), pp. 505-15.
- Hair, Joseph F., Ralph E. Anderson, Ronald L. Tatham and Bernie J. Grablowsky (1979), Multivariate Data Analysis (Petroleum Publishing Co., 1979).
- Hoffman, William H. and Eugene Willis (1984), West's Federal Taxation: Individual Income Taxes (West Publishing Co., 1984).
- Hull, C. Hadlai and Norma H. Nie (1979), SPSS UPDATE: News Procedures and Facilities for Releases 7 and 8 (McGraw-Hill, Inc., 1979).
- Jackson, E. (1968), "Missing Values in Linear Multiple Discriminant Analysis," Biometrics (December 1968), pp. 835-44.
- Krzanowski, W.J. (1975), "Discrimination and Classification Using Both Binary and Continuous Variables," Journal of the American Statistical Association (December 1975), pp. 782-90.
- Lachenbruch, Peter A. (1967), "An Almost Unbiased Method of Obtaining Confidence Intervals for the Probability of Misclassification in Discriminant Analysis," Biometrics (December 1967), pp. 639-45.
- Lachenbruch, Peter A. (1975), Discriminant Analysis (Hafner Press, 1975).
- Lachenbruch, Peter A. and M. Ray Mickey (1968), "Estimation of Error Rates in Discriminant Analysis," Technometrics (February 1968), pp. 1-11.

- Lapin, Lawrence L. (1973), Statistics for Modern Business Decisions (Harcourt Brace Jovanovich, Inc., 1973).
- Madeo, Silvia A. (1979), "An Empirical Analysis of Tax Court Decisions in Accumulated Earnings Cases," The Accounting Review (July 1979), pp. 538-53.
- Misiewicz, Kevin M. (1977), "A Macro-Case Analysis Approach to Tax Research," The Accounting Review (October 1977), pp. 935-938.
- Mylan, John J. (1980), "Current Tax Treatment of Educational Costs," University of Florida Law Review (Spring 1980), pp. 413-17.
- Nie, Norma H., C. Hadlai Hull, Jean G. Steinbrenner and Dale H. Bent (1975), SPSS: Statistical Packages for the Social Sciences, 2nd Ed. (McGraw-Hill, Inc., 1975).
- Pinches, George E. (1980), "Factors Influencing Classification Results from Multiple Discriminant Analysis," Journal of Business Research (December 1980), pp. 429-56.
- Raabe, William and Eugene Willis (1977), "Requirements for Exclusion of Fellowship Grants," Taxes (March 1977), pp. 190-94.
- Siegel, Sidney (1956), Nonparametric Statistics (McGraw-Hill, Inc., 1956).
- Strong, James R. (1981), "Medical Residents and Section 117 - Time for a Closer Examination," Saint Louis University Law Journal (March 1981), pp. 117-60.
- Stuart, William W. (1976), "Tax Status of Scholarship and Fellowship Grants: Frustration of Legislative Purpose and Approaches to Obtain the Exclusion Granted by Congress," Emory Law Journal (Spring 1976), pp. 357-92.
- Tipgos, Manuel A. (1979), "The Taxability of Scholarships and Fellowships: Revisited," Taxes (August 1979), pp. 538-46.
- Whittington, Ray and Gerald Whittenburg (1980), "Judicial Classification of Debt Versus Equity -- An Empirical Study," The Accounting Review (July 1980), pp. 409-18.

Government Publications

U.S. Congress, House (1954), H.R. REP. NO. 1337, 83d Cong., 2d Sess. (1954).

U.S. Congress, Senate (1954), S. REP. NO. 1662, 83d Cong., 2d Sess. (1954).

Unpublished Materials

Bond, James G. (1977), "An Empirical Investigation of Court-Determined Debt-Equity Attributes for Federal Income Tax Purposes," unpublished Ph.D. dissertation (University of South Carolina, 1977).

Lett, Samuel L. (1981), "An Empirical Investigation of Trade or Business Attributes of Quasi-Business Ventures Under the Internal Revenue Code," unpublished Ph.D. dissertation (University of South Carolina, 1981).

Oatsvall, Rebecca J. (1978), "Capital Gain / Ordinary Income Treatment of Real Estate Sales," unpublished Ph.D. dissertation (University of South Carolina, 1978).

Pollard, William B. (1981), "An Empirical Model of Judicial Interpretations of Internal Revenue Code Section 162(A)(2): The Location of a Tax Home," unpublished Ph.D. dissertation (University of South Carolina, 1981).

Taylor, Ronald L. (1978), "Defining Capital Gains in Real Estate Transactions by Applying Discriminant Analysis to Definitional Elements," unpublished Ph.D. dissertation (University of Tennessee, 1978).