

AN INVESTIGATION OF THE EFFECTS OF COMPLEXITY IN FEDERAL
INCOME TAX LAWS ON THE COMPLIANCE OF NONRESIDENT STUDENTS

by

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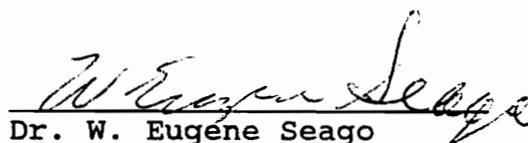
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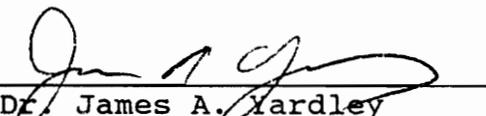
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(ABSTRACT)

This research explores the impact of complexity in federal income tax laws on taxpayer compliance. The primary research question is: Is complexity in the tax law associated with noncompliance? The research is unique in that previous work has not yet demonstrated an a priori circumstance in which taxpayers do not comply with the law when compliance would be in their economic self-interest.

"Economic self-interest" is narrowly construed in this study, being defined as an individual's utility for saving tax dollars. "Complexity" is operationalized by the system of nonresident taxation. A situation is investigated wherein a set of taxpayers do not comply, when there is complexity in the tax law, even though compliance would reduce their tax liability. Examining compliance in this setting renders it unlikely that the confound opportunity to evade is related to observed noncompliance. The results indicate complexity is the key explanatory variable for noncompliance found in this study.

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When a project of this magnitude nears completion, it is difficult to acknowledge all those whose help has made it possible. There are faculty and staff, fellow students and colleagues, neighbors, friends and relatives who over the many years and miles have contributed in some way.

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To committee and family, and others too numerous to name, I offer my humble thanks knowing that this simple expression does not sufficiently convey my true gratitude.

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CHAPTER 1: INTRODUCTION

MOTIVATION/GENERAL

THE COMPLIANCE PROBLEM

Compliance with the law is an issue concerning not only academicians and behavioral scientists, but also policy makers and governmental and regulatory institutions. Smith and Kinsey [1987] state that research in tax compliance contributes to a better understanding of compliance with the contemporary "socio-legal" system in general. This stems from their view that tax laws represent a widely enforced type of "purposive" law.¹ They note that in a complex legal system, compliance is as problematic as noncompliance.

The Internal Revenue Service (IRS) acknowledges the difficulty in voluntarily complying with the tax law. They recently initiated a program called "Compliance 2000" aimed at preventing compliance problems before they happen [Cagle, 1992]. The new program places "more emphasis on (taxpayer) education". It is based on the notion that most taxpayers are honest and want to comply. However, as the IRS now suspects, the existing system may "make it too complicated to comply" with tax law.

¹"Purposive" laws are the complex administrative laws which delineate proper behavior desired to meet political or societal goals, and which regulate market relationships [Smith and Kinsey, 1987]. For further discussion see Bardach and Kagan, 1982; Nonet and Selznick, 1978; and Scholz, 1984.

Empirical knowledge of federal income tax law, compliance is lacking. Beck, Davis and Jung [1991] note that there is a need for "empirical and experimental" research efforts into tax law compliance. Roth, Scholz and Witte [1989] call for work to be done in unravelling the causes of noncompliance. Kidder and McEwan [1989] state that compliance studies should be given high priority in any program of research on taxpayer behavior.

There is a perception that noncompliance with federal income tax laws is high. At one IRS training school, an instructor was quoted as claiming that agents could find "errors in 99.9 percent of all tax returns if they wanted to" [Long, 1981, p. 205]. Recent statistics show a decrease in voluntary compliance [Fratanduono and Bucci, 1989]. The Government Accounting Office (GAO) testified that the tax gap (the difference between actual tax liability owed and that voluntarily paid) is over \$100 billion and growing [U.S. Senate Committee on Governmental Affairs, 1991]. The GAO further stated that the IRS may be losing its ability to promote voluntary compliance in this era of complex and changing tax law. Where there is difficulty in understanding the tax law, there will likely be incorrect payment of the tax.

Also, the IRS has been lax in providing proper compliance information to taxpayers. The GAO [1990]

concluded that the IRS needs to improve its taxpayer information service function. This conclusion is important in light of recent empirical research [Milliron and Toy, 1988] showing the strong positive relationship between information service and taxpayer compliance.²

COMPLEXITY AND COMPLIANCE

Recently, tax authorities have begun to see complexity as undesirable in the tax law.³ Then-IRS Commissioner Fred Goldberg said in a recent speech, "Our tax system is imposing a burden on individual and business taxpayers through uncertainty and complexity of the law." [Cleveland Plain Dealer, 1991]. Much noncompliance "results from laws that are too hard to understand and forms that are too hard to cope with."

Rep. Dan Rostenkowski, Chairman of the House Committee on Ways and Means, now supports reducing complexity in the code. He has noted [Committee on Ways and Means, 1990] that

²Milliron and Toy found that "Increasing IRS Information Services" was one of only four compliance features that had a positive rating in their survey (Table 4). Additionally, it had the highest Cronbach's consistency coefficient of any of the 17 features studied.

³The theme of the 1989 IRS Research Conference was analysis of the Tax Reform Act of 1986 impact on simplicity and fairness. The general opinion was that simplicity is not an important consideration [see Pecarich and Schwarz, 1989; and Steurle, 1989]. However, on July 3, 1991 the Tax Simplification Act of 1991 [H.R. 2777, S. 1394] was introduced by Rep. Rostenkowski and Sen. Bensten.

the Congress has "a responsibility to pursue meaningful tax simplification" to ease the burden of compliance on taxpayers and allow our voluntary system to remain viable. Tax practitioners concur. Sprohge and Hemingway [1991] state that simplification is one of the two key tax policy issues that Congress should address.

The chairman of the AICPA Subcommittee on Simplification, Jay Starkman, has opined, "The tax law is difficult to understand and comply with because of its complexity." [Starkman, 1990, p. 84]. He blames complexity for a plethora of tax system ills.

Carroll [1989] believes that complexity in tax law causes major problems. These run the gamut from anger and frustration ("...generates efforts to get around the requirements or get back at the IRS.") to economic confusion ("...complexity changes the perceived risks associated with noncompliance.") (p. 257).

Milliron [1985a; with Toy, 1988] favors simplification of our tax law. Roth, Scholz and Witte [1989, p.17] share this view by listing simplification as one of the "keys to improving taxpayer compliance". Lewis [1982, p. 191] noted that "incomprehensible tax literature" increases noncompliance.

Empirical research on complexity and compliance is needed. Beck, Davis and Jung [1991] state that empirical

research has "not kept pace" with econometric modeling of complexity's effects on taxpayer compliance. Milliron [1985b] recognizes that complexity is one of several interconnected variables influencing taxpayer compliance and its study is an integral part of research into taxpayer compliance. Roth, Scholz, and Witte [1989, p.80] agree that complexity is an important factor in studying taxpayer compliance. They state that complexity seems intuitively to offer some possible explanations for compliance but has "received little attention from researchers concerned with taxpayer compliance". Beck and Jung [1989b] see a lack of complexity research in the tax law context and note that complexity only recently has begun to receive the attention it deserves. Slemrod [1989, p.178] concludes his discussion of complexity, compliance and evasion by advising that he would be "misleading" if he suggested "that much is known about the relationship between complexity and noncompliance."

Koch and Karlinsky [1984] point out that reducing complexity is not a "cure-all for our tax system's problems". They believe the study of complexity is important as a "step in the right direction" which may have further ramifications. For example, they posited that a simpler law would be perceived as fairer. Indeed, this was born out in later research by Milliron [1985a] who found

that subjects viewed complexity and equity as incompatible constructs in a tax system.

THE COST OF COMPLEXITY

Adam Smith's fourth canon of taxation [1776] states in part, "Every tax ought to be so contrived as both to take out and keep out of the pockets of the people as little as possible over and above what it brings into the public treasury of the state." He continued by explaining that to minimize these costs a tax should be as easy as possible to administer. Complexity causes increased compliance, enforcement and administrative costs [Slemrod, 1989].⁴ Starkman [1990] bluntly states, "Complexity greatly increases the cost of compliance." Given the voluntary nature of our tax system, social, psychic and economic costs also need to be included under the rubric of "compliance costs".

The textbook public economics literature [see Brown and Jackson, 1978; Musgrave and Musgrave, 1976; and Sanford, 1978] has evolved and expanded to seven the number of traditional principles constituting a good tax. These

⁴Slemrod and Sorum [1984] estimate compliance cost. Total cost for filing individual income tax returns was estimated at \$17 to \$27 billion. Total taxpayers' time of approximately 2.13 billion hours was required. The average was 26.7 hours (1982 resource cost: \$318) of the taxpayer's own time. Individuals paid an additional \$3 to \$3.4 billion for professional tax advice.

include: simplicity, equity, ability to pay, efficiency, flexibility, compatibility and certainty.

One of these concepts, simplicity, is salient to this research. This principle states that a tax system should be understood, at least in terms of its basic structure, by the vast majority of the taxpayers affected.⁵ The system should not be so complex as to create confusion among taxpayers.

Carroll [1989] notes that the benefits of a good, simple tax include increased compliance and decreased administrative costs and taxpayer burdens. He worries about the confusion in our present code. By its complexity the code can "make criminals" of honest taxpayers and requires the government to "continually monitor, frighten, and punish" its citizenry at no small cost.

Slemrod [1989] hypothesizes that, because complexity increases the cost of compliance, it indirectly discourages compliance. He states [p. 157]:

"For the taxpayer himself, the critical aspect of complexity is the time and expense involved in completing the tax return, or compliance cost, including not only complying with the filing requirement, but also identifying and documenting the deductions, credits and reductions in taxable income to which he is entitled."

⁵Certainty, or its evil twin uncertainty is related to a lesser degree. The principle of "certainty" calls for tax liability to be definitely calculable and not arbitrary. Some economists [Beck and Jung, 1989] use uncertainty as a surrogate for complexity in econometric modeling of taxpayer compliance.

He has proposed that the total cost of tax collection could be used as an index of complexity in a tax system. He calls for more research into tax law complexity and its relationship to compliance.

Roth, Scholz and Witte [1989] report that theories are now being developed that relate compliance to various costs of compliance. So far, only sketchy findings weakly support the concept that higher compliance costs decrease compliance.

MOTIVATION/SPECIFIC

OPEN-DOOR POLICY CONFLICT

The United States open-door policy towards foreigners leads to the entrance each year of a large number of nonimmigrant international students.⁶ Many will earn income subject to our tax law.⁷ It is important that tax law encourages compliance among our foreign visitors.

It appears that U.S. higher education is receptive to foreign enrollment, and indications are that this trend will

⁶According to the Immigration and Nationality Act, a foreign national here for temporary purposes only, and not intending to stay, is considered a "nonimmigrant".

⁷U.S. source income (subject to federal withholding) paid to all nonresidents approached \$23 billion in 1987 [Flaherty, 1990]. This amount includes interest (other than bank deposit interest), dividends, rents, royalties, capital gains, and compensation for personal services. Income that is "effectively connected" with a foreign person's business is not included in this total.

continue. In 1989, the most recent year for which data are available, nearly 750,000 foreign students, teachers, trainees, and their family members entered the United States [U.S. Department of Justice, 1990 and 1991]. This is an increase of 10.3% from 1988. In 1976 there were only an estimated 50,000 foreign students studying here [Carliner, 1977, p. 113]. America has the largest international student population of any country in the world [Leggat, 1991].

Foreign opinion rates U.S. higher education as the world's best on such criteria as scientific research quality, ingenuity, flexibility of programs, and accessibility to all segments of the population [Bok, 1990]. According to some authorities, "We've got the best scientific education in the world" [Lee, 1991]. Hull [1985] notes, "Even among developed countries the United States is particularly enticing because of its traditional receptiveness, its accessibility, and its strong and supportive immigrant communities (p.5)." Derek Bok, then President of Harvard University, stated, "We are the country of choice for students around the world seeking to pursue their education abroad (p.44)."

The number of international students at the graduate level has been increasing by 6.5% annually [Institute of International Education, 1990]. Of total graduate

enrollment 12 percent (15 percent at doctoral granting institutions) are internationals [Council of Graduate Schools, 1989]. One of every nine students at Cornell University is foreign [Leggat, 1991]. In 1989 over half the U.S. doctorates granted in engineering and nearly half in math and computer science went to foreigners [Lee, 1991].

We should not be threatened by the exodus of foreign talent to U.S. graduate schools. According to William Carroll of NAFSA: Association of International Educators, the foreign students "are filling slots that are going empty", not depriving Americans of an educational opportunity [Lee, 1991].

Lee also notes there is sentiment in industry that the U.S. should make every effort not only to welcome foreign scholars but also to keep them here after graduation.⁸ At Texas Instruments, research Ph.D.s are 25 percent foreign-born. The numbers are 35 percent at IBM and 40 percent at Bell Labs. Still, there are spot shortages of qualified research Ph.D.s in some fields especially where foreign competitors are making inroads into U.S. markets.

Exposure to severe, complicated tax treatment could discourage a nonresident from staying or foster

⁸Congress apparently shares this sentiment. The Immigration Act of 1990 nearly tripled (from 54,000 to 140,000 yearly), the number of "green cards" to be granted highly qualified foreigners [Leggat, 1991].

noncompliance which could persist after resident status is granted. By the guidelines established in the 1984 tax code changes, 100 percent of all masters degree candidates and an estimated 90 percent of doctoral candidates fall under more complex tax law applicable to nonresident aliens. Far from encouraging aliens to become naturalized citizens, Hull [1985] believes that our policies have the "perverse effect of penalizing only those aliens who have resided in the country less than five years (p.49)".

LEGISLATIVE EFFORTS International educators are anxious for changes in the way the U.S. system taxes foreign students. Their lobbying efforts have recently resulted in several proposed pieces of legislation. However, current policy requires that any tax proposal, even one calling for simplification, be "revenue neutral" [Starkman, 1990], i.e. it must be shown the change does not reduce tax revenue.

Senators Pryor and Kennedy, along with five other co-sponsors introduced legislation into Congress, The International Scholarship Tax Corrections Act [Senate Bill S.1155, 101st Congress, 1st Session, June 9, 1989] to alleviate the more severe tax laws applicable to foreign students.⁹ This bill failed to clear the Senate Committee

⁹One year earlier a version of this legislation was included in the year-end budget reconciliation, H.3150. During floor debate, the Senate dropped this provision [Liaison Group, 1990].

on Finance to come for a floor vote. The bill was not revenue neutral, and no revenue enhancement was proposed to offset anticipated revenue losses.¹⁰ Senator Lugar and members of the Senate Committee on Foreign Relations attempted to attach legislation to the Foreign Relations Authorization Act of 1989, S.1160. However, the proposal was dropped on the objection of Senator Bensten who pointed out that the Foreign Relations Committed does not have any jurisdiction over tax matters [Liaison Group, 1990]. Members of Congress are currently discussing two proposals aimed at alleviating the severe taxation of foreign students.¹¹

Hull [1985, p.49] believes it is difficult if not impossible to enact legislation beneficial to aliens. She sees nonresident aliens as "a politically powerless segment of society...(having) virtually no opportunity to assert their interests in the public forum" where they are poorly represented if represented at all. Then Chief Justice Burger in Graham v. Richardson [403 U.S. 365, 372 (1971)] stated that aliens should be viewed with suspicion because they were a "prime example of a discrete and insular

¹⁰Newlon, Dr. Scott, International Economist, Office of Tax Analysis, Treasury Department. Personal interview, June 7, 1991.

¹¹Morrison, Philip D., International Tax Council, Treasury Department. Personal interview. May 22, 1991.

minority that lacked a political voice to protect itself against the majority."

SPECIFIC COMPLEXITY/NONCOMPLIANCE PROBLEM

NONRESIDENT TAX LAW The specific complexity involves compliance problems in the federal income taxation of nonresident foreign students studying in the United States. For tax purposes, nonresidents are individuals who are neither citizens nor residents of the U.S. (Title 8, Aliens and Nationality, U.S. Code). Statutory definitions of "resident" and "nonresident" are found in Internal Revenue Code §7701 (b), added in 1984. The difference is critical because resident foreign students are taxed as U.S. citizens while nonresident foreign students are subject to special tax laws.¹² These laws require them to file and pay tax on U.S. income using a special form, the five-page 1040NR.

Smith and Kinsey [1987] believe conforming with tax law is a complex act. Kidder and McEwen [1989] state that "tax law violations are frequently sins of omission rather than sins of commission (p. 57)." They caution that analysis of noncompliance must study "not only the social circumstances and motives of violators but also the nature of the rule

¹²This runs counter to standards of such international bodies as the United Nations. Their Model Treaty [Art. 20(2)] provides that students who are citizens of another country be allowed to be taxed as citizens of the country in which they are studying.

system (p.56)." For nonresidents, compliance is neither an easy nor routine matter. To fully comply, they must wade through and decipher a maze of tax regulations, complete lengthy forms, and maintain adequate documentation. Applicable tax laws are intricate, leading to miscalculation of U.S. federal income tax liability.

While nonresidents are taxed on U.S. income, common deductions, such as the standard deduction, are denied. This renders their situation more complex given that, as Roth, Scholz, and Witte [1989] note, the majority of taxpayers do not itemize deductions but use the short forms. Also, itemizing burdens nonresidents with record keeping requirements to substantiate the deductions, and causes more difficulty if audited.

INFORMATION LACKING Few entering foreign students comprehend the complex manner in which U.S. tax laws apply to them. The Institute of International Education, Grantax Program sponsor, states, "Unfortunately, the tax laws that apply to (foreign students) are often complex and are not generally understood by many independent tax consultants, host institutions, or grantees" [Institute of International Education, 1990, Introduction]. Nonresident students mistakenly believe they can file like their American colleagues (on Form 1040, 1040A or 1040EZ).

A problem may result because the U.S. has a voluntary

federal income tax system whereby the compliance burden falls on the taxpayer (with periodic auditing by the IRS). Such a system assumes that taxpayers have the knowledge and resources required to comply. However, no organized government program informs foreign students how to comply with U.S. tax law when they apply for, receive, or present visas entering the U.S., nor are they advised of the penalty system for improper filing [GAO, 1988].¹³ The IRS does not automatically mail the proper form (1040NR) to nonresidents, a routine courtesy extended to filers of other forms. Also, it is noteworthy that the 1040NR is not an information item required to be stocked at any of the IRS Information Distribution Centers or 600 plus walk-in sites nationwide [GAO, 1990].¹⁴

NONRESIDENT COMPLIANCE EVIDENCE LACKING There is consensus among international educators that nonresident students have the mistaken impression they can file the same tax forms as U.S. citizens [Liaison Group Workshop, 1990; and NAFSA: Association of International Educators, 1990]. The Institute for International Education [1990] suspect that a

¹³Experimental research [Violette, 1989] shows the import of a factor such as communication of sanctions in improving compliance.

¹⁴The IRS also provides distribution information to banks, post offices and libraries, but does not routinely provide any of these sources with Form 1040NRs or Publication 519 on how foreign taxpayers must file.

"majority" of the foreign students under their auspices file incorrectly. In addition, the IRS recognizes that its own agents give faulty advice to foreign taxpayers.¹⁵ CPAs and tax advisers, unfamiliar with complex laws applying to foreign students, may also give incorrect advice.¹⁶

According to a GAO study, the IRS should reassess the effectiveness of its efforts to increase the tax compliance of nonresident filers [GAO, 1988]. GAO data show the number of nonresident filings reached 153,512 in 1986. Immigration and Naturalization Service (INS) data cited by the GAO indicate this is a fraction of the potential total of nonresident returns. Considering only foreign students and teachers, the total should have been three times higher. The GAO stated, "IRS does not have the kind of information needed to assess (its) alien compliance efforts (p.31)." The IRS responded by giving assurances that they would undertake a self-study (results have not yet been made

¹⁵Carol Tello, Office of the Associate Chief Counsel, International Division, IRS, in address to the Liaison Group, June 8, 1990.

¹⁶Confusion was evident then in 1988 in several tax guide books. The Arthur Young Tax Guide, 1989 provided information based on pre-DRA'84 tax laws stating that foreign students may claim resident status, under the old circumstances-and-intent test, years before §7701 actually permits (p. 513). The Ernst and Young's Arthur Young Tax Guide, 1990 erred in the opposite direction by denying all foreign students resident status (p.687). Other tax guides entirely omitted the subject [Price Waterhouse, 1988; and Arthur Andersen, 1989].

public) beginning in mid-1988.¹⁷

The Organization for Economic Cooperation and Development (a 24-member group including the U.S.) reported that countries which undertook audits of foreign taxpaying activities, invariably found "clear evidence of noncompliance in this area" [GAO, 1988, p.15]. A high rate of noncompliance with U.S. tax requirements has also been found among American residents living abroad [Musselman, 1989], 61 percent of whom do not file.¹⁸ If nationals away from their home land do not comply with their own country's tax law, it is not unreasonable to suspect noncompliance with foreign tax laws. As will be discussed in the Research Approach section, this dissertation will look at other forms of noncompliance in addition to simple nonfiling.

RESEARCH APPROACH

Crumbly [1973] believes that accountants' familiarity with tax laws place them in an advantageous position for compliance and policy study. As to our comparative advantage in research in this area, Koch and Karlisnky

¹⁷Previously, the IRS announced reorganization of its foreign taxpayer division on March 17, 1986, see Ann. 86-56, 1986-17, IRB 34. They consolidated all foreign taxpayer divisions into the Office of Assistant Commissioner-International.

¹⁸The group sampled had income from U.S. sources (average AGI of \$26,039) that did not qualify for the \$75,000 foreign earned income exclusion, and thus had U.S. tax liability.

[1984] state, "Accounting and taxation educators, in particular, are acutely aware of educational problems introduced by tax law complexity" (p. 98).

Prior analytic research suggests complexity negatively affects compliance [Clotfelter, 1983; Witte and Woodbury, 1985]. Other survey research yielded mixed results [Song and Yarbrough, 1978; Westat, 1980; Yankelovich, et.al, 1984], as to complexity's impact on compliance, dependent on interaction with economic self-interest. In their review of prior tax research, Jackson and Milliron [1986, p.139] concluded, "Preliminary work has begun, but much remains to be done to define complexity and measure its effect on compliance."

It is difficult to disentangle the impact of complexity from that of economic incentives for noncompliance. Milliron [1985b] indicated that the effects of complexity in tax laws are enmeshed with confounds such as "opportunity for evasion".

This study evaluates effects of complexity on compliance in the setting of foreign student taxation. Priors suggest significant noncompliance for this subset of taxpayers. By studying a certain subset of foreign students, this research will be able to sort out the effects of complexity from those of opportunity for evasion.

IRS COOPERATION The IRS acknowledges the compliance level

among foreign students is not known. First of all, identifying who is or is not a foreigner from tax return data is not possible. When a Form 1040 is filed by a nonresident, the IRS has no way of knowing whether a Form 1040NR should have been filed. The IRS does not know who should file as nonresidents, only who did. They cannot access INS data which, in any case, do not include social security numbers needed to match tax records. The IRS Research Division has indicated an interest in the taxpaying behavior of the foreign student population and a willingness to share data resources in order to quantify compliance of this group.

Boruch [1989] indicates that certain groups of taxpayers merit special study, preferably field research, because of distinct features of interest or suspected compliance problems. Kidder and McEwen [1989] suggest that "high risk" noncompliance groups be studied directly because their numbers may be too small to identify by random sampling of the population at large. The foreign student group meets these criteria.

Poorly understood law can create a problem in enforcing sanctions against nonresidents. If foreign students leave the country after filing an incorrect tax return, it is unlikely that the IRS will pursue them. It is therefore in the IRS's best interest to understand and encourage

nonresident compliance.

ACTUAL DATA This study's use of actual IRS data is not novel. Schwartz and Orleans [1967], whose work is considered "classic", are credited with being the first academicians granted access to actual return data in order to study taxpayer compliance [Roth, Scholz, and Witte, 1989]. Slemrod [1989] has been critical in general of studies on noncompliance for failing to obtain reliable data.¹⁹ He calls for better data sources in studying "the links between complexity and noncompliance". IRS participation enables this study to overcome such criticism.

WHY FOREIGN STUDENTS? The Complexity Reduction Tax Policy Subcommittee of the ATA has placed foreign student taxation on its list of areas in need of simplification. Also, foreign students are a group who have not yet developed a familiar routine for dealing with U.S. tax law. Interviews with these students reveal an unfamiliarity with our penalty structure. As such, they represent a broader population of unsophisticated taxpayers to whom results of this study may be generalized. Also, Koch and Karlinsky [1984] have supported the use of student subjects because "it is simpler to control for prior knowledge" with a naive group as

¹⁹Also, see Kidder and McEwen [1989] for a critical analysis of problems with survey methodology in tax compliance research.

compared to experienced professionals.

It has been suggested that compliance costs are more salient for low-income taxpayers because they constitute a higher percent of available income [Roth, Scholz, and Witte, 1989]. Median income for sample subjects is \$9,318.

Foreign students are a well educated group. IRS forms and instructions are designed for college-level reading ability [Long, 1981]. Foreign graduate students should be at that level of comprehension.

KEY ASSUMPTIONS Per Slemrod [1989] the study assumes one cannot define complexity in the tax system "independently of the characteristics of the potential taxpaying population" (p. 157). The complexity encountered in a process is dependent on the knowledge and skill level of those who must abide by it.

This study adopts the definition of "compliance" given by the National Academy of Sciences' Panel on Taxpayer Compliance Research [see Roth, Scholz, and Witte, 1989, pp. 20-23]. Their definition means "the returns accurately report tax liability in accordance with the Internal Revenue Code." The key feature of their definition, for purposes of this study, is that noncompliance includes both underreporting and overreporting of tax liability. The panel further believes that noncompliance occurs for reasons other than deliberate evasion. Examples of this include a

lack of diligence, or taxpayer's failure to recognize a plausible but erroneous interpretation of the law.

There are ways other than simply nonfiling by which one can be noncompliant, e.g. misfiling. Tversky [1972] has suggested "that the addition of an alternative to an offered set hurts alternatives that are similar more than those that are dissimilar to it" (p.283). This implies that a foreign student aware of a simpler U.S. tax form would be more inclined to file it than not to file at all because filing an incorrect form is a more similar alternative than not filing at all. This study examines both misfiling and nonfiling as forms of noncompliance.

EVASION VERSUS UNINTENTIONAL NONCOMPLIANCE This study further assumes there are two basic reasons for noncompliance. People fail to comply with tax laws because either (1) they do not understand the law, or (2) they understand the law and choose not to comply with it. The first type represents unintentional noncompliance, the second, intentional.²⁰ Klepper and Nagin [1989b] claim, "The ever-increasing complexity of federal...tax codes increases both the likelihood of nonwillful noncompliance and the opportunity for aggressive and calculated forms of

²⁰The Treasury distinguishes two sources of noncompliance: either intentional (evasion) or unintentional (e.g. a promptly filed return on the wrong form) [U.S. Department of the Treasury, 1983].

noncompliance" (p.129).

In his article on stochastic models of taxpayer compliance, Schmidt [1989] assumes no individual deliberately overstates tax liability. That is, evasion involves deliberate understatement of tax liability. Overreporting indicates other states of nature, such as unintentional, complexity-generated confusion.

Klepper and Nagin [1989a] and Roth, Scholz, and Witte [1989] note that some noncompliance benefits the taxpayer and view overreporting tax liability as very "unlikely to be intentional". It seems evident that overpaying taxes is the antithesis of the motivation required to classify an action as "evasion". Also, the degree to which one over reports is seen by Klepper and Nagin as both evidence of and a proxy measure for the complexity of a tax item. They apply this measure on a line-item basis to return data.

Economic interests motivate evasion. Alternatively unintentional noncompliance, or failure to understand law may be caused by confusion, ignorance (a degree of complexity), or uncertainty. Complexity raises these barriers. One may intend to comply but be intimidated by fear of the unknown (transaction "costs" such as preparer fees, time to learn, record keeping, fear of authority) generated by the uncertainty of a complex system. This may prohibit individuals from taking full benefit of their tax

situation. Roth, Scholz, and Witte [1989] note that complexity in the tax law imposes a burden, and "inadvertent noncompliance may result from carelessness or lack of ability to understand the legal requirements" (p.148).

Carroll [1989] theorizes that a confluence of factors affect compliance. Opportunity and skill both have to be present to a high degree, and combine with strong motivation to produce evasion or purposeful cheating. All three of these factors are impacted by the level of complexity inherent in a process of compliance. Complexity is seen to lead to "accidental tax cheating" by making the compliance act too difficult to complete accurately.

RESEARCH QUESTION The primary research question for this study is: Is complexity in the tax law a determinant of noncompliance? For the U.S. population as a whole, it is nearly impossible to separate most complexity-driven noncompliance from other noncompliance motivations such as an opportunity to evade.

However, for a subset of the nonresident population, foreign students with certain characteristics, noncompliance is not in the taxpayer's economic self-interest. A compliantly filed 1040NR can result in greater tax savings than a noncompliantly filed 1040. In such a situation, noncompliance must be related to complexity. It is within this subset that noncompliance is assessed by this study.

CHAPTER 2: LEGAL BACKGROUND

INTRODUCTION

The area of nonresident taxation has been chosen to operationalize complexity. The proper nonresident federal income tax return form, the Form 1040NR, is an imposing document five pages long. It contains unwieldy terms, unfamiliar to tax practitioners, and not found on other versions of the Form 1040. The 1040NR must be filed for the first five years a student is present in the U.S.

True complexity of nonresident filing is not fully revealed by the tax forms. Affiliated requirements exist in addition to all regular U.S. tax rules. Type of income is considered since different tax rates apply, and certain exclusions may not be allowed depending on treaty agreements with the student's home country. Married couples must file separate 1040NRs.

Even though foreign students must itemize deductions, they cannot claim many of the most common deductions. Medical expenses, personal property taxes, real estate taxes, and mortgage or personal interest are nondeductible.

Few of the growing number of foreign scholars comprehend the complex manner in which tax law applies to them. This chapter discusses the intricate process from determination of filing status to calculation of final tax

liability. The following items are discussed: the residency test, filing status, exemptions, gross income, deductions and exclusions. The rules concerning the deductibility of education expenses are highlighted. Also examined are tax treaty effects on filing.

Many foreign students mistakenly believe they can file like their American classmates and colleagues. However, the pattern for alien taxation is structured to accommodate foreign businessmen, not students. Confronting new forms, requirements and tax liabilities, foreign students are as likely to be victims of tax complexity as Americans pursuing their studies in a foreign country.

NONRESIDENTS TAXATION

NONRESIDENT STATUS A foreign student may be considered a nonresident for tax purposes. Section 7701(b), added to the IRC in 1984, provides statutory definitions of "resident" and "nonresident" aliens. The distinction is critical. Resident alien students are taxed like U.S. citizens; nonresidents are subject to special tax laws denying them comparable treatment. Nonresident students are taxed only on their income from U.S. sources, but the standard deduction and dependency exemptions are not available.

The Immigration and Nationality Act [8 U.S. Code (1980)] delineates the various categories of foreign student. All are considered "nonimmigrant aliens".

"Nonimmigrants" come to the U.S. temporarily for a specific purpose, presumably with no intention of abandoning their homelands [§1101(a)(15) (A)-(L)]. An "alien" is any person not a citizen or national of the U.S. [§1101(a) (15)]. A "student" is one who is here as "a bona fide student qualified to pursue a full course of study and who seeks to enter the U.S. temporarily" [§1101(a)(15)].

Students may enter on F, J or M visas. The determinants of visa type a student receives are the agency that approves their plan of study (i.e. Department of Education or U.S. Information Agency), the type of institution at which they will enroll, and the plan of study they will pursue [8 USC §1101(a)(15)(F), (J) and (M)].

Prior to 1984, distinctions between resident and nonresident were provided only in regulations and were subjectively based on an ill-defined notion of current circumstances and intent to stay or leave. The Deficit Reduction Act (DRA) of 1984 established two tests in an effort to simplify the determination of resident or nonresident filing status.²¹ The new tests focus on objective criteria and replace the circumstances and intent distinction. The American Bar Association Committee on U.S.

²¹Public law 98.369, passed in 1984, and taking effect January 1, 1985. Congress explicitly intended to simplify determination of residency status [U.S. Congress Staff of the Joint Committee on Taxation, 1984].

Activities of Foreigners and Tax Treaties encouraged Congress to provide guidelines which would simplify the filing status rules for foreign business persons [Sutherland, 1986]. The tests are the "green card" and the "substantial presence" test.²² Neither test is immediately available to students entering on F, J or M visas.

THE TAX RESIDENCY TESTS Determination of residency status is made annually [§7701(b)(1)(A), Prop. Reg. §301.7701(b)-1)].²³ There is a presumption of nonresident status [§1.871-4(b)]. As a general rule, a foreign person becomes a resident for tax purpose if at any time during the year the alien is a lawful permanent resident under immigration law (the "green card test") [§7701(b)(1)(A)(i), (6)]. Alternatively, an alien is a resident if (s)he meets the

²²The new definitions of resident and nonresident aliens were intended to replace the old subjective definition of resident and apply only for purposes of computing the tax liability and not to supersede treaty definitions (H.R. Rept. No. 432, part II, 98th Congress, 2nd Sess. at 1523 (1984)). The rules were presumably adopted to eliminate the problem of resident aliens leaving the U.S. for a short period of time in order to dispose of assets free of any U.S. tax and then return to and resume residency in the U.S. (H.R. Rept., No. 861, 98th Congress, 2nd Sess at 967 (1984)).

²³For review of residency rules see Rolfe & Douppnik, "IRS Defines Nonresident Aliens," 14 International Tax Journal 211 (1988); "U.S. Taxation of Foreign Nationals Under the 1984 Tax Act: Analysis and Planning, 10 International Tax Journal 433 (1984); Feingold, "The New Statutory Definition of Resident Alien Under the Tax Reform Act of 1984," 44 NYU Institute of Federal Taxation 46.1 (1986); Heizer & Braun, "Working With the New Definition of 'Income Tax Resident'," 11 International Tax Journal 109 (1985).

"substantial presence" test.

To meet this test, the alien must be present in the U.S. on at least 31 days during the year, and the total of days present in the year, plus 1/3 of the days present in the previous year, plus 1/6 of the days present during the second previous year, must be at least 183 [§7701(b)(1)(A)(ii), (3)]. The total days in the "substantial presence calculation" can be shown as follows:

Current year days	x 1	=	
+First preceding year days	x 1/3	=	
+Second preceding year days	x 1/6	=	_____
TOTAL DAYS		=	

Any portion of a day is counted as a full day. For the test, days present in 1984 are counted only for aliens who had resident status under prior law by the end of 1984. Days present in 1983 will be counted only for aliens who had residence status under prior law at the end of both 1983 and 1984 [Prop. Reg. §301.7701 (b)-9(b)(2)].

The substantial presence test will not apply unless the alien is in the United States for at least 31 days during the calendar year in question [§7701(b)(3)(A)(i); Prop. Reg. §301.7701(b1)-1(c)(4)]. Also, if the alien is in the United States less than 183 days in the current year and can show closer ties to a foreign country, (s)he will not meet the substantial presence test [§7701(b)(3)(B)(ii); Prop. Reg. §301.7701(b)-2(a)(1), (2), (3)]. The "closer ties" test

involves such facts as home available year round, drivers license, voting rights, membership in a religious organization, and bank accounts.

But the "substantial presence" test is modified for students [§7701(b)(3)(D)(i), (5)]. These persons must be physically present for many days in the U.S. to accomplish their purpose in coming to the U.S., but their stay here is by its nature temporary. Technically, the substantial presence test does not count any day on which the individual is an "exempt individual" as explained in the next section.

RESIDENCE TEST FOR STUDENTS A student is any individual who is temporarily present in the U.S. under an F, J or M visa [§7701(b)(5)(D)(i)(I) and (II)]. A student cannot file a Form 1040, 1040A or 1040EZ for the first five calendar years (s)he studies in the U.S. because students are considered "exempted" individuals for that time. An exempt individual cannot count days towards the substantial presence test, and is thus precluded from establishing residency for tax purposes. In the sixth calendar year, the student must file as a resident if (s)he is present for at least 183 days unless (s)he can establish that (s)he does not intend to permanently reside in the U.S. and that (s)he is in substantial compliance with the student visa requirements [§7701(b)(5)(E)(ii)]. 1985 is the first year that can be counted towards the two, four, or five year requirements for

teachers, trainees, and students.²⁴

FILING STATUS AND EXEMPTIONS A nonresident alien married to a U.S. citizen or resident on the last day of the tax year may elect to be treated as a resident for tax purposes [§1.6013-6(a)(1)], and thus file as married filing jointly on Form 1040, provided the other spouse consents [§1.6013-6(a)(4)]. This election is made by filing a statement with the 1040. The statement must include social security numbers of both spouses and a declaration by the nonresident spouse opting to be treated as a resident [§1.6013-6(a)(4)(ii)]. If this option is elected, all worldwide income of both spouses is taxed, not just U.S. source income. However, if both spouses are nonresident aliens, they may not file jointly even if both live in the U.S.

Most married nonresident aliens must use the married filing separately status [IRS Publication 519]. A married nonresident alien from Mexico, Canada, Japan or the Republic of Korea who lives in the United States the entire year and does not reside with his or her spouse at any time during the year can file using single status. This results in lower tax liability if U.S. taxable income before the

²⁴Prop. Reg. §301.7701(b)-3(b)(7). "Pre-1985 presence of an alien who was not a resident (under prior law) at the close of 1984 will not count in the substantial presence test. "General explanation of TRA 1984, Public Law 98-369, July 18, 1984, Joint Committee on Taxation, p. 472.

deduction for the personal exemption exceeds \$16,825, the point at which married filing separate taxpayers reach the 28% marginal tax rate in 1988.²⁵

A nonresident cannot claim head of household status [§2(b)(3)(A)]. Married nonresident aliens who live apart from their family for the entire year and are from Mexico, Canada, Japan or the Republic of Korea may file using the status for "other single nonresident alien."²⁶ This exception could save taxes at higher levels of income.

A nonresident is allowed a deduction for the personal exemption only if effectively connected U.S. source income is reported. If no effectively connected income is reported, the personal exemption is denied unless total income exceeds \$15,400 [§1.873-1(b)]. Because all income earned by students from personal services is treated as effectively connected, the personal exemption is permitted.

INCOME The income of a nonresident alien must be separated into four categories depending on its origin (U.S. source or foreign) and its connection with a U.S. trade or business (effectively connected or not effectively connected).

²⁵For 1988, 28% bracket is reached when taxable income exceeds \$14,875 and filing status is married filing separate. Since the taxpayer is entitled to one exemption of \$1,950, AGI greater than \$16,825 (\$14,875 + 1,950) is taxed at 28%. This threshold is not reached on a single return until AGI exceeds \$19,800.

²⁶Instructions to Form 1040NR, p. 4.

Foreign source income is exempt from U.S. tax, except in the rare case when it is effectively connected with a trade or business. Nonresident income that is U.S. source and is also effectively connected with a U.S. trade or business is taxed at the same graduated rates as U.S. citizens and residents.²⁷ U.S. source income that is not effectively connected with a U.S. trade or business is taxed at a flat 30% rate, or at a lower treaty rate if one applies, without the benefit of any deductions, exemptions, or credits. The employer is required to withhold taxes at a rate of 30% unless a lower treaty rate of 14% applies [§1.1441-1]. If the employer fails to properly withhold, the employer could be forced to pay any taxes unpaid by a departing alien.

Students and trainees on F or J or M visas are subject to graduated rates on their earned income. The code deems their U.S. source income from wages or salary to be effectively connected with a trade or business in the U.S.²⁸

SCHOLARSHIPS AND FELLOWSHIP EXCLUSIONS Most scholarship or fellowship grants awarded after August 16, 1986 are reportable on line 12 of Form 1040NR.²⁹ However, certain

²⁷§871(b).

²⁸§871(c).

²⁹The reporting of scholarship income and exclusion of all or part of same are unique to the Form 1040NR. Line-item reporting of scholarships no longer exists on other versions of the 1040. The amount of scholarship excludible as

scholarships and fellowship grants are entirely or partially exempt from income tax if they fall under the rules of a tax treaty between a particular nation and the U.S. Grandfather rules may pertain to certain grants awarded prior to August 17, 1986 which clearly established a multi-year aid commitment with no need for the candidate to reapply [Prop. Reg. 1.117-6(e)(3)]. Grants made by foreign governments or organizations, and certain nonprofit agencies, for necessary educational expenses can also be excluded from income if the funding is considered foreign-source.³⁰

In contrast to tuition scholarships, graduate teaching assistantships (TA) and research assistantships (RA) are taxable as compensation for services [§117(c)], and qualified educational expenditures may not be deductible even if enrollment is a condition of the grant. Tuition reduction waivers are nontaxable [§117(d)(5)] even though the student also receives an RA or TA.³¹

NON-EFFECTIVELY CONNECTED INCOME When filing the Form

qualified education-related expense is deducted back out as an adjustment on line 28.

³⁰When in doubt about the taxability of a foreign-funded award, consult Rev. Rul. 89-67, 1989-1 C.B. 233. (effective May 15, 1989, retroactive to January 1, 1986, revoking Rev. Rul. 66-292, 1966-2 C.B. 280.

³¹This was the pre-1987 rule, and was re-inserted in the Code by the Technical and Miscellaneous Reform Act of 1988 (TAMRA), effective for taxable years beginning after December 31, 1987.

1040NR, the taxpayer should be aware of anomalies regarding non-effectively connected income, also referred to as portfolio income. Interest paid by a U.S. bank, savings and loan, or insurance company, the most common form of unearned income received by nonresident aliens, is specifically exempt from U.S. income tax [§871(i)].

When dividend income is received by a nonresident from a company incorporated in the U.S., it is taxed at either the 30% rate or the lower tax treaty rate. However, dividends received from a foreign corporation, unless 25% or more of its earnings are effectively connected with a U.S. trade or business, are not taxed. The former are not taxed because they are not U.S. source income; the latter because of a specific exemption [§§861(a)(2)(B) and 871(i)(2)(B); §1.861-3(a)].

ADJUSTMENTS TO INCOME Only a few adjustments to gross income are available to nonresident aliens on F or J visas. The portion of scholarship and fellowship grants that relates to direct school costs is an adjustment to income.³² The portion of an educational grant that covers living expenses, could be deducted from AGI as an itemized

³²If a scholarship or fellowship grant is included in income, degree candidates of accredited educational institutions may deduct, as an adjustment to gross income, amounts spent on tuition, fees, books, and instructional supplies, but not for amounts spent on room, board or living expenses. §117(b)(1).

deduction if the student meets the eligibility requirements for the education expense deduction.

ITEMIZED DEDUCTIONS Nonresident alien taxpayers may not take the standard deduction [§63(c)(6)(B)]. Itemized deductions are allowed only to "the extent that they are connected with income from sources within the U.S." [§1.873-1(a)(1)]. The foreign student must consider an expense's nature and its connection with U.S. business income to determine whether the expense is deductible. Some deductions are allowable regardless of connection to a U.S. trade or business. Casualty losses are permitted on property located within the U.S. [§873(b)(1), subject to requirements of §165(c)(3)]. Deductions for contributions made to U.S. charities also are allowed [§873(b)(2)]. However, itemized deductions for medical expenses, property taxes, and interest expense are not allowed [Rev. Rul. 74-453, 1974-2 CB 19, and §873(a)].

The major itemized deductions available to foreign students or teachers holding F or J visas are: moving expenses, continuing education expenses, and certain expenses incurred in a temporary job away from home. Each deduction requires careful planning and recordkeeping. In all cases, deductions are limited to amounts actually spent and documentation in the form of calendars, diaries, cancelled checks, and receipts may be required to

substantiate amounts claimed.

EDUCATIONAL EXPENSES Qualified amounts may be deductible as an ordinary and necessary business expense [§1.162-5]. The qualifying educational deduction can be substantial since it includes away-from-home living expenses and education related travel, as well as any tuition, books and fees not deducted elsewhere on the tax return. Expenses are deductible to the extent they pertain only to the taxpayer and must be adequately substantiated [§274(d)].

A supporting Form 2106 should accompany the claiming of an educational expense deduction. This is required support and indicates an individual has claimed job related expenses. The educational deductions are entered on page two of the Form 1040NR, on line 7a.

Requirements for the education deduction are stringent: the taxpayer must be engaged in the trade or business to which the education relates prior to undertaking the "continuing education" and must fully intend to return to this profession when the education is completed [Rev. Rul. 77-32, 1977-1 C.B. 38]. To be "related," the education must maintain or improve the employee's existing skills and neither fulfill the minimum job requirements for the trade in which (s)he is currently engaged nor qualify him or her for a new profession. A student who initially qualifies but changes major or field will be denied the deduction.

Also, the nonresident taxpayer must maintain residency outside the United States to qualify for this deduction [Bruce A. Pappas, ¶75,169 P H Memo TC]. However, the mere fact that a taxpayer does not incur duplicative lodging expenses does not automatically defeat away-from-home status for purposes of the educational deduction. In *Johnson v Comm.* [CCH Dec. 44,731 (M), 55 TCM 700 (1988)], the Tax Court allowed a Texas professor educational lodging expenses even though she had sold her home in Texas prior to pursuing doctoral studies out of state. Among other things, the Court looked at stored belongings, maintenance of a voting residence and ownership of property in Texas to determine that she still resided in Texas.

Case law addresses ambiguities resulting from complexity in this area. One concern is the appropriate length of time a qualified educational expense deduction can be claimed. In Furner vs Comm. [(CA-7) 21 AFTR2nd 794, Rev'g 47 TC 165] the Seventh Circuit Court of Appeals held in 1968 that educational expenses were deductible as long as the taxpayer was only "temporarily" away from his or her job. Also, the education must be for a definite time span [Rev. Rul. 68-591, 1968-2 C.B. 73] to be deductible.

The Tax Court has held that three years is a "definite rather than open-ended" period of time for individuals enrolled in a graduate program [Robert J. Picknally, 36

T.C.M. 1292 (1977)]. Delaney , Helleloid and Kudialis [1990] note that length of time required for education is not the sole determinate of deductibility. Rather, the Tax Court has found that each case's own facts and circumstances must be evaluated.³³

Education expenses must not be for the purposes of meeting the minimum requirements of a job or profession. Several cases have held that the educational requirements for being licensed in other countries constitute meeting the minimum requirements of a job, even though an individual was already licensed as a dentist or lawyer at home.³⁴

Students qualifying for educational expense deductions can be identified from demographic data, e.g. prior work experience, major and academic level, government sponsorship, and age. Students not qualifying are undergraduates or those without related prior work experience. Educational deductions are not allowable for graduate students whose assistantships are their first

³³After 1992 away-from-home expenses are not deductible if the stay is 12 months or more. This does not affect tax years covered in this study.

³⁴In *Ansis Mitrevics*, 22 T.C.M. 271 (1963), a dentist from a European country was denied an education expense deduction for courses taken in the U.S. because they were necessary for him to meet the minimum certification requirements as a U.S. dentist. See *Yaroslav Horodysky*, 54 T.C. 490 (1970), similar results for a lawyer. These cases apply not only to nonresident aliens but also to residents seeking professional certification in other states.

employment. A graduate teaching assistant who was not previously employed as a teacher was barred from deducting the expenses of his education, because enrollment in graduate school was a prerequisite to receiving his graduate teaching assistantship [Arthur M. Jungreis, 55 T.C. 581 (1970)].

The nonresident taxpayer may be able to identify other professional and employment related expenses such as dues, subscriptions, business travel, and supplies. Denial of the standard deduction makes it important to maximize miscellaneous expenses [§67(a)].

OTHER CONSIDERATIONS

TAX TREATIES Principles of international law are reflected in treaties. A nation may distinguish its treatment between various classes of aliens as long as the distinctions neither violate international law nor appear irrational given the obligations of the citizens of that nation [Weston, Falk, and D'Amato, 1980].

Tax treaties help to minimize the tax liability of nonresident aliens. Most treaties provide exemptions or reduced rates for specific items of nonresident taxpayers' income. They are "a means of avoiding double taxation of income" [Flaherty, 1990, p.48]. Tax treaties generally provide for reciprocal tax breaks. Some treaties exempt compensation paid for teaching or research for example. The

IRS reports any income amounts exempted to the student's home country, where (s)he may be liable for tax on amounts exempted in the U.S., on Form 1042S. IRS Publication 901 details the treaties in force.³⁵

Some tax treaties have provisions which allow students to elect to be taxed as U.S. residents, following the United Nations Model Treaty [Art. 20(2)].³⁶ Some treaties also exclude from tax minor amounts of personal services income derived by students or trainees in the U.S. Tax treaties must be reviewed to see if any exclusions apply. For student visa holders, the exclusion most commonly varies from \$2,000 to \$5,000 and approximates the amount of the standard deduction. An example of a selected exclusions would be: China, Peoples Republic of, \$5,000 of U.S. income excluded from U.S. taxation while present as a student.

However, the treaty exclusion is claimed in addition to any itemized deduction. Thus, there is economic incentive to claim the treaty benefit if one exists. When a tax treaty assures no tax is due, the student may avoid

³⁵The full text of U.S. tax treaties with other countries can be found in RIA Federal Tax Coordinator, Vol. 20. Six additional treaties were ratified by the Senate in 1990 and are effective for tax year 1991. These include treaties with Finland (replaces existing treaty), Germany (replaces existing one), India (new treaty), Indonesia (new treaty), Spain (new treaty), and Tunisia (new treaty).

³⁶This is true of treaties with Barbados [Art. 20(2)], Hungary [Art. 18(2)], and Jamaica [Art. 21(3)].

withholding. To avoid withholding a student must complete Form 8233 and file it with their employer. Their employer must retain the Form 8233 to insure against any penalty being imposed against them for failure to withhold income tax. Rev. Proc. 87-8 [1987-1 C.B. 366] details the procedures to follow to support a claim for exemption from withholding.

Under most circumstances, employers must withhold taxes on a foreign students income [see Flaherty, 1990, for more detailed discussion]. A nonresident student is liable for federal and state income taxes but is initially exempt from social security tax. F-1 student visa holders who are admitted to the U.S. in order to study at a recognized institution are exempt for five years from social security tax on wages paid to them in connection with that exempt purpose.³⁷ This includes practical training pay received during a period of employment directly related to the purpose for which an F-1 student visa is issued.

SAILING PERMIT The title "sailing permit" is an anachronism from when the requirement was established in 1921. A permanently departing alien must procure a certificate verifying compliance with final tax obligations [§6851(d)].

³⁷Title II of the Social Security Act; Immigration and Nationality Act §101(a)(15)(F), (J), or (M), 66 Stat. 166, 75 Stat. 534.

These nonresidents must file either Form 2063 (stating no taxable income in the year of departure) or Form 1040C (a final part-year return). In order to receive a "sailing permit," the nonresident taxpayer must present to an IRS employee at the local district office copies of the two prior years' tax returns and tax-preparation materials for the current tax year, along with other relevant information, such as supporting records for deductions and a statement from the employer showing current year's wages. The sailing permit certifies outstanding tax liability has been satisfied.

Neither the law establishing the sailing permit nor its legislative history indicate how it is to be enforced.³⁸ The GAO [1988] found that while the number of aliens present in the United States increased tenfold from 1960 to 1986, the number of filings for sailing permits drastically decreased from roughly 176,000 to 1,000. The GAO also found the IRS had no basis for judging sailing permit compliance. Barring cooperation by the Immigration and Naturalization Service or the Customs Service, the law is unenforceable.

This undoubtedly contributed to a recent regulation

³⁸The IRS appears to rely primarily on nonresidents voluntary compliance. Sailing permits are not presently monitored by the IRS and the law is not enforced by the Immigration and Naturalization Service or the State Department [GAO, 1988].

change alleviating requirements for foreign students to obtain sailing permits [Temp. Reg. §1.6851-2T(a)(2)(ii), promulgated by TD 8332, Fed. Reg. January 28, 1991]. Effective in 1991, foreign students holding F, J, or M-1 visas³⁹ need not obtain a sailing permit provided their only U. S. source income is: 1) an allowance for study expenses in the U.S.; 2) for services or accommodations incidental to that study; or 3) received in accordance with the employment authorizations applicable to the alien's visa type in 8 CFR §274(a)(12).

³⁹H-3 and H-4 visa holders (industrial trainees and their spouses) are also exempt from the sailing-permit requirement.

CHAPTER 3: PRIOR LITERATURE

INTRODUCTION

Empirical taxpayer compliance research has only reached its second decade [Roth, Scholz, and Witte, 1989]. Findings thus far support the belief [Allan, 1971; Eisenstein, 1961; Groves, 1948; James and Nobes, 1978] that economic self-interest of the taxpayer leads to less than 100 percent compliance. Such sentiment is not new. Hamilton [1790] bemoaned, "fraud[in collecting the publick revenue have been complained of from the earlie[t period[of our hi[tory down to the pre[ent time(p.17)."

This chapter reviews prior work on noncompliance. Economic literature's evasion theory is seen as an incomplete explanation for noncompliance. The concept of expected utility theory and the rationality assumption are criticized as being insufficient, and alternatives are presented.

Further, the chapter reviews development of the construct of complexity as utilized in previous tax research. The relationship between the previous work and complexity in this research is established. Theories as to complexity's effect on compliance are discussed, and prior complexity-compliance research is analyzed. The limited prior work specifically in the field of nonresident

compliance is reviewed.

ECONOMIC THEORY

EVASION AND NONCOMPLIANCE Eisenstein [1961] states that people have come to see taxes as a "distinctly disagreeable" burden, one to be placed on the backs of others. Evasion accomplishes escape from the incidence of taxation, and economic self-interest motives explain such noncompliance.

Clotfelter [1983] sees the basic theoretical model of evasion as application of the economic model of individual choice under uncertainty. He posits that only deliberate evasion and random error (e.g. mathematical mistakes) need be considered in specifying a model of taxpayer reporting behavior. He notes that random errors, involving both over- and underreporting, will cancel each other out leaving only the systematic evasion (underreporting) component. He does not consider that the alternative situation, systematic overreporting, may be detected. His logic leads to the conclusion that discovery of the state of nature overreporting indicates the systematic influence of some other factor. Klepper and Nagin [1989a] concur having utilized overreporting as a proxy for the impact of complexity in an area of tax law.

However, as Spicer [1986] indicates the economic model of evasion may be incomplete. There are alternative explanations as to why taxpayers do not comply.

There has been a well spring of literature criticizing the supposedly all encompassing economic-model approach to evasion [Roth and Scholz, 1989].⁴⁰ Carroll [1980 and 1989] notes that many assumptions on which the economic model rest prove to be inadequate in explaining results of experiments in decision making under uncertainty. He suggests a cognitive approach to understanding noncompliance that emphasizes the limited capacity of individual taxpayers rather than utility seeking behavior, when complex situations, such as those presented by our present tax system, are encountered. Carroll points out that most taxpayers do not know the risks or probabilities associated with being caught cheating.

GAO data [GAO, 1979] indicate that the average educational level of the over six million taxpayers who should have, but did not file tax returns in 1976 was well below the national average. Roth, Scholz, and Witte interpret this to mean the filing process was too difficult to be understood by many. Miscalculation can be seen as reflecting "inattention, lack of interest" or face-value acceptance of incomplete advice, problems which may persist even though a taxpayer intended to comply with a complex

⁴⁰For discussion of the classic economic model of evasion, see Allingham and Sandmo, 1972; Beck and Jung, 1989a; and Reinganum and Wilde, 1985.

law.

Katona [1977] takes a strong stance against a pure economic theory explanation of noncompliance. He raises several major criticisms including misplaced statistical inferences and lack of attention to psychologically based information processing theory. The model of an "economic man" weighing alternative choices in a rational manner does not reflect results of research into the way people actually approach problems. Hollis and Nell [1975] echo such sentiment criticizing economic theory for rarely being adjusted in light of new empirical evidence.

Smith and Kinsey [1987] also criticize the economic argument reviewing counterpoints and opposing theories. They note that such concepts as expected payoff and utility theory do not fully explain failure to comply.

PROBLEMS WITH EXPECTED UTILITY THEORY Standard economic models of individual choice model decision makers as maximizing expected utility [Roth, Scholz, and Witte, 1989]. Expected utility is calculated by identifying all possible outcomes and assigning a value (payoff or loss) and a probability to each outcome. The value is multiplied by the probability to calculate the expected utility of each outcome. The individual then selects the outcome with the highest expected payoff, the maximum utility.

Utility theory offers a mathematical justification for

its model structure. If the calculated gain of evasion outweighs the risk, then people will evade. This suggests that noncompliance could be deterred by increasing the risk involved.

Although a utility theory concept of weighing expected outcomes appears plausible, the manner in which people actually respond does not seem to follow the laws of mathematical probability [Kahneman, et. al., 1982]. A behavioral decision theory literature has developed which demonstrates that individuals violate the assumptions of economic utility theory.

For example, an experiment by Payne, et. al. [1984] produced results which cast doubt on the applicability of common utility functions. Another example, prospect theory, as presented by Kahneman and Tversky [1979, (see also Tversky and Kahneman, 1981)] has shown that people incorrectly discount the occurrence of events with low probabilities. Alm [1991] notes the frequency of audits in the U.S. has fallen to less than one percent. The implication for tax compliance is that probability-based and cost/benefit analyses will at best only partially explain taxpayer behavior.

Other researchers support this contention. In testing their econometric model against actual return data, Witte and Woodbury [1985] found, "somewhat surprisingly", that

neither probability of sanction nor severity of penalty was related to compliance. Alm [1991] observed "several fundamental problems with the existing application of expected utility theory" (p. 577). He then notes, regarding probabilities and penalties (which he grants do have a degree of influence on compliance), that "it is equally clear that detection and punishment cannot explain all compliance behavior".

In an interdisciplinary conceptual framework for compliance research, Smith and Kinsey [1987] criticize the economic theory approach of the expected utility model of individual choice given uncertainty. They point out that taxpaying behavior does not necessarily involve deliberate decision making. Taxpayers cannot be assumed to automatically weigh the costs and benefits of noncompliance with full knowledge of probability of detection and size of penalty (necessary to calculate expected payoff). It is unsafe to assume that a taxpayer has such a wealth of knowledge.

Tversky [1972] criticizes the cost/benefit theory of decision making. He indicates that people find justifications for inconsistencies between their choices and expected utility returns. Payne [1982] concurs that a cost/benefit framework has "unresolved conceptual problems". He states, "A 'justification' explanation is difficult to

fit into either a cost/benefit or a perceptual type of theoretical framework (p. 389)." Farrington and Kidd [1977, p. 139] state, "Given the indeterminism of human behavior, it is inadvisable to postulate a threshold theory in which people commit a crime if and only if its expected utility exceeds its expected cost."

Einhorn and Hogarth's [1985] results call into question expected utility theory. In their experiment with risky decisions, subjects used a "bastardized" process of assessing payoffs and outcomes. Some combination of adjustment and imagination operated in assessing probability evidence. Einhorn and Hogarth imply that a subject's attitude regarding ambiguity may affect his or her preferred choices to a greater extent than probability knowledge. Complexity causes subjects to effectively shortcut the expected utility process.

A broader perspective than expected utility theory is needed to explain taxpayer behavior. Alm [1991] concludes that failure to consider and incorporate other factors "renders all existing applications of expected utility theory in tax compliance (including his own) incapable of explaining much of the actual tax reporting decisions of individuals (p. 578)".

CRITICISM OF RATIONALITY ASSUMPTION Expected utility theory assumes a high degree of rationality on the part of the

decision maker. Lewis [1982, p.27] states bluntly, "Rational economic man does not exist; he is a fiction." Carroll [1978, 1980] has argued that those committing crimes do not exhibit such rationality. They irrationally consider outcomes only very loosely. For instance, only 41 percent of criminals considered the possibility of conviction [Carroll, 1978].

One financial dishonesty study questions whether rational, utility rules are determinant of criminal acts [Farrington and Kidd, 1977]. A field experiment was conducted to test if financial dishonesty was a rational decision that would follow the utility model's prediction, i.e. dishonesty increases directly with the expected payoff of dishonesty. Contrary to the experimenter's expectation, the utility manipulation had no effect on dishonesty. The researchers concluded by questioning whether financial dishonesty involves a wholly rational decision.

Others question the rationality assumption. Carroll [1989] reviews behavioral literature which claims "human rationality is severely limited." Smith and Kinsey [1987] and Alm [1991] consider the low audit probability, low IRS success rates discovering unreported income, and relatively mild sanctions, and wonder why rational people do comply with tax laws rather than why they do not. Apparently other answers have to be found besides rationality-based expected

utility theory.

COMPLEXITY AND DECISION MAKING As indicated, the problem with economic utility decision theory is that it fares poorly when examined in the light of complexity. Roth, Scholz and Witte [1989] believe there is a "broad range of phenomena" , in addition to economically-motivated willful evasion, that lead to noncompliance. Human behavior may be intendedly rational, but limited cognitive skills foil such intentions.

Einhorn and Hogarth's [1985] research discredits utility theory by indicating that the calculus of expected payoff determination deteriorates even more rapidly under complex conditions. They state that complexity or ambiguity "results from having limited knowledge of the process that generates outcomes (p. 433)". Such a state exists with the foreign students completely unfamiliar with the U.S. tax process and nonresident filing requirements.

Lewis [1982] sees complexity impacting decision making by disrupting information flow and communication. Payne [1982] discusses how "seemingly minor" changes which complicate tasks can cause inexplicable reactions in subjects' information processing and decision behavior. He concludes that decision making ability is highly contingent on task demands.

Tversky [1972] suggests that when a task is complex,

decision makers may use a "cognitively less costly" approach (for which the term elimination-by-aspect, or EBA, was coined).⁴¹ Increased decision complexity results in use of strategies which reduce information processing demands. In a later work [Tversky and Kahneman, 1981, p. 457] it was noted that most subjects were "unaware of alternative frames and of their potential effects on the relative attractiveness of options". Carroll [1978] found similar patterns of choice. His subjects focused on only one dimension of a decision and either ignored others or made only minor adjustments based on them.

The lack of tax information provided nonresidents, coupled with pseudo-expert suggestions of U.S. colleagues to file using an income tax form e.g. form 1040EZ etc., suggests that these taxpayers may not even consider more complicated alternatives (e.g. thorough search for proper tax advice).⁴² Rather, the nonresident's decision may be based on limited information. The consideration of all alternative payoffs, a keystone of utility theory, may be preempted by complexity.

⁴¹In EBA, an alternative is selected based on one aspect. This allows other alternatives that do not measure up on this aspect to be quickly eliminated.

⁴²Lewis [1982] discusses how taxpayers do not always choose proper channels for advice and often rely on informal, albeit dubious sources on information.

The above theory could be true if the foreign students overpaid their taxes. The rational purposive assumption of utility theory could then not hold. One who is economically rational would not choose a payoff (noncompliance) that would result in his or her becoming worse off (overpayment of taxes).

People may fail to undertake a series of actions necessary to fully comply with a complex law. The cumulative result is noncompliance. Decision theorists [Triandis, 1977; Payne, 1982] emphasize that choosing is not a unitary phenomenon, but rather a multi-staged one. People may hesitate to fully investigate their options in decision making. Due to inertia or some other reason, people end up choosing not to bother to make a conscious, fully informed decision. Complexity of the law is seen as a primary factor in such a decision-by-default process. In terms of the tax system, this can occur when a taxpayer hesitates to move in an unfamiliar direction even though a tax savings is possible.

Smith and Kinsey [1987] believe there undoubtedly exists a state of nature known as unintentional noncompliance. This theoretically stems from the complexity of laws and regulations, lengthy forms, and confusing instructions. They also note that human inertia may cause people to fail to take the necessary steps required to

overcome complexity.

Roth, Scholz and Witte [1989] take a similar perspective. Compliance in tax law requires a series of steps be taken, some of which demand a certain degree of judgment and effort. This is not like compliance with civil and criminal laws which merely require that one refrains from certain behaviors. Thus, they see potential for noncompliance in many forms and for a variety of reasons other than deliberate evasion. They think research to date has neglected the dynamic process of decision making and want to see attention shifted to the complex act of compliance.

COMPLEXITY AND TAXATION

WHY THIS RESEARCH IS UNIQUE Complexity in the tax law thwarts well-meaning policy if the tax law is too difficult to follow. This research is not intended to show at what step of the decision process complexity intervenes, but rather to show that complexity itself can cause failure to comply with tax laws. To prove this, one must identify a *priori* a theoretically complex area of tax law and then show that noncompliance, which is economically not in the taxpayers best interest, i.e. overpayment of taxes, exists in that area.

In econometric modeling, Klepper and Nagin [1989a] have used overreporting of tax liability as a proxy for the

complexity of a tax item.⁴³ Overreporting would sort out noncompliance which is unintentional from that which is intentionally based on the opportunity to evade, e.g. underreporting.

As Roth, Scholz and Witte [1989] indicate overstatements of tax liability "are unlikely to be intentional." They state that tax forms generating higher rates of noncompliant overreporting have been more strongly impacted by complexity. They also believe that subtraction items such as itemized deductions (itemizing is required on the 1040NR) are areas where overreporting reflects effects of complex compliance requirements. They view failure to take advantage of the allowable deductions in favorable tax law as an effect of complexity.

As Milliron [1985b] noted, it is difficult to sort out the effects of complexity from the effects of economic incentive for evasion. No prior research has accomplished this. However, if in a complex area overpayment of taxes results, then one can safely conclude that taxpayers did not act in their own economic best interest. Complexity can be identified as the salient cause of such noncompliance. One criticism of Milliron's [1985a, and b] work on complexity is

⁴³Recall this research assumes that by definition overreporting is considered a form of noncompliance [Roth, Scholz, and Witte, 1989].

that she did not attempt to determine the level of overreporting in the hypothetical scenarios she presented.

THE CONSTRUCT OF COMPLEXITY There is no definitive statement in prior work which defines "complexity" in terms of tax law. One key assumption of this research is that complexity can be encountered at different levels by different people. As Slemrod [1989] pointed out, different aspects of complexity impact on different players in the tax system. A lawyer is concerned with complexity in "predictability of the tax law" whereas the tax authority encounters complexity in "enforceability". The interface between various party's functions and complexity becomes crucial. This seems logical given Payne's [1982] conclusion that information processing is "highly contingent on the demands of the task".

Complexity abounds in U.S. tax law. Roth and Scholz [1989] believe there are many areas where "the overwhelming complexity" of relevant information can cause noncompliance. An early attempt to gauge complexity in the tax code was made by Koch and Karlinsky [1984], who noted the lack of "a reliable measure of complexity".

Klepper and Nagin [1989a] suggest that the percentage of taxpayers who overreport income on a form can proxy for the level of complexity of that form. This is a rudimentary gauge which also could be measuring careless math errors

which lead to both over- and underpayments.

The AICPA tax simplification subcommittee [Starkman, 1990] considers simplification "to be the ability of taxpayers ...to understand and comply with the tax laws that pertain to them." From this, it can be implied that noncompliance is *prima facie* evidence of complexity. Such a definition is unsatisfactory. It ignores the possibility that a simple, well-understood law can also be evaded intentionally.

The two most substantive efforts to define complexity in tax law, (Milliron [1985b], and Long and Swingen [1987]) identified factors that affect the perception of complexity in terms of the tax law. Both studies utilized practitioner surveys.

Using multidimensional scaling, Milliron concluded that taxpayers define complexity along four distinct dimensions: nature of the topic, quantitateness of presentation format, vulnerability of the law to misuse, and readability. The first dimension represented a personal (low) versus technical (high complexity) dichotomy. Financial topics (recognition of income, interest) seemed to be perceived as more technical and difficult. Second, quantitateness correlated with number of calculations required and change in the law. Next, vulnerability to misuse, revealed descriptors such as "area of widespread abuse" and

"impossible to catch cheaters" correlated with greater complexity. The fourth dimension, readability, had length of passage or association with the code (jargonesque) as indicative of more difficult reading. "Unfamiliar, unsettled and technical scenarios" produced the most complex reading.

In another article based on the same research, Milliron [1985a] expands and amends her list of "potential aspects of complexity". These include "length, legal references, allusion to numbers, numerical computations, (and) changes in tax law" (p. 23).

Long and Swingen [1987] attempted to determine factors that influence the perception of complexity among tax practitioners and preparers. They stated, "While the problem of complexity is often discussed, the term is seldom formally defined, and almost never measured empirically (p. 22)." Although somewhat critical of Milliron and her use of multidimensional scaling (subject to interpretation problems), a strong similarity resulted between their factors and her dimensions.

Long and Swingen's results indicated high consensus in rating complexity in terms of six factors: ambiguity, calculations, changes, detail, forms, and record keeping. Two factors, excessive detail in the law and numerous computational requirements, account for about 86% of the

variation in subjects' perceived complexity scores, with excessive detail having the most explanatory power. The next most significant factor explaining complexity was the format of the instructions and forms. In the next section, these factors, as well as Milliron's conception of complexity will be related to nonresident filing.

NONRESIDENT TAXATION AND COMPLEXITY

NONRESIDENT TAX LAW OPERATIONALIZES COMPLEXITY Milliron [1985b] found there were no significant relationships between the weightings of the four dimensions and the demographic information of her subjects. Likewise, Long and Swingen [1987] concluded that no significant differences were found among the complexity ratings of subjects with different educational (with or without advanced degrees), experience or professional background. The perception of factors of complexity was independent of background demographics. This indicates the factors constituting complexity, although perhaps encountered at different levels and in different situations, fall into the same pattern across different peoples. Differences among foreign students in this study should not be a factor in how they perceive complexity.

Long and Swingen [1987] found that two factors, excessive detail and numerous computations required, explained 86 percent of subjects' perception of complexity.

Also, Slemrod [1989] has used time required to file as a surrogate measure for complexity in his estimates of the cost of complexity. The complicated and lengthy Form 1040NR (five pages long) meets all criteria.

Per requirements of the Paperwork Reduction Act, the IRS must publish estimates of average time required to complete forms. The 1040NR requires over seven hours to learn, prepare and assemble versus approximately one hour total for the 1040EZ. An estimated additional six and a half hours of background recordkeeping are required for the 1040NR as compared to an estimated five minutes for the 1040EZ.

"Recordkeeping requirements" was identified as a type of "mechanical" complexity [Committee on Ways and Means, 1990], and as one of six factors [Long and Swingen, 1987] which comprise the construct complexity. Itemizing demands added record keeping. The 1040NR requires that foreign students itemize deductions.

Three companion publications, ranging from 25 to 38 pages in length, are needed to complete the five-page 1040NR. Its "calculation complexity" is worsened by the fact that income is divided into categories, depending on its source and any applicable treaty provisions, and taxed at different rates on different pages. By comparison, the

Form 1040EZ⁴⁴ filed by most U.S. students, is one "short" page (extra large print) and filers use the standard deduction. Experts in this area have defined the nonresident filing process as "complex" [see Lipton and Filer, 1986].

A key point in the complexity of nonresident taxation is the required itemizing of deductions. Roth, Scholz and Witte [1989, p.51] provide evidence to "suggest that, relative to reporting income, subtracting allowable adjustments is even more subject to error" due to the effects of complexity. A portion of this research focuses on correct handling of deductions.

Milliron's [1985b] dimension of "readability" (similar to Long and Swingen's factor of clarity in forms) and Koch and Karlinsky's [1984] notion of "reading complexity" apply to the complexity of the nonresident filing process. The nonresident is confronted with many jargonesque terms, e.g. "income not effectively connected with a trade or business", unfamiliar to tax practitioners let alone recently arrived foreign students. Lewis [1982] has noted that ideal tax instruction should avoid "pompous jargon".

The difficult presentation style of the legalese

⁴⁴The form 1040EZ was designed specifically as part of a budding IRS research effort, The Long Range Tax Forms Simplification Study, to reduce complexity in filing [IRS, 1983].

employed in applicable tax treaty articles can take a lawyer's skill to decipher. Also, if the only tax assistance a foreign student had was the inherently difficult, code-like 1040NR, he or she would be impeded by its "content complexity" [Koch and Karlinsky, 1984].

Milliron [1985b] and Long and Swingen [1987] both implicate change as a factor in complexity. A major law change (discussed in the last chapter) was enacted effective January 1, 1985. The tax year under study is 1988. While three years may seem a long enough time to adjust to changes, students interviewed in pilot studies indicated they were filing under guidelines of the old law.

Finally, the "vulnerability to misuse" or potential-abuse complexity dimension, identified by Milliron [1985b] is important. On a cost/benefit basis, IRS apprehension of foreign students who have departed the country falls into the category of "impossible to catch cheaters". There also is much potential for abuse in the fact that IRS information on the foreign taxpaying population is nearly nonexistent [GAO, 1988].

INCENTIVE FOR FULL COMPLIANCE A foreign student who qualifies for educational deductions saves money on taxes by compliantly filing a 1040NR with itemized deductions rather than a noncompliant 1040A or EZ with only a standard deduction taken. The extent of the itemized educational

deduction is fully appreciated upon realizing that away-from-home living expenses⁴⁵ (i.e. travel, room, board, utilities and laundry) are all deductible, in addition to tuition and fees, if education is job related [per IRC Reg. §1.162-5].⁴⁶ This deduction typically totals two to three times the amount of the standard deduction available on a regular Form 1040. Because of the required 30% withholding, unless lower 14% treaty rate applies [§1.1441-1], on foreign students' income, it would be in their best interest to file a return claiming all allowable deductions.

PRIOR RESEARCH

PRIOR COMPLEXITY-COMPLIANCE RESEARCH Although a consensus seems to be developing as to the relationship between complexity and compliance, there is not unanimous agreement [see Jackson and Milliron's 1986 compliance review] among researches that complexity contributes to noncompliance. Typically, arguments favorable to complexity stress fairness and increased economic sophistication in the tax structure. Milliron [1985a] reviews several pre-1970 studies,

⁴⁵Not deductible after 1992 if stay is going to be longer than one year.

⁴⁶The IRS has verified the legitimacy of the educational expense deduction for foreign students, but no international organizations advise them as to how to claim it [Reading, 1990; Institute for International Education, 1990; Liaison Group, 1990; NAFSA, 1990].

predominantly qualitative IRS reports, stressing benefits (horizontal and vertical equity, allocative and distributional improvements) of complexity. Roth, Scholz and Witte [1989] list studies from the 1970s and early 80s which do not implicate complexity as a compliance problem.

Four prior studies, two normative ones [IRS, 1976; New York State Bar Association, 1972], and two surveys [Song and Yarbrough, 1978; Westat, 1980], argue that complexity either favorably impacts compliance or is an insignificant factor. The New York State Bar tax policy committee saw complexity increasing by way of abstract, technical terminology. The Bar deduced that through complexity appropriate taxes could be determined. They theorized average taxpayers would then pay a fair, albeit arduously determined share. The Bar saw a problem when opportunity for evasion confounds complexity and a significant minority of taxpayers take positions "for which there is very little or no basis" (p. 330).

The IRS [1976] reviewed compliance factors. They suggested that complexity (for equity reasons) was a needed feature in a tax system. They noted, "Reducing complexity of the tax laws ... will also (worsen) voluntary compliance" (p.21). They indicated a positive relationship between complexity and compliance.

Westat [1980] argues that, because complexity worsens taxpayer uncertainty, "the net result ... is that people are

more afraid of the IRS than they otherwise might be" (p. 29). Complexity affects taxpayers by generating a degree of uncertainty which in turn acts as a "deterrent". Because taxpayers perceive the IRS as having the "upper hand", they think uncertainty will be resolved in the IRS's favor.⁴⁷ The interests of the treasury are thus served by complexity-induced uncertainty.⁴⁸

On the issue of uncertainty resolution, prior literature is unclear as to who theoretically benefits. Econometricians, using uncertainty and ambiguity as a surrogate for effect of complexity in their models concur with Westat. Schotchmer [1989, p. 49] states, "The maximum net revenue attainable through optimal enforcement is greater with taxpayer uncertainty than without." Beck and Jung [1989b] agree that as "complexity creates tax liability uncertainty" reported income and tax revenues increase.

However, those who see complexity's effect intermingled with the opportunity for evasion disagree. Relying on exchange and regulatory economics theory, Jackson, Milliron and Toy's [1988] survey found if complexity leads to

⁴⁷Long [1981] concurs arguing that the IRS exploits the unpredictability of tax law to increase its power by arbitrarily determining cases in favor of the government.

⁴⁸See Alm [1991] for a review of recent survey evidence critical of expected utility theory that shows individuals do not exhibit utility maximizing behavior, given uncertainty, under a variety of individual choice circumstances.

uncertainty in the law, the more knowledgeable practitioner resolves the situation in favor of the taxpayer. Starkman [1990] agrees that complexity erodes voluntary compliance and "reduces revenue".

Song and Yarbrough's [1978] aforementioned survey of taxpayers did not indicate complexity as a major factor impacting compliance. They had expected to find "that the complexity of income tax laws would frustrate taxpayers seriously" (p. 451). However only 13.1 percent of their subjects mentioned complexity as the most serious problem compared to 34.6 percent who picked complexity as the least serious problem among the five alternatives presented. This led to them to conclude that complexity was only of "minor concern" for most taxpayers.

Milliron [1985b] criticizes Song and Yarbrough's analysis. Design problems exist in their instrument, and Milliron sees several of their variables, such as "tax loopholes", as highly correlated with aspects of their variable "complexity". She believes their five alternatives were not independent and Song and Yarbrough did not distinguish clearly between complexity and other constructs such as opportunity for evasion.

Although research questioning complexity has only emerged in the last decade, earlier policy researchers pondered why tax "legislation is insufferably complicated"

[Simon, 1945]. Milliron [1985a] found practitioners believe our tax system has grown more complex. Recently, Beck and Jung [1989a, p. 3] have called complexity the "difficult and, as yet unresolved, problem".

Prior survey research indicates complexity is one reason why a tax system functions ineffectively [Long and Swingen, 1987; Milliron, 1985b; Milliron and Toy, 1988; and Yankelovich, et. al., 1984]. Econometric modeling supports this finding [Clotfelter, 1983; Klepper and Nagin, 1989a; and Witte and Woodbury, 1985]. Clotfelter's [1983] econometric research, though not focusing primarily on complexity, found a direct relationship between complexity and noncompliance. His model utilized the number of supplementary schedules filed with the return as a measure of complexity. Clotfelter arbitrarily chose four as the cutoff for a complex return.

The economic model of Witte and Woodbury [1985] also indicates a direct relationship between complexity and noncompliance. Parameters for their regression are estimated from a data set gathered by the IRS in the early 1970s. For their complexity variable they use the "number of additional tax schedules filed".

There are two serious flaws in the operationalizing of complexity in the above econometric studies [Long and Swingen, 1987]. First, as Long and Swingen [1987] point

out, number of forms is a poor proxy for complexity because that number does not distinguish between the level of complexity of different forms. Second, and of greater concern, is the focus on what Witte and Woodbury term a measure of "opportunity for noncompliance". This is not a sound proxy and, more importantly, it is a confound of complexity per se.

Simple laws can be evaded. An index, such as Witte and Woodbury's, simultaneously purporting to measure two distinct constructs, intentional evasion and unintentional noncompliance, cannot be considered a reliable measure of either one.

Klepper and Nagin [1989a] employ a more refined econometric measure of effects of complexity, disaggregating noncompliance to a "line item" basis. The reporting of certain lines (e.g. "capital gains") reflects more complex law than other lines (e.g. "interest"). They theorize, "The ability of the taxpayer to excuse the noncompliance as nonwillful will vary across line items (p.6)". It is really at the line item level where noncompliance occurs and this is where irregularities in tax payment should be observed. They admit to a retrospective development of their theory after data (1982 TCMP) was examined. Greater noncompliance lines were assumed to be of greater complexity which "can serve as a basis for excusing noncompliance".

Again, the problem of confounding opportunity for evasion with complexity occurs. Recognizing this, Klepper and Nagin [1989a] conclude that research into compliance factors such as complexity must somehow control opportunity for intentional noncompliance.

Other survey research questions the effects of complexity. A government-commissioned survey found taxpayer's understanding of complex tax law, or lack thereof, influences compliance [Yankelovich, et. al., 1984]. Milliron and Toy [1988] found practitioner support for the concept that a simpler (flat tax) system would improve compliance.

Milliron [1985a and b] performed a two-stage research which developed conceptual dimensions of complexity in the first stage. Her second stage attempted to operationalize complexity in various tax scenarios presented to her subjects (prospective jurors awaiting selection) to investigate its effect on their compliance judgments.

Milliron found complexity had an effect, but the direction of the effect was not consistent. Long and Swingen [1987] question whether her "misuse" dimension was really measuring an aspect of complexity or some other phenomenon. Milliron had a control problem in failing to isolate the confounding effect of opportunity-to-evade from complexity operationalized in her scenarios. The wording

created possible interaction with other factors (e.g. societal benefit) that could be varying the direction of the influence on compliance.

Milliron concluded that complexity impacts reporting "through its effect on the opportunity to evade". She stated, "In presenting these results ... I wish to emphasize that they are presented as suggestive and not conclusive evidence (p. 803)". One firm conclusion was to refute the contention of Song and Yarbrough [1978] that complexity was only of minor concern as a compliance factor. Milliron concluded that complexity definitely mattered, but it did so in "complicating" ways.

There have been many and varied positions in the literature as to the relationship between complexity and compliance. Although operational definitions have been formulated, no prior work has distinguished between the confounding effects of opportunity for evasion and complexity. Complexity's relationship with noncompliance has always been studied in circumstances where noncompliance is in the taxpayer's economic self-interest. Thus, lingering doubt remains as to whether the noncompliance is due to complexity.

PRIOR WORK ON NONRESIDENT TAXATION Only one study considered compliance and nonresident alien taxation. The General Accounting Office (GAO) assessed IRS procedures for

monitoring compliance in this area [GAO, 1988]. GAO concluded, "IRS does not have the kind of information needed to assess (its) alien compliance efforts (p.31)."

The GAO review of the IRS had many weaknesses. Subjects were selected in a biased, nonrandom sample. Apparently, the IRS guided the GAO to returns of certain visa classes, particularly those of the most visible (entertainers and athletes) and well-to-do (investors and financiers). These groups had disproportionate representation. For example, distinguished merit visitors (entertainers and athletes) represent only 0.5 percent of the population of nonresidents temporarily entering the U.S. They represented 34 percent of the GAO sample. Many distinguished merit visitors (e.g. musicians on tour) must, through their promoters, prearrange tax payments with the IRS before they even enter the country.

The GAO stated that the few (no exact number given) students examined "were inadvertently included." No attempt was made to match the noncompliant returns of students to demographic or background data to uncover causes. GAO believed that much work needed to be done in this area.

This study provides insight into nonresident compliance. Also it answers questions regarding the effects of complexity unconfounded by the opportunity to evade.

CHAPTER 4: HYPOTHESIS DEVELOPMENT

INTRODUCTION

This chapter reviews the research question and develops the hypotheses to be tested in this study. Reasons that the study is unique are discussed. Issues related to the research are presented along with the rationale for the approach taken. The research question and hypotheses are first reviewed. Then, the dependent variables measure employed is explained and related to the hypotheses.

RESEARCH QUESTION, HYPOTHESES AND EXPECTATIONS

The primary research question for this study is: Is complexity in the tax law associated with noncompliance? Prior complexity/compliance research has failed to adequately control for the confounding effects of opportunity to evade. Such research has not ascertained whether subjects failed to comply because they did not understand the law or because it was not in their economic self-interest to comply with the law. This failure results from the difficulty of separating complexity-driven noncompliance from noncompliance driven by evasion. There is lingering uncertainty as to whether opportunity to evade taxes (economic self-interest) or confusion (from complexity) causes noncompliance. This study attempts to show that complexity relates to unintentional noncompliance.

For a subset of foreign students with certain characteristics, noncompliance is not in their economic self-interest as taxpayers. Full compliance with the nonresident laws results in tax savings. In such a situation, noncompliance can be related to complexity since there would be no economic incentive to evade.

Two hypotheses are generated to answer the research question. H1: In the presence of complexity in tax law, noncompliance occurs at the same level when compliance would be in the economic self-interest of the taxpayer as when compliance would not be in the economic self-interest of the taxpayer. (There is no difference in the level of noncompliance.)

H2: Absent the effects of complexity, taxpayers, for whom full compliance is in their economic self-interest, will comply at a higher level than those who have not had the effects of complexity removed.

The first hypothesis is stated in the null, the second in the alternative form. Support for these hypotheses indicates that complexity is related to noncompliance.

The first hypothesis states that the effects of complexity overwhelm economic self-interest. Thus, noncompliance is expected to be the same in the population of foreign students with economic incentive to comply as in the population of foreign students without economic incentive to comply. It is suspected that no significant difference exists, that is, the levels of noncompliance are the same in both populations. If a tax law is so complex as

to lead to unintentional noncompliance, there should be approximately equal noncompliance among those with and without an economic incentive to comply.

In the case of the first hypothesis, it is expected that it will not be rejected. Failure to reject a null hypothesis is not as strong as acceptance of an alternative hypothesis. At issue is power. To determine the strength of the evidence, an analysis will be made of the power of the statistical tests used. Kirk [1982] recommends 0.70-0.80, as a general guideline for level of power. (see Figure 3 in Chapter 5 for the formula to calculate power, and the power discussion in Chapters 5 and 6).

The second hypothesis states that removing the effects of complexity will lead to taxpayers acting in their economic self-interest. To test this hypothesis, a treatment intervention is provided to a group of foreign students from one university to reduce the effects of complexity. These students are then compared to foreign students from another university where no treatment was provided. Expectation is that students from the treatment university will comply at a rate significantly different from students at the university where no treatment intervention was provided.

Even though the entire foreign student population at the treatment university did not directly undergo the

complexity-reducing intervention, a difference in compliance is expected. Beron, Tauchen and Witte [1990] found support for the concept of a "ripple" (spillover) effect resulting from an audit intervention. The tax filing behavior of taxpayers whose returns were not directly audited, but who were in proximity to those whose were, differed from a control group. Their model also suggested a ripple effect on compliance may exist from the provision of taxpayer information/education programs.

Dubin, Graetz and Wilde [1990] concluded audit interventions had a "spillover" effect to individuals not directly audited. Their results indicate a significant, positive impact on compliance. However, a second, negative effect between audits and the number of returns filed per capita was reported. Thus, even though more people were brought to full compliance with the law, an increase in the proportion of nonfilers was also observed.

Kinsey [1992] also reported a dual effect ("two opposing effects") on compliance resulting from audits. The first effect (positive) was observed for those who had direct contact with an IRS audit. The second effect (negative) occurred in subjects who had only indirect ("vicarious") contact with the IRS, and thus was more by way of a ripple effect.

If the training intervention at the treatment

university produces similar results to a tax audit intervention, then a difference in level of compliance should be observed. There should be a relationship between the level of compliance and the university attended. But, even though the expectation is that more students may be brought into full compliance, there may also be a decline in the number of returns filed per capita if the secondary, ripple effect occurs.

Support for both hypotheses provides evidence that complexity itself is associated with noncompliance. This allows a statement to be made as to the relationship of complexity and compliance absent confounding effects of opportunity to evade. To determine whether the hypotheses are valid, two statistical tests will be run on each. These statistical tests are discussed in Chapter 5, Methodology.

DEPENDENT VARIABLE CONSTRUCT AND HYPOTHESIS DEVELOPMENT

The dependent variable in this study is the level of compliance among subjects. Roth, Scholz and Witte [1989] define compliance as the accurate filing of a tax return per code requirements. They denote two general categories of noncompliance, over- and underreporting. If taxpayers do not claim all allowable deductions, overreporting occurs. If taxpayers claim deductions to which they are not entitled, underreporting occurs.

In his discussion of stochastic models, Schmidt [1989]

argues that a model of deliberate evasion would be "one-sided". There would be no overreporting of tax liability, only underreporting. However, if this study finds equal over- and underreporting (noncompliance) behavior at the university where no treatment intervention was provided, results would not fit the evasion model. One could not argue that opportunity for evasion drives such noncompliance. Given that the area of tax law being examined is a complex one, the argument could then be advanced that complexity is related to noncompliance.

In the case of foreign scholars who qualify for educational expense deductions, full compliance with the law reduces tax liability. Foreign students, who have income over a threshold amount of \$4,950 for 1988 (the total of a \$3,000 standard deduction allowed U.S. residents plus the personal exemption of \$1,950), and also qualify for educational expenses will pay less taxes if they fully comply. By federal requirement these students have had money withheld from their pay checks. Given withholding, not filing or filing wrongly could lead to overpayment of tax liability which is not in their economic self-interest.

Full compliance for a foreign student who qualifies involves filing a Form 1040NR, and claiming an educational deduction and allowable treaty benefits. Because the educational deduction can be two to three times the amount

of the U.S. standard deduction, the tax savings are greater than what they achieve by claiming a standard deduction on a noncompliant tax return. Treaty benefits, ranging from \$2,000 to \$5,000 are claimed in addition to any educational expense deductions, and are not available on a regular U.S. tax form (1040, 1040A or 1040EZ) which a foreign student may incorrectly file. Tax savings can represent a substantial proportion of disposable income for a foreign student. Because by law [§1.1441-1] withholding from their wage and scholarship income was either at a 30% or 14% rate, it would be in their best interest to claim every allowable deduction. Noncompliance for them could not be confounded with economic self-interest or opportunity to evade.

Because there are many points at which a person can fail to comply given the series of purposive steps required to comply with tax law [Smith and Kinsey, 1987], a further expectation is that multiple forms of noncompliance will be encountered. Tversky [1972] has developed a theory called elimination-by-aspect (EBA) to show how given similar choices, individuals arrive at different decisions. Such a theory indicates taxpayers in similar circumstances and from similar backgrounds can still reach different conclusions; it suggests noncompliance does not take the same form. Thus, multiple measures of the dependent variable, level of compliance, will be utilized to test the hypotheses.

CHAPTER 5: METHODOLOGY

INTRODUCTION

This research can be categorized as a field study [Kerlinger, 1986], or "quasi-experiment" [Cook and Campbell, 1979]. It analyzes relationships among existing social structures. There is no controlled environment. Rather, data are gathered on subjects in an actual social milieu from tax year 1988.

The Methodology Chapter first reviews the research question and hypotheses. It then introduces constructs and variables, followed by a discussion on how they will be measured. Next, data collection activities are examined. Last, the analysis of data, and calculation of revenue impact are presented.

RESEARCH QUESTION, HYPOTHESES AND EXPECTATIONS

The primary research question is: Is complexity in the tax law associated with noncompliance? There is lingering uncertainty as to whether opportunity to evade taxes (economic self-interest) or confusion (from complexity) causes noncompliance. This study sorts out the effects of complexity from the effects of opportunity to evade.

Two hypotheses are generated to answer the research question.

H1: In the presence of complexity in tax law, noncompliance occurs at the same level when

compliance would be in the economic self-interest of the taxpayer as when it is not.

- H2: Absent the effects of complexity, taxpayers, for whom full compliance is in their economic self-interest, will comply at a higher level than those who have not had the effects of complexity removed.

There are two tests for each hypothesis as described later in the analysis section of this chapter. Support for these hypotheses indicates that complexity is related to noncompliance.

The first hypothesis states that the effects of complexity overwhelm economic self-interest, i.e. noncompliance is expected to be the same in a population of foreign students with economic incentive to comply and a population of foreign students without economic incentive to comply. If complexity in the tax law generates such confusion, then the degree of noncompliance should be approximately equal among those with and without an economic incentive to comply leaving no difference in the level of noncompliance. The expectation is that the null hypothesis will not be rejected.

The second hypothesis states that removing the effects of complexity will lead to taxpayers acting in their economic self-interest. The expectation is that the degree of compliance among a group which has undergone a treatment to reduce the effects of complexity will be significantly greater than a group which has not undergone such treatment.

The expectation is to reject the null hypothesis.

OPERATIONALIZING CONSTRUCTS AND VARIABLES

NONCOMPLIANCE Kidder and McEwen [1989] developed a topology of noncompliance. Several types are salient to this research: procedural, lazy, and unknowing noncompliance. Two types "procedural" and its companion form, "lazy noncompliance" are conceptually related. A similar feature that distinguishes these forms of noncompliance from other forms is that information is either missing, or incompletely provided at a point where only a little more effort is required for the taxpayer to at least partially comply. Some sin of omission or deceit is involved. Such noncompliance may result in either failure to file at all or filing in what may be perceived as an evasive way. Examples would include omitting income information (lazy) when calculating tax liability, or filing the 1040NR but claiming a tax treaty deduction to which one is not entitled (procedural). Kidder and McEwen emphasize, "such violations do not necessarily result in understatements of tax liability (p. 57)."

Their third type of noncompliance of interest for this study is "unknowing noncompliance" which involves incorrect payment of taxes due to lack of understanding of "complex, changing and sometimes ambiguous rules (p. 58)." Failure to fully comprehend the law and to identify an allowable

deduction in a complex area, such as the educational deduction (described at the end of Chapter 4) typifies unknowing noncompliance. Regarding taxpayers exhibiting this latter type of noncompliance, Kidder and McEwen state, "None of them intends to break the law (p.58)."

EFFECTS OF COMPLEXITY The presence of complexity in the nonresident student filing process is viewed as a variable expected to affect the level of noncompliance. It is expected that, given complexity, taxpayers may not file in a manner consistent with their best economic self-interest.

TREATMENT EFFECT A treatment training was given at one university to reduce the effects of complexity. Categorical absence or presence of this training intervention is viewed as an independent variable. The treatment is best described as an "information program" [a la Roth, Scholz and Witte, 1989, pp. 128-129]. Such programs are "designed to combat nonwillful noncompliance". They should present "the requirements of the tax law in as clear, simple and nonthreatening a manner as possible". Such programs simplify tax "instructions and regulations".

Roth, Scholz and Witte state, "The objective of information programs is to provide taxpayers with the means to comply (e.g., tax returns), the information necessary to comply (instructions, regulations, and notification of statutory changes), and knowledge of the consequences of not

complying (p.128)." They imply that such presentations utilize graphic media and include extensive question and answer opportunities. Taxpayers should be able to obtain individual assistance for their problems and to receive actual direction in "preparing tax returns".

Subjects at the treatment university were exposed to training designed to reduce the effects of complexity in tax law. Aspects of nonresident taxation were explained in detail at a three-hour workshop. All IRS publications required to properly file the form 1040NR were provided. A 1040NR was reviewed step by step using overhead projection of a sample form. The training included an extended session on educational expense deductions. The tone was nonthreatening, but with reference made to obligation for voluntary compliance.

At the conclusion, an extended individual question and answer period with the majority of the participants, served as a manipulation check. Conversations with the students indicated they had been impacted by the training, understood the 1040NR requirements, and were aware of the qualified educational deductions (i.e. many question on various elements of the deduction, e.g. phone calls back to home country).

Informally indicating an indirect spillover ("ripple") effect to the population at large were the approximately 50

students who approached the instructors in the weeks after the intervention. They admitted that they had not been to the training program, but knew somebody who had, and wanted to find out more about their allowable deductions on the form 1040NR.

INCENTIVE TO COMPLY Economic benefits of compliance accrue to foreign students who qualify for the educational deduction and/or tax treaty benefits. The educational deduction can be two to three times the amount of the standard deduction. Also, by compliantly filing a 1040NR, many foreign students can claim additional tax treaty benefits.⁴⁹ Treaty exclusions are claimed in addition to any itemized deductions on the form 1040NR. Treaty exclusions are not deductible on the regular form 1040. For students who qualify for both educational deductions and treaty benefits, compliance is rendered even more in their economic self-interest.

DATA COLLECTION

A variety of demographic data were obtained on foreign students. Two universities agreed to participate in this

⁴⁹A treaty country student who is assured of having zero tax liability can arrange to have no withholding by filing a Form 8233. This form was not in use at either university. Filing an 8233 does not relieve a nonresident of the obligation to file a tax return even if no taxes are due. Also, if a nonresident does not file within sixteen months of their due date, they will lose all tax treaty benefits, deductions, and credits (Sec. 1.871)

study if confidentiality of data was guaranteed. The schools provided social security numbers, data on government sponsorship, prior work experience, academic major and level, visa information, age, sex and date of entry into the U.S.

Social security numbers were forwarded to the IRS Research Division. By computer matching, the IRS in turn provided grouped output as described in the "Measurement of Variables" section of this chapter. (§7213 forbids the IRS from disclosing information on any specific individual or information that would allow identification of any specific individual) from the actual tax returns filed for the years being studied. The social security field was deleted from the final data base at the time each individual record was matched.

The IRS Research Division, which is separate from their Audit Division, guaranteed no retribution based on the results of this study. As a further precaution, tax year 1988 is used in the study. The statute of limitations (three years) for 1988 expired prior to release of any results of this study.

MEASUREMENT OF VARIABLES

This study measures noncompliance categorically as properly filing, or not. If all foreign students properly file a 1040NR, then no complexity argument can be made.

However, priors suggest noncompliance persists among foreign students.

A simple measure of compliance would be whether or not a student filed the Form 1040NR. However, as discussed, merely filing a 1040NR does not constitute full compliance. There are many other ways a foreign student can fail to comply, some of them not in the student's best interest. A more sophisticated approach is utilized since filing a 1040NR, while the proper form for a foreign student to file, does not in and of itself constitute full compliance.

This more refined approach required a chart of noncompliance be developed (see Figure 1, Flow Chart) covering major issues for nonresident filing. The major forms of noncompliance are coded on the Flow Chart and discussed in the accompanying Compliance Key (see Figure 2).

The Flow Chart sorts students into 32 compliance categories based on the juncture at which noncompliance occurred. Several lengthy SAS programs, matching demographic data collected from universities with actual IRS return data, were developed to sort subjects into the 32 compliance categories. These programs were run at the IRS. The 32 categories distinguish such factors as whether or not an individual student was qualified for educational and/or treaty benefits. Thus, the compliance of qualified students can be distinguished from the compliance of nonqualified

N = Noncompliance (Not in best interest of Taxpayer, i.e., Unintentional)

C = Compliance
P = Partial Compliance

E = Evasion (In best interest of T, Intentional)

----- Noncompliance
————— Compliance

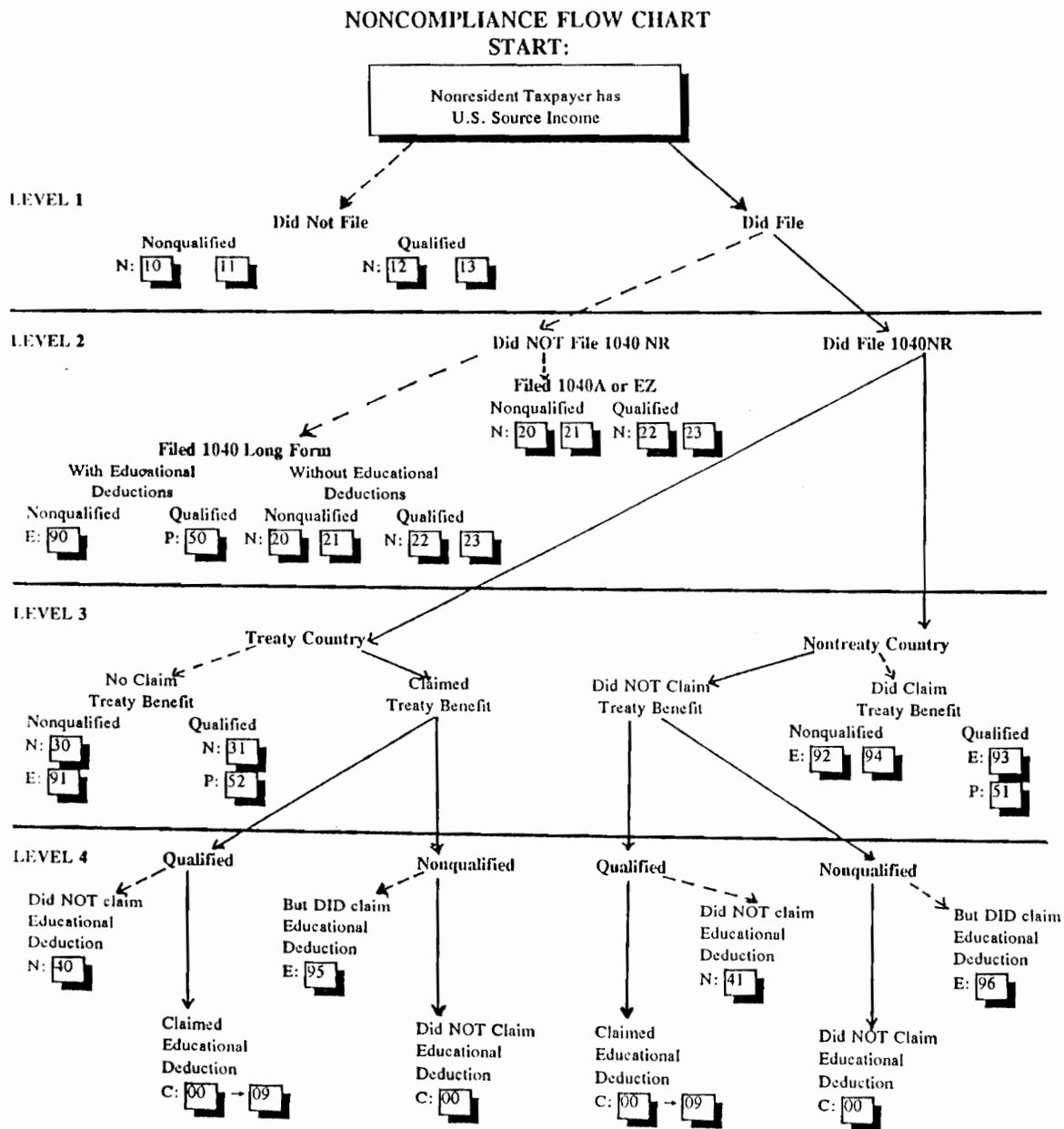


FIGURE 1
NONCOMPLIANCE FLOW CHART

NOTE: If a foreign student illegally claims a treaty benefit OR educational deduction, this indicates evasion. If the student is sophisticated enough to know of the existence of such benefits or deductions and unlawfully claims them, it is difficult to conceive of this as an unintentional action.

- 00. FULL COMPLIANCE, \$0 - \$999 OF EDUCATIONAL DEDUCTIONS.
- 01. FULL COMPLIANCE, \$1,000-1,999 EDUCATIONAL DEDUCTIONS.
- 02. FULL COMPLIANCE, \$2,000-2,999 EDUCATIONAL DEDUCTIONS.
- 03. FULL COMPLIANCE, \$3,000-3,999 EDUCATIONAL DEDUCTIONS.
- 04. FULL COMPLIANCE, \$4,000-4,999 EDUCATIONAL DEDUCTIONS.
- 05. FULL COMPLIANCE, \$5,000-5,999 EDUCATIONAL DEDUCTIONS.
- 06. FULL COMPLIANCE, \$6,000-6,999 EDUCATIONAL DEDUCTIONS.
- 07. FULL COMPLIANCE, \$7,000-7,999 EDUCATIONAL DEDUCTIONS.
- 08. FULL COMPLIANCE, \$8,000-8,999 EDUCATIONAL DEDUCTIONS.
- 09. FULL COMPLIANCE, OVER > \$9,000 EDUCATIONAL DEDUCTIONS.

- 10. NONCOMPLIANCE: DID NOT FILE.
- 11. NONCOMPLIANCE: DID NOT FILE AND MISSED TREATY BENEFIT.
- 12. NONCOMPLIANCE: DID NOT FILE AND MISSED EDUCATIONAL.
- 13. NONCOMPLIANCE: DID NOT FILE AND MISSED BOTH.

- 20. NONCOMPLIANCE: FILED WRONG 1040.
- 21. NONCOMPLIANCE: FILED WRONG 1040 AND MISSED TREATY BENEFIT.
- 22. NONCOMPLIANCE: FILED WRONG 1040 AND MISSED EDUCATIONAL.
- 23. NONCOMPLIANCE: FILED WRONG 1040 AND MISSED BOTH.

- 30. NONCOMPLIANCE: FILED 1040NR BUT MISSED TREATY BENEFITS.
- 31. NONCOMPLIANCE: FILED 1040NR BUT MISSED BOTH.

- 40. NONCOMPLIANCE: 1040NR (TREATY CORRECT) MISSED EDUCATIONAL.
- 41. NONCOMPLIANCE: 1040NR (NONTREATY COUNTRY) MISSED EDUC'N'L.

- 50. PARTIAL COMPLIANCE: FILED WRONG FORM, EDUCATIONAL CORRECT.
- 51. PARTIAL COMPLIANCE: TREATY INCORRECT; EDUCATIONAL CORRECT.
- 52. PARTIAL COMPLIANCE: MISSED TREATY; EDUCATIONAL CORRECT.

- 90. EVASIVE: WRONG 1040 AND INCORRECT EDUCATIONAL DEDUCTION.
- 91. EVASIVE: MISSED TREATY, INCORRECT EDUCATIONAL DEDUCTION.
- 92. EVASIVE: NONTREATY STUDENT, INCORRECT TREATY BENEFIT.
- 93. EVASIVE: INCORRECT TREATY BENEFIT, MISSED EDUCATIONAL.
- 94. EVASIVE: INCORRECTLY CLAIMED TREATY AND EDUCATIONAL.
- 95. EVASIVE: TREATY CORRECT; BUT EDUCATIONAL INCORRECT.
- 96. EVASIVE: NONTREATY STUDENT WITH INCORRECT EDUCATIONAL.

COMPLIANCE KEY

FIGURE 2

students.

Students were further grouped at the IRS according to broader types of noncompliance indicated by Kidder and McEwen's [1989] topology. The 32 compliance categories were summarized into three broad compliance groups: Lazy Noncompliance, Unknowing Noncompliance and Full Compliance.⁵⁰ As discussed, not filing would be an example of Lazy Noncompliance. Filing the wrong form or incorrectly filing the 1040NR would be an example of Unknowing Noncompliance. For students who do not qualify for the educational deductions, compliance means filing a 1040NR with no educational deductions and properly handling tax treaty benefits. For students who qualify for the educational deduction, compliance is defined as filing a 1040NR with educational deductions and properly handling tax treaty benefits.

Thus, the proportion of students who fall into each of the three compliance groups can be determined. Qualified students grouped as Lazy Noncompliance are indicated by compliance code categories: 12, 13 and 93. Qualified students in Unknowing Noncompliance include categories: 22, 23, 31, 40, 41, 50, 51 and 52. Qualified students in Full

⁵⁰Because of low cell count that would result from keeping Procedural Noncompliance separate (too low to allow statistical analysis) this group was combined, based on conceptual commonalities, with the Lazy Noncompliance group.

Compliance include code categories: 00 through 09.

Nonqualified students grouped as Lazy Noncompliance were indicated by compliance code categories: 10, 11 90, 91, 92 and 94 through 96.⁵¹ Nonqualified students in Unknowing Noncompliance include categories: 20, 21, and 30. Qualified students in Full Compliance are category 00.

ANALYSIS OF DATA

The first step in analyzing the data is to identify nonresidents who have an economic incentive to comply. Many foreign students, temporarily present in the U.S., qualify for educational expense deductions on a 1040NR provided their education is related to a prior job.

PARTITIONING OF SUBJECTS Subjects are analyzed by *a priori* comparisons of various groups.⁵² The first group is the "qualified no-help" group. Subjects in this group are foreign students indicated as qualifying for the educational deduction who are from universities with no formal tax help programs. Complexity is expected to have greater impact on compliance by this group. Full compliance subjects in this group have compliance code categories ranging from 00

⁵¹None of the students in the final sample of 1,193 were coded at the IRS as compliance categories 94, 95 or 96.

⁵²Although it would be interesting, data limitations prevent comparison of pre- to post-DRA'84 compliance levels. The IRS Master File is only maintained for the three most recent years.

through 09. Lazy noncompliance includes categories 12, 13, and 93. Unknowing noncompliance includes categories 22, 23, 31, 40, 41, 50, 51 and 52.

The next group includes subjects who qualify for the educational deduction and are from universities where efforts were made to provide tax information. The tax information interventions were designed to allow foreign students to experience fewer problems with complexity. Tax information intervention is viewed as a treatment. To identify them as having the effects of complexity reduced, they are referred to as the "qualified, complexity-lite" group. Full compliance subjects in this group have compliance code categories ranging from 00 through 09. Lazy noncompliance includes categories 12, 13, and 93. Unknowing noncompliance includes 22, 23, 31, 40, 41, 50, 51 and 52.

The third group consists of students who do not qualify for educational expense deductions and are from universities where no tax help was offered. Subjects in this group are nonqualified foreign students who have not had a complexity-reducing treatment. This third group is thus called the "nonqualified, no-help" group. Code category 00 indicates full compliance for this group. Lazy noncompliance includes categories 10, 11, 90, 91, 92, and 94 through 96. Unknowing noncompliance includes categories 20, 21, and 30.

The final partitioning subdivides the "qualified, no-

help" group. This last partitioning is a further refinement which removes all nontreaty students. By leaving only students who can claim treaty benefits, but have not been exposed to formal tax help sessions, this last group represents the subset where both economic incentive to comply and effects of complexity are their strongest. They are called the "treaty" group. Code category 00 indicates full compliance for this group. Lazy noncompliance includes categories 10, 11, 90, 91, 92, and 94 through 96. Unknowing noncompliance includes categories 20, 21, and 30.

STATISTICAL ANALYSIS The dependent variable, noncompliance, is measured categorical as the proportion of nonresident students in each group who do not file properly. Before comparing the groups as described above, a more basic, preliminary test will be run to determine if there is a difference between the complexity-lite and no-help universities based on the simplest measure of compliance, the type of tax return filed. Although merely filing a form 1040NR does not constitute full compliance, a difference should be observed in the proportion of form 1040NR returns filed at the two universities. That is, there should be a positive relationship between attending the university which offered tax help and the filing of the form 1040NR. If there is no difference in the proportion of form 1040NR returns filed at the two universities, the likelihood that

the training intervention had a positive effect would be difficult to prove.

A chi-square test will determine whether the type of tax return filed is independent of whether the student attended a help versus a no-help university by comparing the proportion of returns filed at each university. The expectation is that the complexity-lite university will differ from the no-help university.

To test the two hypotheses developed in Chapter 4, the categorical dependent variable measure utilized is compliance group, i.e. Lazy, or Unknowing Noncompliance and Full Compliance. The appropriate statistic for comparing groups on a multiple, categorical dependent variable measure is the chi-square test [Ott, 1988]. The null hypothesis, there is no relationship between sample group and the dependent variable measure (independence) will be tested. The alternative hypothesis, there is a relationship between the groups and the dependent variable (dependence) will be accepted if the null hypothesis is rejected.

TESTS OF HYPOTHESES To test H1, the "qualified, no-help" group is compared to the "nonqualified, no-help" group (see Figure H1A1 for group comparison). The two groups are compared on the three levels of the dependent variable measure, lazy and unknowing noncompliance, and full compliance, to determine if complexity impacted compliance.

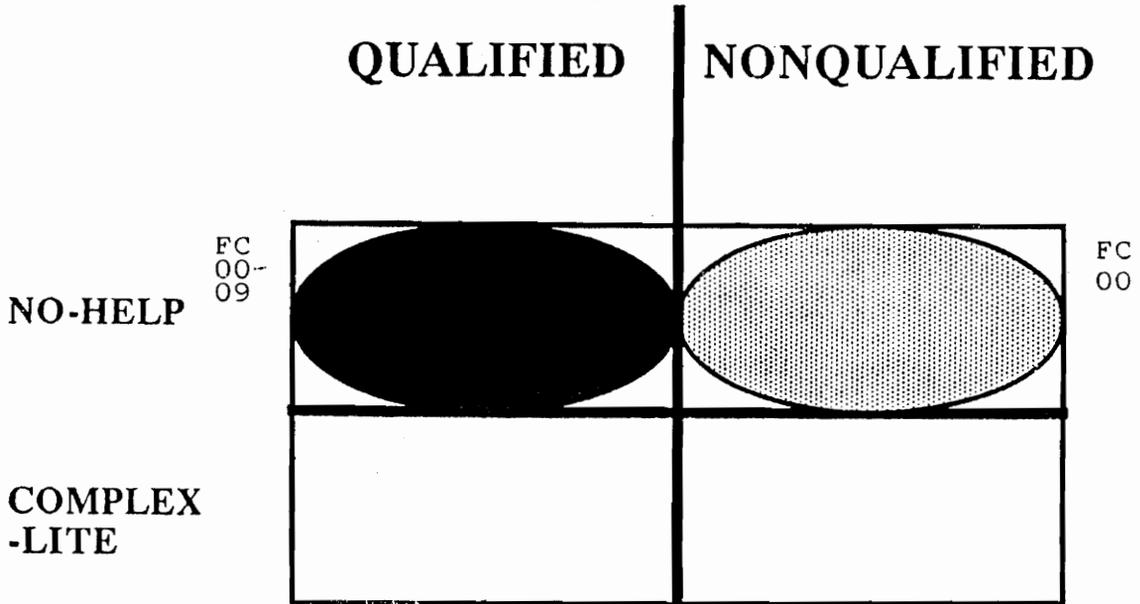


FIGURE H1A1

QUALIFIED VS NONQUALIFIED

NOTE: FC= FULL COMPLIANCE

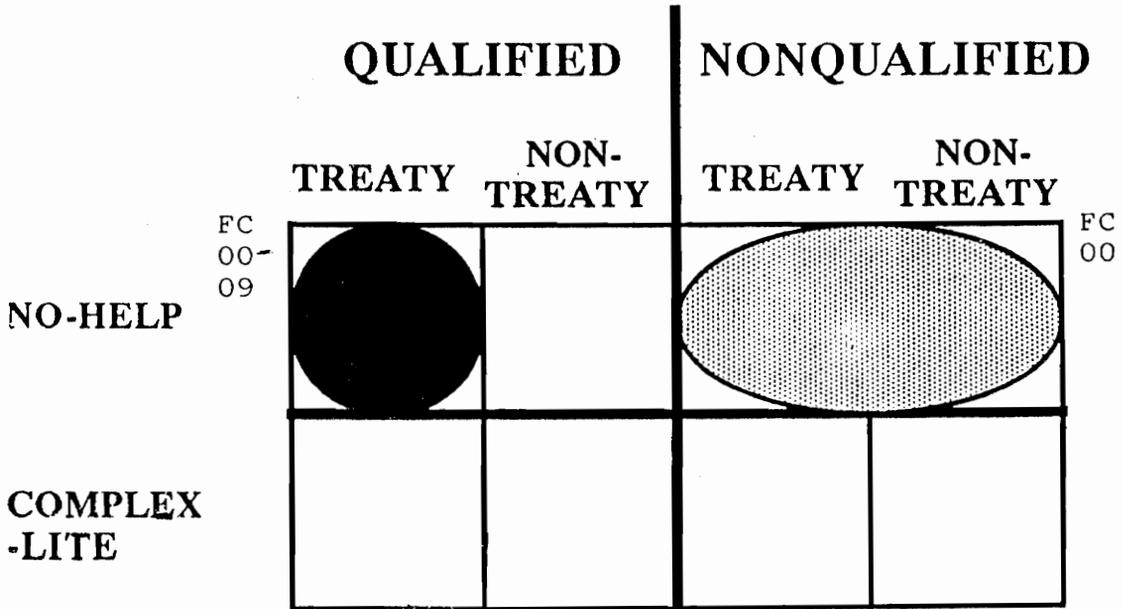


FIGURE H1A2

QUALIFIED-TREATY VS NONQUALIFIED

Failure to reject suggests that the effects of complexity overwhelmed the economic self-interest of the taxpayer. The alternative hypothesis test is:

$$H1_{A1}: \text{NONCOMPL}_{\text{QLD,NO-HELP}} \text{ is not equal to } \text{NONCOMPL}_{\text{NQLD,NO-HELP}}$$

Where QLD,NO-HELP = Qualified, did not receive help.

NQLD,NO-HELP = Nonqualified, did not receive tax help.

As discussed earlier, power is an issue when failing to reject a null hypothesis. Knowing sample sizes and proportions, Walpole and Myers [1978] calculate power for the Z test of a binomial distribution. Figure 3 reproduces their formula and shows power calculations for several sample sizes and various proportions of noncompliance. Fairly large sample sizes are needed to yield acceptable levels of power. Power for this study is presented in the Results Chapter.

To test H2, noncompliance of the qualified "complexity-lite" group is compared to the qualified "no-help" group (Figure H2A1). If noncompliance is lower for the "complexity-lite" group, H2 is supported. This implies that, if the effects of complexity are reduced, people are more likely to comply. Again, the two groups are compared on both measures of the dependent variable, procedural (lazy) and unknowing noncompliance. The alternative hypothesis is:

$$H2_{A1}: \text{NONCOMPL}_{\text{QLD,CMPX-LT}} < \text{NONCOMPL}_{\text{QLD,NO-HELP}}$$

Power = $P(Z > z) = 1 - \Phi(Z)$, where

$$Z = \frac{z_{\alpha} \sqrt{(k+1) \left(\frac{\pi_1 + k\pi_2}{k+1} \right) \left(1 - \frac{\pi_1 + k\pi_2}{k+1} \right) - (\pi_1 - \pi_2) \sqrt{kn_1}}{\sqrt{k \pi_1 (1 - \pi_1) + \pi_2 (1 - \pi_2)}}$$

α	π_1	π_2	n_1	n_2	Power (1- β)
.05	.40	.35	300	450	.40
.05	.80	.70	200	300	.81
.05	.70	.50	100	150	.94
.05	.60	.35	100	100	.9999

Confidence Interval

$$\hat{\pi}_1 - \hat{\pi}_2 \pm Z_{\frac{\alpha}{2}} \sqrt{\frac{\hat{\pi}_1 (1 - \hat{\pi}_1)}{n_1} + \frac{\hat{\pi}_2 (1 - \hat{\pi}_2)}{n_2}}$$

POWER CALCULATION

FIGURE 3

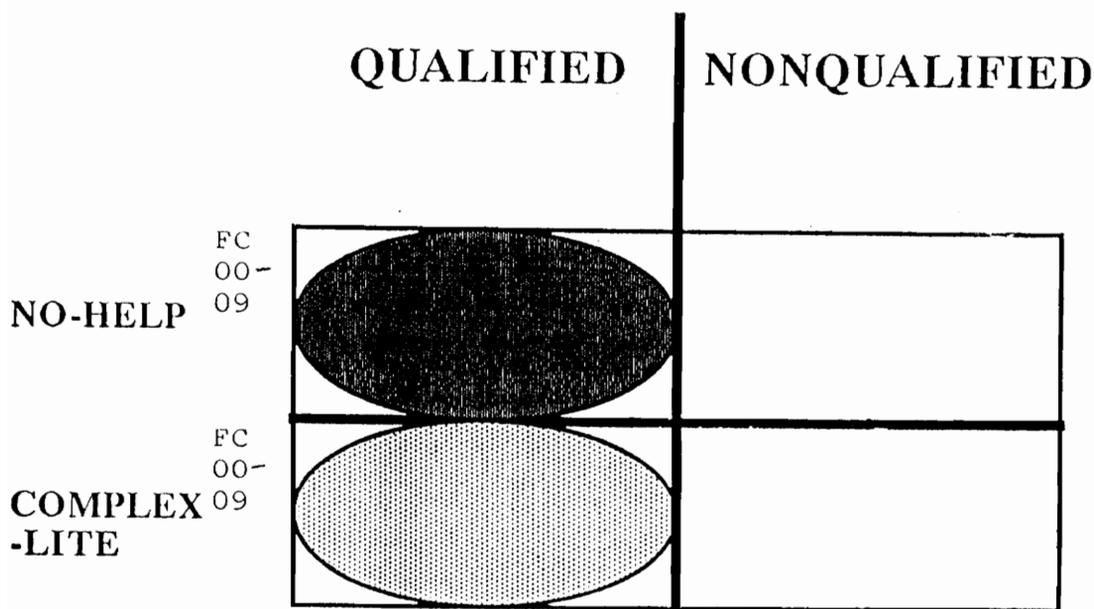


FIGURE H2A1

NO-HELP VS COMPLEXITY_LITE

NOTE: FC= FULL COMPLIANCE

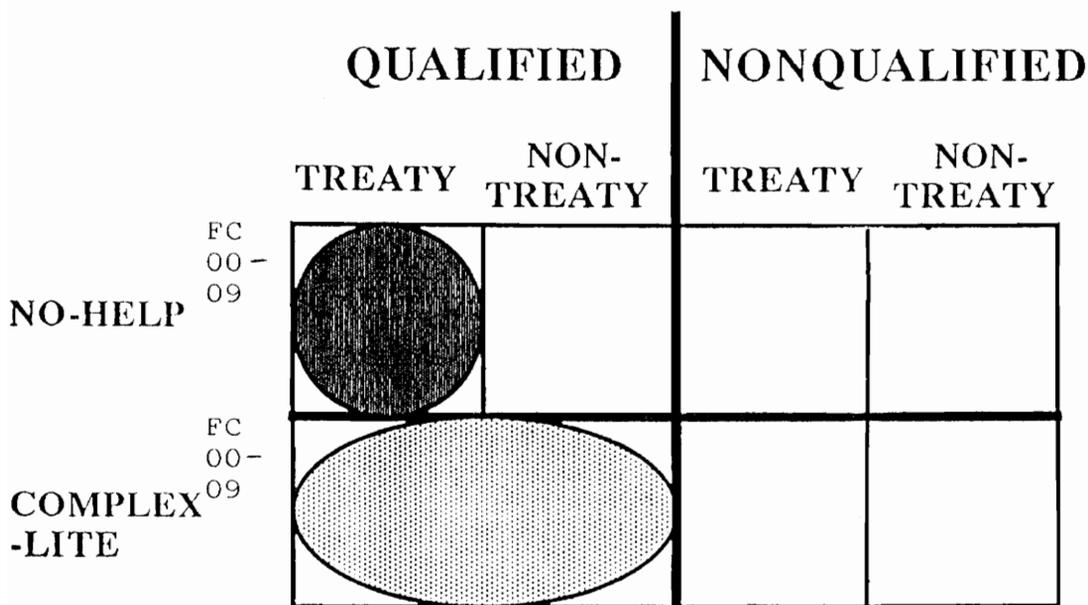


FIGURE H2A2

NO-HELP TREATY VS COMPLEXITY-LITE

Where QLD,CMPX-LT = Qualified, exposed to tax help.
 QLD,NO-HELP = Qualified, did not receive tax help.

The last two tests examine the effects of complexity on the group with the strongest economic incentive to comply, qualified foreign students who also have treaty benefits. The first of these two tests compares the qualified, no-help, treaty group ("treaty") to the "nonqualified, no-help" (see Figure H1A2). Because of economic incentives noncompliance should be less in the "treaty" group, since tax dollars are saved by complying. Again, groups are compared on all three measures of the dependent variable. For students who both qualify for the educational deduction and are entitled to treaty exclusions, full compliance is indicated by filing a form 1040NR on which both educational and treaty deduction benefits are claimed. The alternative hypothesis is:

H_{1A2} : $NONCOMPL_{TREATY}$ is not equal to $NONCOMPL_{NQLD,NO-HELP}$

Where TREATY = Strong incentive, treaty and educational deduction.

NQLD,NO-HELP = Nonqualified, did not receive tax help.

Failure to reject the null indicates complexity is a determinant of noncompliance.

The last test compares the qualified "complexity-lite" group to the qualified, no-help "treaty" group (Figure H2A2). The "complexity-lite" group, for whom some of the complexity is reduced, is expected to act in its economic

self-interest (by claiming educational deductions). The "complexity-lite" group has less economic incentive to comply (economic argument is for higher noncompliance) because not all members can claim treaty exclusions. The alternative hypothesis is:

$$H2_{A2}: \text{NONCOMPL}_{\text{QLD,CMPX-LT}} < \text{NONCOMPL}_{\text{TREATY}}$$

Where QLD,CMPX-LT = Qualified, exposed to tax help.
 TREATY = Strong incentive, treaty and educational deduction.

Groups are compared on both measures of the dependent variable.

REVENUE IMPACT

In addition to addressing the research question and hypotheses, the overall revenue impact of noncompliance among foreign students is examined. Clotfelter [1983] and Witte and Woodbury [1985] offered an econometric estimate of total tax revenues lost from evasive noncompliance. Klepper and Nagin [1989a] believe lost revenue calculations can provide insight for tax policy considerations. However, the revenue estimate portion of this research may provide a unique perspective in that it is expected as prior literature suggests, that complexity can also cause overpayment of taxes.

The magnitude of the revenue impact is calculated by determining the correct tax liability, had the 1040NR been

filed, with a qualified educational deduction and any allowable tax treaty benefits, compared to tax reported on the forms 1040, 1040A, or 1040EZ. An algorithm is used to compute a hypothetically correct tax expense. If qualified students claim only the standard deduction instead of their full educational expense deduction, they probably overpaid the taxes if they are from a treaty country.

Tuition expenses at each university were known and living expenses were estimated at each university for room and board. From these amounts, a range for the qualified education deduction at each university was estimated. Expenses such as housing and utility information were approximated by cost of living data obtained from: American Chamber of Commerce Researchers Association, "Inter-City Cost of Living Index," 4th quarter, 1988 and 1st quarter, 1989; American Gas Association, Gas Facts, 1989; Places Rated Partnership survey of local real estate boards; U.S. Department of Education, Directory of Postsecondary Institutions, 1989; and U.S. Department of Energy, Typical Electric Bills, 1989 [Boyer and Savageau, 1989].

CHAPTER 6: RESULTS

FINAL SAMPLE AND DATA COLLECTED

Initially, 2,665 students (1,595 from the complexity-lite university and 1,070 from the no-help university) were identified as foreign scholars to be considered for inclusion in this study. Social Security numbers and wage information were obtained for these subjects. Students whose income was less than \$1,950, the minimum amount for which a foreign student was exempt from taxes in 1988, were omitted. This reduced the sample size to 2,078 students.

Additional demographic information was obtained from the two universities, and subjects with either incomplete or otherwise unusable data were eliminated. Examples of reasons for eliminating students include: length of stay in U.S., i.e. sufficient time to establish tax residency status; and/or citizens of three countries, Barbados, Hungary, and Jamaica, whose tax treaties allow filing as U.S residents as soon as they arrive (thus making noncompliance impossible to detect for purposes of this study); and/or data insufficient to determine qualification for treaty and educational deductions. The final sample includes 1,193 students (749 from the complexity-lite university, 444 from the no-help university).

Student social security numbers and other relevant

demographic data were forwarded to the IRS Research Division. The Research Division matched and merged data supplied by the researchers to tax return data from IRS's 1988 Master Tapes. Sorting and coding programs were run at the Research Division which then released selected data tables in grouped output format (rendering it impossible to identify any individual).

STATISTICAL RESULTS AND HYPOTHESES TESTS

The first statistical analysis examines the relationship between the type of tax return filed (the simplest dependent variable measure of compliance) and university, using a chi-squared test.⁵³ The significant chi-square, $p = 0.000$ (see Table 1), indicates a relationship exists (a dependency) between the university variable and type of tax return filed.⁵⁴ A significant difference in compliance behavior by students attending the two universities, as measured by return filed, was found.

The variable having the greatest impact is the form

⁵³A chi-square analysis does not require the assumption of normality of data.

⁵⁴All tables are organized as follows. The subjects being compared are divided by rows according to differences such as university (complexity-lite or no-help) or economic incentive to comply (qualified or nonqualified). The categorical dependent variable is broken down by columns. Table columns indicate either the simpler measure, return filed (Tables 1 through 5) or the more sophisticated measure, level of compliance (Tables 6 through 15).

TABLE 1
RETURN FILED AT EACH UNIVERSITY
BREAKDOWN OF ALL RETURNS FILED

University	Return					
	Did Not File	1040EZ	1040A	1040 Long	1040NR	Total
Complexity-Lite	404 ¹ 389.88 ² 0.5112 ³	71 91.663 4.6579	62 77.851 3.2273	136 130.59 0.2243	76 59.016 4.8878	749 62.78%
No-Help	217 231.12 0.8624	75 54.337 7.8577	62 46.149 5.4442	72 77.412 0.3783	18 34.984 8.2454	444 37.22%
Total	621 52.05%	146 12.24%	124 10.39%	208 17.44%	94 7.88%	1193 100.00%

Statistic	DF	Value	Prob
Chi-Square	4	36.297	0.000
Likelihood Ratio Chi-Square	4	36.968	0.000
Mantel-Haenszel Chi-Square	1	28.869	0.000
Phi Coefficient		0.174	
Contingency Coefficient		0.172	
Cramer's V		0.174	

Sample Size = 1193

¹ Frequency actually observed per cell.

² Frequency expected if no difference in groups.

³ Cell's contribution to total Chi-Square value.

1040NR column. In 2x2 cross tabulations (see Tables 2 through 5) alternately pairing return variables and crossing with university, the form 1040NR is the only return variable that remains significant regardless of which other return variable it is paired with (chi-square probabilities of $p = 0.000$ to 0.007).

Table 1 results indicate that students at the no-help university filed the 1040EZ or 1040A more often than expected if there were no difference between the universities. Students at the complexity-lite university filed the form 1040NR and form 1040 long form more often than expected. Also, there were slightly more nonfilers at the complexity-lite than at the no-help university. There appears to be a shift among "unknowing" noncompliant (those who filed, but filed wrongly, e.g. 1040EZ) to the proper tax return form (1040NR) or a form which at least permits them to claim educational benefits. I suggest that these findings relate to the allowance of educational deductions only on the 1040NR or long form.

Also, the theory that Roth, Scholz and Witte [1989] advanced as to expected outcome of information training is of interest in light of these findings. They theorized that information training is "designed to combat nonwillful (unknowing) noncompliance". Such appears to be the case. Those who filed the 1040A or 1040EZ are unknowingly

TABLE 2
RETURN FILED AT EACH UNIVERSITY
COMPARISON OF 1040NR AND 1040A ONLY

University	Return		
Frequency Expected Cell X^2	1040NR	1040A	Total
Complexity-Lite	76 ¹ 59.505 ² 4.5727 ³	62 78.495 3.4664	138 63.30%
No-Help	18 34.495 7.888	62 45.505 5.9796	80 36.70%
Total	94 43.12%	124 56.88%	218 100.0%

Statistic	DF	Value	Prob
Chi-Square	1	21.907	0.000
Likelihood Ratio Chi-Square	1	22.878	0.000
Continuity Adj. Chi-Square	1	20.599	0.000
Mantel-Haenszel Chi-Square	1	21.806	0.000
Fisher's Exact Test (Left)			1.84E-06
(Right)			1.000
(2-Tail)			2.49E-06
Phi Coefficient		-0.317	
Contingency Coefficient		0.302	
Cramer's V		-0.317	
Sample Size = 218			

¹ Frequency actually observed per cell.

² Frequency expected if no difference in groups.

³ Cell's contribution to total Chi-Square value.

TABLE 3
RETURN FILED AT EACH UNIVERSITY
 COMPARISON OF 1040NR AND 1040EZ ONLY

University	Return		
	1040NR	1040EZ	Total
Frequency Expected Cell X^2			
Complexity-Lite	76 ¹ 57.575 ² 5.8963 ³	71 89.425 3.7963	147 61.25%
No-Help	18 36.425 9.32	75 56.575 6.0005	93 38.75%
Total	94 39.17%	146 60.83%	240 100.0%

Statistic	DF	Value	Prob
Chi-Square	1	25.013	0.000
Likelihood Ratio Chi-Square	1	26.352	0.000
Continuity Adj. Chi-Square	1	23.674	0.000
Mantel-Haenszel Chi-Square	1	24.909	0.000
Fisher's Exact Test (Left)			3.13E-07
(Right)			1.000
(2-Tail)			4.22E-07
Phi Coefficient		-0.323	
Contingency Coefficient		0.307	
Cramer's V		-0.323	
Sample Size = 240			

¹ Frequency actually observed per cell.

² Frequency expected if no difference in groups.

³ Cell's contribution to total Chi-Square value.

TABLE 4
RETURN FILED AT EACH UNIVERSITY
 COMPARISON OF 1040NR AND 1040 LONG FORM ONLY

University	Return		
	1040NR	1040LONG	Total
Frequency Expected Cell X^2			
Complexity-Lite	76 ¹ 65.987 ² 1.5195 ³	136 146.01 0.6867	212 70.20%
No-Help	18 28.013 3.5792	72 61.987 1.6175	90 29.80%
Total	94 31.13%	208 68.87%	302 100.0%

Statistic	DF	Value	Prob
Chi-Square	1	7.403	0.007
Likelihood Ratio Chi-Square	1	7.791	0.005
Continuity Adj. Chi-Square	1	6.682	0.010
Mantel-Haenszel Chi-Square	1	7.378	0.007
Fisher's Exact Test (Left)			4.17E-03
(Right)			0.998
(2-Tail)			6.61E-03
Phi Coefficient		-0.157	
Contingency Coefficient		0.155	
Cramer's V		-0.157	
Sample Size = 302			

¹ Frequency actually observed per cell.

² Frequency expected if no difference in groups.

³ Cell's contribution to total Chi-Square value.

TABLE 5
RETURN FILED AT EACH UNIVERSITY
COMPARISON OF 1040NR AND THOSE NOT FILING RETURNS

University	Return		
	1040NR	Did Not File	Total
Complexity-Lite	76 ¹ 63.105 ² 2.635 ³	404 416.9 0.3989	480 67.13%
No-Help	18 30.895 5.3822	217 204.1 0.8147	235 32.87%
Total	94 13.15%	621 86.85%	715 100.0%

Statistic	DF	Value	Prob
Chi-Square	1	9.231	0.002
Likelihood Ratio Chi-Square	1	10.015	0.002
Continuity Adj. Chi-Square	1	8.529	0.003
Mantel-Haenszel Chi-Square	1	9.218	0.002
Fisher's Exact Test (Left)			1.25E-03
(Right)			0.999
(2-Tail)			2.10E-03
Phi Coefficient		-0.114	
Contingency Coefficient		0.113	
Cramer's V		-0.114	
Sample Size = 715			

¹ Frequency actually observed per cell.

² Frequency expected if no difference in groups.

³ Cell's contribution to total Chi-Square value.

noncompliant (not able to claim educational or treaty benefits to fully reduce their tax liability). This group was proportionately smaller at the complexity-lite school.

Finally, as the "ripple" effect theorists indicated may happen, per capita nonfiling was worse in the treatment population as indicated by the greater than expected number of nonfilers. In any case, compliance pattern, based on return filed, shows a difference between the two universities suggesting the training intervention at the complexity-lite university had an impact.

HYPOTHESIS TESTS OF H1 The simple measure, return filed, is not as sophisticated a dependent variable measure as is level of compliance. Merely filing the 1040NR return does not in and of itself constitute full compliance. A student could file a 1040NR but miss educational or treaty deductions, or both. Only students with over \$5,100 of income are analyzed further since for them filing a form 1040NR with qualified educational deductions would save tax money compared to filing a regular 1040 with a standard deduction.

These students were placed in compliance groups based on their level of compliance, Lazy (nonfilers) or Unknowing Noncompliance (filed wrongly), or Full Compliance. Statistical tests of the hypotheses were performed to establish the relationship between level of compliance and

university.

H1 states that the effects of complexity so overwhelm economic self-interest that there is no difference in compliance between students with or without economic incentive to comply. If this hypothesis is true, the level of noncompliance would be the same, at the no-help university, among students with economic incentive to comply (those who qualify for educational deduction benefits) and those without economic incentive to comply.

As described in the Methodology Chapter, there are two tests of H1. Both tests examine noncompliance at the no-help university where the effects of complexity are expected to be greater. The first test compares compliance of qualified students with that of nonqualified students. The results based on a chi-square analysis show no significant difference (see Table 6) $p=0.563$, but caution must be advised in their interpretation.

When more than 25 percent of the cells have an expected cell count less than 5, the chi-square test may not be valid [Ott, 1988].⁵⁵ However, this presents more of an interpretation problem when the null is rejected in favor of the alternative (when p values show a significant difference).

⁵⁵ Also, SAS programs will flag the output tables to warn of this potential problem.

TABLE 6
BREAKDOWN OF COMPLIANCE GROUPS AT NO HELP
UNIVERSITY

ALL NONQUALIFIED VS QUALIFIED
 COMPARISON ON ALL LEVELS OF COMPLIANCE

University	Compliance Group			
	Full Compliance	Filed Wrongly	Non Filers	Total
No-Help Nonqualified	1 ¹ 0.5869 ² 0.2908 ³	58 54.581 0.2141	44 47.832 0.307	103 29.34%
No-Help Qualified	1 1.4131 0.1208	128 131.42 0.0889	119 115.17 0.1275	248 70.66%
Total	2 0.57%	186 52.99%	163 46.44%	351 100.00%

Statistic	DF	Value	Prob
Chi-Square	2	1.149	⁴ 0.563
Likelihood Ratio Chi-Square	2	1.115	0.573
Mantel-Haenszel Chi-Square	1	0.951	0.330
Phi Coefficient		0.057	
Contingency Coefficient		0.057	
Cramer's V		0.057	

Sample Size = 351

¹ Frequency actually observed per cell.

² Frequency expected if no difference in groups.

³ Cell's contribution to total Chi-Square value.

⁴ 33% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

The low-cell count problem with Table 6 output results from full compliance being achieved by only one student in each of the qualified and nonqualified groups at the no-help university. If the one student in each group is not considered (by deleting the full compliance column from the chi-square), this leaves two levels of noncompliance to analyze for the two groups. A 2x2 chi-square, cross tabulation (see Table 7) again shows similarly insignificant results, $p=0.391$.

The results indicate no statistically significant difference in the level of noncompliance between those who had an economic incentive to comply and those who did not. This provides evidence that complexity, in this instance, has overwhelmed the effects of noncompliance driven by the opportunity to evade taxes (economic incentive).

Power is an issue when failing to reject a null hypothesis of no difference. The power of a test is the percent of time the null is correctly rejected.⁵⁶ When there actually is a difference between the populations of interest, power is the percent of time that a statistical test correctly indicates a difference. Power varies with several factors: *alpha* (level of significance chosen for

⁵⁶Beta is the probability of incorrect acceptance of the null when there is a difference between the populations of interest but the statistical test employed fails to reveal the difference. Thus, power equals $1.00 - \text{Beta}$.

TABLE 7

NONCOMPLIANCE BREAKDOWN AT NO-HELP UNIVERSITY
ALL NONQUALIFIEDS VS ALL QUALIFIEDS
COMPARISON ON TWO LEVELS OF NONCOMPLIANCE

University	NonCompliance Group		
	Filed Wrongly	Non Filers	Total
Frequency Expected Cell X^2			
No-Help Nonqualified	58 ¹ 54.361 ² 0.2436 ³	44 47.639 0.278	102 29.23%
No-Help Qualified	128 131.64 0.1006	119 115.36 0.1148	247 70.77%
Total	186 53.30%	163 46.70%	349 100.00%

Statistics for Table of UNIQUA by Compliance Group

Statistic	DF	Value	Prob
Chi-Square	1	0.737	0.391
Likelihood Ratio Chi-Square	1	0.739	0.390
Continuity Adj. Chi-Square	1	0.548	0.459
Mantel-Haenszel Chi-Square	1	0.735	0.391
Fisher's Exact Test (Left)			0.836
(Right)			0.230
(2-Tail)			0.411
Phi Coefficient		0.046	
Contingency Coefficient		0.046	
Cramer's V		0.046	

Sample Size = 349

¹ Frequency actually observed per cell.

² Frequency expected if no difference in groups.

³ Cell's contribution to total Chi-Square value.

rejection of the null), sample size (larger samples yield larger power), variance (inversely, smaller variances yield larger power), and difference between the populations of interest. The closer the two population proportions actually are, the smaller the power of a test will be.

The same is true for two sample proportions. The closer the observed sample proportions are, i.e. the smaller the estimate of the population difference, the smaller power of the test will be. Figure 4 shows this relationship. The shaded area represents power. In "a", power is large because a large difference exists between the groups. In "c", where the two populations differ by an even larger amount, power (the shaded area) is even larger. In "b", where the difference in the two groups is smaller, power is also smaller. As the two groups move closer together, the power would continue to shrink. Thus, if the two observed sample proportions were nearly equal, the estimation of power would approximate zero.

The fact that sample proportions in this study are fairly close (differ insignificantly) lowers the power of the test. Kirk [1982] recommends a power level of 0.70 to 0.80, when the null is rejected in favor of an alternative hypothesis, in order to assure that a significant difference was truly found (the null was correctly rejected). The power found in this study was 0.44. However, given the

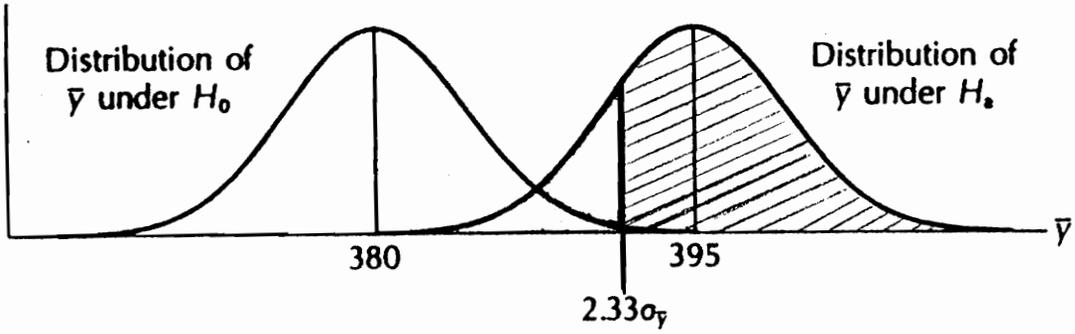
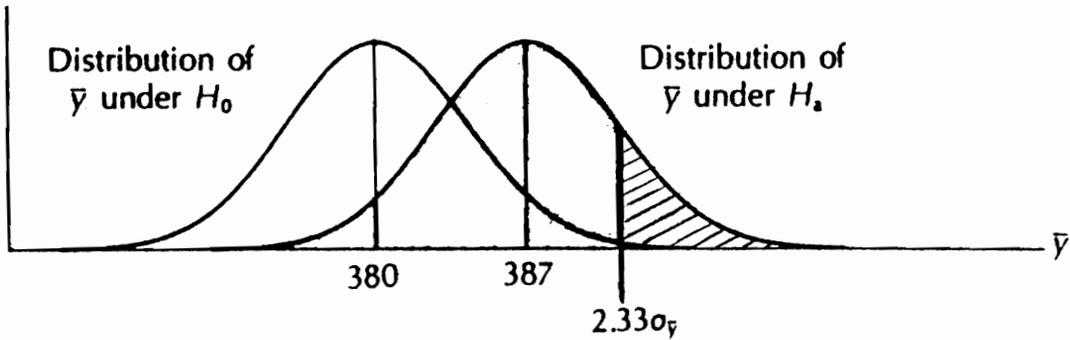
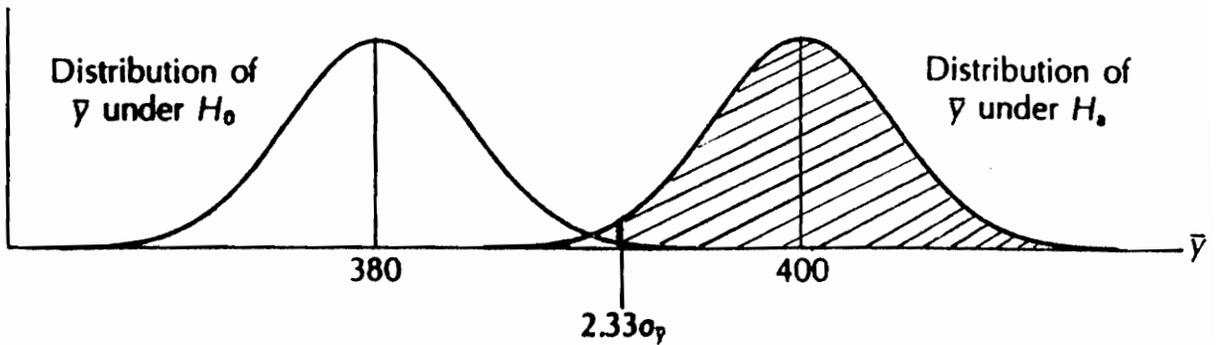
(a) when H_1 is $\mu = 395$ (b) when H_1 is $\mu = 387$ (c) when H_1 is $\mu = 400$

FIGURE 4

HOW POWER VARIES WITH DIFFERENCE BETWEEN GROUPS

small difference observed between proportions, a huge sample size would be needed to achieve recommended levels of power. Data restrictions precluded gathering such a sample.

While there is no procedure to test for power of a chi-square, a 2x2 matrix can be viewed as two binomial proportions. That is, the proportion of nonqualified students (see Table 7) who filed wrongly (unknowingly noncomplied) is 0.5686 (58/102), and can be compared to the proportion of qualified students who filed wrongly (unknowingly noncomplied), 0.5182 (128/247). Knowing sample sizes and proportions, Walpole and Myers [1978], and Fleiss [1973] give the formula (see Chapter 5, Figure 3, p. 99) to calculate power in a test of binomial proportions.

Based on the power formula, and the above sample proportion statistics (that is assuming that the true difference in proportion is 0.0504 (0.5686 - 0.5182)) power for this test is estimated to be 0.44. The calculation (see Figure 3 in Chapter 5) is determined based on the difference observed between the two sample proportions, which is assumed to be the best estimate of the true population differences.

A more relevant question is: Based on the samples involved, what is the power of this test for purposes of detecting a given difference between the two populations? Fleiss [1973] indicates that if the true population

difference was 0.10 (0.60 - 0.50), power would be 0.70. If the true population difference was 0.15 (0.65 - 0.50 = .15), power would be 0.97.

The second test of H1 also examines only students from the no-help university. The group of qualified students, with economic incentive to comply, is further refined by eliminating any student who is not also entitled to treaty benefits. In the qualified group, this leaves only those students who are both qualified for educational deductions and entitled to treaty benefits. These students, the "treaty" group, have greater economic incentive to comply than the nonqualified students to whom they are compared.

The chi-square results (see Table 8) show $p=0.065$. A problem once more arises that too many cells (33%) had a count of less than five for the chi-square test to be valid. Again, a secondary analysis, using a 2x2 cross tabulation eliminating the full compliance column, is performed to combat the low cell count problem (see Table 9). The table shows a p value of 0.022, a significant difference. There are significantly more treaty students who did not file than would be expected given no relationship between complexity and level of compliance. This result at first seems to contradict hypothesis H1.

To further examine the result, another analysis was run on no-help university data comparing the qualified "treaty"

TABLE 8

COMPLIANCE BREAKDOWN AT NO-HELP UNIVERSITY
NONQUALIFIEDS VS QUALIFIEDS FROM TREATY COUNTRIES
COMPARISON ON ALL LEVELS OF COMPLIANCE

University	Compliance Group			
	Full Compliance	Filed Wrongly	Non Filers	Total
Frequency Expected				
Cell X^2				
No-Help Nonqualified	1 ¹ 1.329 ² 0.0815 ³	58 51.168 0.9123	44 50.503 0.8374	103 66.45%
No-Help Qualified and Treaty	1 0.671 0.1614	19 25.832 1.807	32 25.497 1.6587	52 33.55%
Total	2 1.29%	77 49.68%	76 49.03%	155 100.00%

Statistics for Table of UNIQUA by Compliance Group

Statistic	DF	Value	Prob
Chi-Square	2	5.458	⁴ 0.065
Likelihood Ratio Chi-Square	2	5.504	0.064
Mantel-Haenszel Chi-Square	1	3.981	0.046
Phi Coefficient		0.188	
Contingency Coefficient		0.184	
Cramer's V		0.188	

Sample Size = 155

¹ Frequency actually observed per cell.

² Frequency expected if no difference in groups.

³ Cell's contribution to total Chi-Square value.

⁴ 33% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE 9
BREAKDOWN OF NONCOMPLIANCE AT NO-HELP
UNIVERSITY

ALL NONQUALIFIED VS QUALIFIEDS FROM TREATY COUNTRIES
 COMPARISON ON TWO LEVELS OF NONCOMPLIANCE

University	NonCompliance Group		
	Filed Wrongly	Non Filers	Total
Frequency Expected Cell X^2			
No-Help Nonqualified	58 ¹ 51.333 ² 0.8658 ³	44 50.667 0.8772	102 66.67%
No-Help Qualified and Treaty	19 25.667 1.7316	32 25.333 1.7544	51 33.33%
Total	77 50.33%	76 49.67%	153 100.00%

Statistics for Table of UNIQUA by Compliance Group

Statistic	DF	Value	Prob
Chi-Square	1	5.229	0.022
Likelihood Ratio Chi-Square	1	5.272	0.022
Continuity Adj. Chi-Square	1	4.474	0.034
Mantel-Haenszel Chi-Square	1	5.195	0.023
Fisher's Exact Test (Left)			0.993
(Right)			1.70E-02
(2-Tail)			2.63E-02
Phi Coefficient		0.185	
Contingency Coefficient		0.182	
Cramer's V		0.185	

Sample Size = 153

¹ Frequency actually observed per cell.

² Frequency expected if no difference in groups.

³ Cell's contribution to total Chi-Square value.

subset of nonqualified treaty students (nonqualified students from only treaty countries). These two groups should have more similar demographic features. This subset of nonqualified treaty students consisted only of those who also were entitled to treaty deductions. Once again, a 2x2 cross tabulation was done (see Table 10).

Results comparing only treaty-qualified and treaty-nonqualified students showed no significant difference, $p=0.781$, in compliance. Similar to results in Table 9, the proportion of nonqualified treaty students who did not file was higher than the proportion of nonqualified treaty students who filed wrongly.

Federal income taxes, as discussed in prior chapters, are required by law to be withheld on foreign students' payroll and scholarship income at the rate of 30% unless a tax treaty allows lower withholding at a rate of 14%.⁵⁷ Thus, as compared with not filing, filing wrongly will result in at least some tax relief (e.g. from claiming a standard deduction). From the results of H1 statistical tests, an argument can be advanced as to the impact of complexity on compliance.

That is, given withholding, the group who did not file

⁵⁷If the employer fails to withhold proper amounts, then that employer will be held liable for any underpayment of taxes by the employee.

TABLE 10
BREAKDOWN OF NONCOMPLIANCE AT NO-HELP
UNIVERSITY
 NONQUALIFIEDS FROM TREATY COUNTRIES VS QUALIFIEDS FROM
 TREATY COUNTRIES
 COMPARISON ON TWO LEVELS OF NONCOMPLIANCE

University	NonCompliance Group		
	Filed Wrongly	Non Filers	Total
No-Help Nonqualified and Treaty	5 ¹ 5.4545 ² 0.0379 ³	10 9.5455 0.0216	15 22.73%
No-Help University Qualified and Treaty	19 18.545 0.0111	32 32.455 0.0064	51 77.27%
Total	24 36.36%	42 63.64%	66 100.00%

Statistics for Table of UNIQUA by Compliance Group

Statistic	DF	Value	Prob
Chi-Square	1	0.077	0.781
Likelihood Ratio Chi-Square	1	0.078	0.780
Continuity Adj. Chi-Square	1	0.000	1.000
Mantel-Haenszel Chi-Square	1	0.076	0.783
Fisher's Exact Test (Left)			0.517
(Right)			0.716
(2-Tail)			1.000
Phi Coefficient		-0.034	
Contingency Coefficient		0.034	
Cramer's V		-0.034	

Sample Size = 66

¹ Frequency actually observed per cell.

² Frequency expected if no difference in groups.

³ Cell's contribution to total Chi-Square value.

would pay even greater taxes than the group who filed the wrong form. Both groups would pay more taxes than those who fully complied and claimed all allowable deductions.⁵⁸ The finding of no difference in compliance patterns between those with economic incentive to comply and those without economic incentive to comply suggests that complexity of the tax law rather than evasion is the appropriate explanatory variable.

HYPOTHESES TESTS OF H2 H2 states that removing the effects of complexity is related to increased compliance when compliance is in the taxpayers best economic self-interest. To test this hypothesis, compliance is compared for only those taxpayers who qualify for educational deductions (have economic incentive to comply) at the two universities. There were a total of 713 qualified students in the final sample (465 at the complexity-lite and 248 at the no-help university). The hypothesis states that compliance will be different between students at the two universities with the complexity-lite university exhibiting a higher rate of full compliance.

The first test of H2 compares the compliance results of only qualified students. All the qualified students at the

⁵⁸Although the IRS will not release tax payment data (because of confidentiality problems), they did state that one qualified nonfiler at the no-help university overpaid taxes by over \$2,500.

complexity-lite university are compared with all the qualified students at the no-help university on level of compliance (see Table 11). There is a significant difference in level of compliance, $p=0.000$, between the two universities. The null hypothesis, no relationship between university and level of compliance (independence) is rejected in favor of the alternative hypothesis. A relationship (dependence) is indicated between university and level of compliance.

The largest difference is found in the Full Compliance column. More students at the complexity-lite university fully complied than would be expected if the null hypothesis of no relationship were true. The next largest difference occurs in the Filed Wrongly (Unknowing Noncompliance) column. At the no-help university, more students filed wrongly than expected. At the complexity-lite university fewer people filed wrongly than expected (apparently shifting from unknowing to full compliance) but also more people did not file than expected. Overall, nonfiling is higher than expected at the complexity-lite university where the training intervention occurred.

Looking at these last two columns, the primary shift to compliance appears to be among students who were filing already, but filing wrongly. The number of nonfilers was proportionately higher than expected at the university where

TABLE 11
BREAKDOWN OF COMPLIANCE GROUP BY UNIVERSITY
ALL QUALIFIEDS AT COMPLEXITY-LITE VS ALL QUALIFIEDS
AT NO-HELP
COMPARISON ON ALL LEVELS OF COMPLIANCE

University	Compliance Group			
	Full Compliance	Filed Wrongly	Non Filers	Total
Frequency Expected Cell X^2				
Complexity-Lite Qualified	51 ¹ 33.913 ² 8.6092 ³	152 182.61 5.1306	262 248.48 0.7358	465 65.22%
No-Help Qualified	1 18.087 16.142	128 97.391 9.6199	119 132.52 1.3797	248 3.78%
Total	52 7.29%	280 39.27%	381 53.44%	713 100.00%

Statistics for Table of UNIQUA by Compliance Group

Statistic	DF	Value	Prob
Chi-Square	2	41.617	0.000
Likelihood Ratio Chi-Square	2	52.170	0.000
Mantel-Haenszel Chi-Square	1	0.199	0.656
Phi Coefficient		0.242	
Contingency Coefficient		0.235	
Cramer's V		0.242	

Sample Size = 713

¹ Frequency actually observed per cell.

² Frequency expected if no difference in groups.

³ Cell's contribution to total Chi-Square value.

training intervention occurred. This result, higher per capita nonfiling, provides evidence that supports the "ripple" effect findings of Beron, Tauchen and Witte [1990], Dubin, Graetz and Wilde [1990], and Kinsey [1992], whereby a higher per capita nonfiling was observed in their treatment group populations.

The second test of H2 also examines only qualified students. The group of qualified students from the no-help university is further refined by eliminating any student who is not also entitled to treaty benefits. In the no-help group, this leaves only those students who are both qualified for educational deductions and entitled to treaty benefits. These students, the "treaty" group, have greater economic incentive to comply than the group they are compared to from the complexity-lite university which includes many qualified students who are not entitled to treaty benefits.

The results of the second test of H2 are presented in Table 12 (see Table 12). The p value (0.120) is not at a generally accepted level of significance. However, cell chi-squares of the four cells representing the two levels of noncompliance at the two universities contribute only a total of 0.4315 ($0.0211 + .1885 + .0223 + 0.1996$) to the overall 4.236 chi-square. The two full compliance cells contribute 3.8045 ($.3826 + 3.4214$) to the overall chi-

TABLE 12
BREAKDOWN OF COMPLIANCE GROUP BY UNIVERSITY
ALL COMPLEXITY LITE QUALIFIEDS VS ONLY NO-HELP
QUALIFIEDS FROM TREATY COUNTRIES
COMPARISON ON ALL LEVELS OF COMPLIANCE

University	Compliance Group			
	Full Compliance	Filed Wrongly	Non Filers	Total
Complexity-Lite Qualified	51 ¹ 46.77 ² 0.3826 ³	152 153.8 0.0211	262 264.43 0.0223	465 89.94%
No-Help Qualified and Treaty	1 5.2302 3.4214	19 17.199 0.1885	32 29.571 0.1996	52 10.06%
Total	52 10.06%	171 33.08%	294 56.87%	517 100.00%

Statistics for Table of UNIQUA by Compliance Group

Statistic	DF	Value	Prob
Chi-Square	2	4.236	0.120
Likelihood Ratio Chi-Square	2	5.943	0.051
Mantel-Haenszel Chi-Square	1	2.103	0.147
Phi Coefficient		0.091	
Contingency Coefficient		0.090	
Cramer's V		0.091	

Sample Size = 517

¹ Frequency actually observed per cell.

² Frequency expected if no difference in groups.

³ Cell's contribution to total Chi-Square value.

square. Because of this, further analysis of Table 12 results was performed.

First, the Full Compliance column was eliminated to leave a reduced 2x2 chi-square matrix (see Table 13). This reduced 2x2 chi-square matrix only compares the two measures of noncompliance, filed wrongly and nonfilers. No significant difference exists, between the two universities, for those who did not comply ($p=0.940$). In fact, the Fisher 2-Tail test shows a probability of $p=1.000$ that there is no difference between the two universities considering only the two levels of noncompliance. The noncompliance pattern of the qualified treaty group from the no-help university is fairly similar to the noncompliance pattern of all qualified students at the complexity-lite university.

Recall that the complexity-lite university had a higher proportion of nonfilers overall than the no-help university (see Table 1), but the treaty students at the no-help university had the highest proportion of nonfilers (see Table 8). Also, the treatment at the complexity-lite university appears to have shifted some of those who filed wrongly to full compliance. Considering only the two levels of noncompliance, this shift left the proportion who filed wrongly low relative to the proportion of nonfilers at the complexity-lite university. This shift made the noncompliance pattern fairly similar to the no-help

TABLE 13
BREAKDOWN OF NONCOMPLIANCE GROUP BY UNIVERSITY
ALL COMPLEXITY-LITE QUALIFIEDS VS ONLY NO-HELP
QUALIFIEDS FROM TREATY COUNTRIES
COMPARISON ON TWO LEVELS OF NONCOMPLIANCE

University	NonCompliance Group		
	Filed Wrongly	Non Filers	Total
Complexity-Lite Qualified	152 ¹ 152.25 ² 0.0004 ³	262 261.75 0.0002	414 89.03%
No-Help Qualified and Treaty	19 18.755 0.0032	32 32.245 0.0019	51 10.97%
Total	171 36.77%	294 63.23%	465 100.00%

Statistics for Table of UNIQUA by Compliance Group

Statistic	DF	Value	Prob
Chi-Square	1	0.0006	0.940
Likelihood Ratio Chi-Square	1	0.0006	0.940
Continuity Adj. Chi-Square	1	0.0000	1.000
Mantel-Haenszel Chi-Square	1	0.0006	0.940
Fisher's Exact Test (Left)			0.527
(Right)			0.595
(2-Tail)			1.000
Phi Coefficient		-0.003	
Contingency Coefficient		0.003	
Cramer's V		-0.003	

Sample Size = 465

¹ Frequency actually observed per cell.

² Frequency expected if no difference in groups.

³ Cell's contribution to total Chi-Square value.

university's treaty group (per Table 13), and contributed to the insignificant results in Table 12.

To continue the analysis, the two levels of noncompliance were combined. This left only a dual measure of the dependent variable, either full compliance or noncompliance, a binomial proportion. A Z test of binomial proportions was then calculated to determine if full compliance was significantly greater at the complexity-lite university than the no-help university. The Z value obtained was 2.0454, with a significant, $p=0.0204$, result. Reducing complexity appears to be significantly related to full compliance which is in the taxpayer's best interest.

Full compliance was also compared individually with each of the two levels of noncompliance, in a 2x2 chi-square matrix. When full compliance is compared with either level of noncompliance, the differences are significant. Full compliance compared with nonfiling differs significantly at the $p=0.043$ level (see Table 14). Full compliance crossed with filing wrongly differs significantly at the $p=0.042$ level (see Table 15).

There was a final comparison made. The qualified group at the complexity-lite university was refined to a subset with treaty benefits, similar to the no-help university treaty group. The difference (see Table 16) in compliance level between these two groups was significant at the 0.000

TABLE 14
BREAKDOWN OF FULL COMPLIANCE AND NON FILERS
BY UNIVERSITY
 ALL COMPLEXITY LITE QUALIFIEDS VS ONLY NO-HELP QUALIFIEDS
 FROM TREATY COUNTRIES

University	Compliance Group		
	Full Compliance	Non Filers	Total
Frequency Expected Cell X^2			
Complexity-Lite Qualified	51 ¹ 47.04 ² 0.3333 ³	262 265.96 0.0589	313 90.46%
No-Help Qualified and Treaty	1 4.9595 3.1612	32 28.04 0.5591	33 9.54%
Total	52 15.03%	294 84.97%	346 100.00%

Statistics for Table of UNIQUA by Compliance Group

Statistic	DF	Value	Prob
Chi-Square	1	4.113	0.043
Likelihood Ratio Chi-Square	1	5.635	0.018
Continuity Adj. Chi-Square	1	3.139	0.076
Mantel-Haenszel Chi-Square	1	4.101	0.043
Fisher's Exact Test (Left)			
(Right)			0.997
(2-Tail)			2.62E-02
Phi Coefficient			4.09E-02
Contingency Coefficient		0.109	
Cramer's V		0.108	
		0.109	

Sample Size = 346

¹ Frequency actually observed per cell.

² Frequency expected if no difference in groups.

³ Cell's contribution to total Chi-Square value.

TABLE 15
BREAKDOWN OF FULL COMPLIANCE & FILING WRONGLY
BY UNIVERSITY

ALL COMPLEXITY-LITE QUALIFIEDS VS ONLY NO-HELP QUALIFIEDS
 FROM TREATY COUNTRIES

University	Compliance Group		
	Full Compliance	Filed Wrongly	Total
Complexity-Lite Qualified	51 ¹ 47.336 ² 0.2836 ³	152 155.66 0.0862	203 91.03%
No-Help Qualified and Treaty	1 4.6637 2.8781	19 15.336 0.8752	20 8.97%
Total	52 23.32%	171 76.68%	223 100.00%

Statistics for Table of UNIQUA by Compliance Group

Statistic	DF	Value	Prob
Chi-Square	1	4.123	0.042
Likelihood Ratio Chi-Square	1	5.424	0.020
Continuity Adj. Chi-Square	1	3.074	0.080
Mantel-Haenszel Chi-Square	1	4.105	0.043
Fisher's Exact Test (Left)			0.996
(Right)			2.93E-02
(2-Tail)			5.05E-02
Phi Coefficient			
Contingency Coefficient		0.136	
Cramer's V		0.135	
		0.136	

Sample Size = 223

¹ Frequency actually observed per cell.

² Frequency expected if no difference in groups.

³ Cell's contribution to total Chi-Square value.

TABLE 16
BREAKDOWN OF COMPLIANCE GROUP BY UNIVERSITY
ONLY QUALIFIED STUDENTS FROM TREATY COUNTRIES

University	Compliance Group			
	Full Compliance	Filed Wrongly	Non Filers	Total
Complexity-Lite Qualified and Treaty	44 ¹ 34.55 ² 2.58 ³	31 38.39 1.42	97 99.05 .0426	172 23.21%
No-Help Qualified and Treaty	1 10.45 8.54	19 11.61 4.71	32 29.95 0.1408	52 76.79%
Total	45 20.09%	50 22.32%	129 57.59%	224 100.00%

Statistic	DF	Value	Prob
Chi-Square	2	17.440	0.000
Likelihood Ratio Chi-Square	2	22.222	0.000
Mantel-Haenszel Chi-Square	1	5.183	0.023
Phi Coefficient		0.279	
Contingency Coefficient		0.269	

Sample Size = 224

¹ Frequency actually observed per cell.

² Frequency expected if no difference in groups.

³ Cell's contribution to total Chi-Square value.

level. This indicates that compliance levels are not equal, for the qualified students from treaty countries.

Those with the highest incentive to comply, qualified students with treaty benefits, differed significantly in their level of compliance. The students for whom the effects of complexity were reduced fully complied at a higher than expected rate. The students at the no-help university filed wrongly more than would be expected if the groups were equal. There was little difference in nonfilers.

RESULTS OF REVENUE IMPACT ANALYSIS

The overall revenue impact of noncompliance among foreign students was also examined. A revenue calculator determined the dollar effect of complexity in this area of tax law. The magnitude of the revenue impact was calculated by comparing the correct tax liability, had the 1040NR been filed with allowable qualified educational deduction and tax treaty benefits properly claimed, to tax liability actually reported.

Because I had access to students' payroll withholding records, the IRS would only release this confidential data, in highly summarized format for the full 1,193 student final sample. The maximum and minimum estimates of educational deductions generate a range of overpayment and underpayment of tax liability for each individual student. These

summarized results indicate average overpayment of taxes, based on the maximum estimate of educational deductions,⁵⁹ is about \$1,150, and about \$1,040 based on the minimum estimate of educational deductions. Although some students underpaid taxes, the ratio of substantial⁶⁰ overpayments to substantial underpayments was about 13:1 at the no-help university.

Thus, because of complexity in this area of tax law, students at the two universities included in this study overpaid their taxes by more than \$1,375,000. Considering only the 103 colleges and universities with foreign student enrollments in excess of 1,000 [Institute of International Education, 1991] the U.S. government over collects taxes by more than \$50 million from a group whose median income (\$9,318 per person) places them below the poverty line.

⁵⁹The maximum amount of educational deduction would, of course, generate a lower tax liability. Thus, overpayment is higher when this estimate of educational deductions is used.

⁶⁰"Substantial" is defined here as greater than \$500.00.

CHAPTER 7: CONCLUSION

CONTRIBUTIONS

This study contributes to the tax compliance literature by examining the effects of complexity on compliance, absent the confound of opportunity to evade. In operationalizing complexity, earlier research failed to adequately control for opportunity to evade. As a consequence, prior results were difficult to interpret due to uncertainty as to whether complexity or the opportunity to evade taxes was the variable related to noncompliance.

The study provides evidence that suggests complexity relates to unintentional ("unknowing") noncompliance in the tax law rather than noncompliance driven by economic self-interest (i.e. evasion). The results also suggest that reducing the effect of complexity leads to higher levels of full compliance.

Roth and Scholz [1989] have noted that attempts to deter noncompliance, without first understanding the root cause and process underlying it, will most likely result in incomplete or unsatisfactory solutions at best. The results of this research contribute evidence that a state of nature such as unintentional noncompliance exists. Tax administrators and policy officials will have to more fully consider this form of noncompliance in their efforts to

solve future compliance problems.

Another contribution of this study is providing empirical data which supplements theoretical arguments and models. This research utilized multiple measures of noncompliance per Kidder and McEwen's [1989] topology. Recently, compliance researchers have begun to recognize that noncompliance takes a variety of forms and occur for a variety of reasons [Portney, 1992]. Noncompliance should be studied as a multi-dimensional construct. Different strategies are needed to combat different forms of noncompliance. The more limited view of noncompliance is too broad. It prevents full understanding and precludes gaining important insight into the rich, multifaceted puzzle that the compliance problem has come to represent in our current tax system.

The final contribution of this study is to determine the revenue impact of noncompliance for over three-quarter million individuals. The extent of noncompliance in nonresident student population was unknown prior to this study. As a result of this study, the IRS Research Division has expressed concern over the high level of noncompliance found among foreign students.

DISCUSSION

This research has revealed a situation whereby noncompliance appears related to complexity. Even the

foreign students who attempted to comply with the tax laws usually failed to do so. The fact that they overpaid taxes makes it extremely unlikely that evasion was the motivating factor.

The results also indicate no statistically significant difference in the level of noncompliance between those who had an economic incentive to comply and those who did not. This provides evidence that complexity, in this instance, has overwhelmed the effects of noncompliance driven by the opportunity to evade (economic incentive).

The compliance literature has called for simplification of the tax law [Long and Swingen, 1987; Milliron, 1985b; Milliron and Toy, 1988; and Starkman, 1990]. Economic theory holds that complexity causes a tax system to function inefficiently [Beck and Jung, 1989a and b; Klepper and Nagin, 1989a; and Witte and Woodbury, 1985]. The results of this study reveal the inability of taxpayers to comply with complex laws even though compliance was in their economic self-interest. This finding supports the contention made in prior literature that complexity hinders compliance and prevents a tax system from functioning efficiently. Simpler alternative tax systems e.g. the value-added tax [Slemrod, 1989], have been proposed to reduce noncompliance levels. Slemrod goes on to note that as a result of simplification the IRS would have "less to do" and "could accomplish its

remaining tasks better (p. 176)". Also, taxpayers would have less opportunity to evade. Risks associated with noncompliance would be more clearly defined, given a simpler law, and the system could be regulated more closely.

Tax legislators must come to realize that all noncompliance is not driven by evasion. Evasion is an intentional activity that one undertakes for economic self-interest. Prerequisite to the act of evasion is an understanding of the law sufficient to allow illegal circumvention of one's tax burden. The results of this study indicate that a complex law leads to noncompliance, but not necessarily tax evasion.

Schmidt [1989] argued that models of evasion are one-sided since only underpayment of the tax liability is considered. If the opportunity to evade were the salient explanation for all noncompliance, underpayment of taxes would be prevalent. Roth, Scholz, and Witte, [1989] stated that taxpayers do not intentionally overpay taxes. Overpayment is a form of noncompliance though. This study reveals that foreign students are overpaying their taxes as indicated by their failure to claim all allowable deductions. However, such a situation could not be construed as intentional evasion. The logical explanation is complexity driven, unintentional noncompliance.

Roth, Scholz, and Witte also stated that information

training programs, such as the one developed and presented at the complexity-lite university, are "designed to combat nonwillful (unknowing) noncompliance". This study supported that contention, by showing that a shift to full compliance came mostly among students who were already filing, but were filing wrongly (unknowingly noncompliant). The indication is that among the unknowing noncompliant, some form of increased taxpayer education or assistance may be of value.

The number of nonfilers was proportionately higher at the complexity-lite university (as "ripple effect" researchers have suggested occurs given other types of tax compliance interventions). Another strategy may have to be devised to bring individuals, such as nonfilers into compliance.

This study suggests that, to successfully implement complex procedural laws, more information and instruction may be required than is currently provided. For the tax layperson, simplifying the process either by reducing the complexity of the law or providing some form of training intervention appears to be effective. Large scale intervention efforts, involving all taxpayers in a population whose level of compliance is suspect, could help guide average taxpayers through the complexity of the tax laws and should improve compliance. Other measures may be more appropriate for tax professionals.

As to the revenue impact of noncompliance in this area, it should be noted that the federal government's heavy debt burden has given rise to a stipulation in the current tax law that any changes be "revenue neutral". That is, changes must not result in a decrease in tax revenue. This requirement has been used as a rationale to explain why simplification has not yet occurred in many areas [Starkman, 1990]. Unfortunately, it may also explain why effort has not been forthcoming to reduce the complexity for nonresident filers. Nonresident foreign students currently overpay their taxes as a result of being unable to identify all allowable deductions and exclusions. Simplifying the law, to allow them to identify all tax benefits, may lead to reduced revenue collections by the IRS, not presently a viable option under current fiscal restraints.

EXTENSIONS

Future research into compliance and complexity should continue to focus on multiple measures of the level of noncompliance. There are many different ways for people to fail to comply with our complex federal income tax law, and this failure occurs for a variety of reasons. Research may show that certain approaches are more effective in combating certain types of noncompliance. To the extent that various types of unknowing noncompliance can be detected, certain techniques may be developed to educate taxpayers and improve

compliance with the law.

For example, Roth and Scholz [1989] theorize that tax law simplification will reduce "lazy noncompliance". They recommend either changes in the code or publicity targeted at specific groups. A simplified compliance package could be mailed to a target group of nonresidents to determine whether they would be more compliant.

Also, comparison of different approaches, e.g. threat of sanction versus an appeal to conscious would provide useful results. A longitudinal study could be done over time to determine if compliance interventions have a cumulative effect on a target population.

There is still work to be done in defining and developing a more refined topology of complexity in the tax law. Perhaps an effort could be made to classify different portions of the code according to the types of complexity represented. Calibration studies could then be made to verify that taxpayers' perceptions of complexity coincide with definitions developed. Techniques such as "verbal protocols" [Roth and Scholz, 1989] (whereby subjects verbalize in a flow of consciousness descriptions of their reactions and thought process) could be used to study how taxpayers respond when confronted by various types of tax complexity. Also, research could be performed on how changes to different aspects of complexity in the tax system

impact compliance.

LIMITATIONS

The generalizability of this study is limited due to the use of foreign student subjects. However, Koch and Karlinsky [1984] and Porcano [1984] have argued in defense of using student subjects. They found no significant difference between students and others in research results. As Klepper and Nagin [1989b] point out, a problem with prior compliance research was the failure to control for various demographic variables across individuals. The study of a more or less homogenous group of taxpayers, such as foreign students, alleviates this problem.

One point should be made concerning the impact of tax complexity's dimensions and taxpayers' backgrounds. Milliron [1985b] found there were no significant relationships between weightings of her dimensions and the demographic information of her subjects. Likewise, Long and Swingen [1987] concluded that no significant differences were found among the complexity ratings of subjects with different educational (with or without advanced degrees), experience or professional background. The perception of factors of complexity was independent of background demographics. The implication is that differences among foreign students in this study should not be a factor in how they perceive complexity.

There is currently no published literature on the compliance rates among form 1040NR filers based upon their country of origin. Because of the small number of students from any one country in this study, and the possibility that through the demographic data available on these students the confidentiality of tax return information could be compromised as a consequence, the IRS has been reluctant to release any by-country breakdown of the results. However, future research which could determine whether students from certain countries are likely to be less compliant could allow the IRS to pinpoint their compliance efforts and focus enforcement resources where needed.

Another limitation to the study is the inability to identify which students attended the tax information workshop at the complexity-lite university. Because of the sensitive nature of an individual's tax filing, permission to identify students who participated in the training was not obtained. The "ripple" effect theories suggest that there would be a spillover compliance impact on the population at large from those who underwent treatment.

Indicating a spillover effect was a steady stream of 40 to 60 foreign students, who did not attend the workshop, but in the weeks following the training sought information from the workshop presenters on the material covered, e.g. the Form 1040NR, treaty benefits and qualified educational

expense deductions. Also indicating a spillover effect was a survey taken the following year, just prior to the start of the tax year 1989 workshop. Of the 158 foreign students who completed that survey, 106 indicated they intended to file the 1040NR before coming to the workshop even though only 19 of these students indicated they had attended the tax year 1988 workshop.

Another limitation may be the degree of the treatment effect of tax help provided by universities. If this variable is not operationalized, the effects of complexity may not be reduced. Such would bias this study against finding support for H2. Significant results, indicating support for H2, provide evidence that the treatment did have an effect on subjects.

The self-selection of students into the treatment group could be considered a limitation. However, tax compliance is voluntary. There may be a benefit to studying taxpayers who elect to attend a training workshop. Since individuals cannot be forced to undergo tax training, results of this study would then generalize to the population of taxpayers who do seek tax help.

The selection of universities that participated in this study was nonrandom. These universities self-selected into the study and agreed to participate because of their large foreign student population. No reason exists, besides the

training intervention, to suspect a systematic difference from other universities in terms of the compliance of foreign students.

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APPENDIX A
SAMPLE DEMOGRAPHICS BY COUNTRY

<u>COUNTRY</u> <u>NAME</u>	<u>TREATY</u>	<u>COMPLEXITY-LITE</u>		<u>NO-HELP</u>	
		<u>QUALIFIED</u>	<u>NONQUAL</u>	<u>QUALIFIED</u>	<u>NONQUAL</u>
ARGENTINA	YES	0	6	6	0
BANGLADESH	NO	3	2	0	0
BRAZIL	NO	0	0	4	0
BULGARIA	NO	3	1	0	0
CANADA	NO	16	5	12	2
CHILE	NO	0	0	5	1
CHINA	YES	82	15	36	12
COLUMBIA	NO	4	0	7	0
EGYPT	YES	4	0	0	0
FRANCE	YES	4	5	0	0
GREECE	NO	8	4	6	1
HONG KONG	NO	10	2	9	2
INDIA	NO	151	65	78	54
IRAN	NO	10	13	6	1
ISRAEL	NO	7	0	4	1
ITALY	NO	5	0	0	0
JAPAN	YES	3	1	8	0
JORDAN	NO	0	5	0	0
LEBANON	NO	1	7	2	2
MALAYSIA	NO	5	8	0	0
MEXICO	NO	5	1	0	0
NEPAL	NO	2	3	0	0
NIGERIA	NO	0	0	11	3
PERU	NO	0	0	7	1
PHILLIPINES	YES	16	0	11	0
POLAND	YES	12	0	0	0
SOUTH AFRICA	NO	5	1	0	0
SOUTH KOREA	YES	64	7	12	4
SRI LANKA	NO	12	2	7	1
TAIWAN	NO	50	18	29	9
THAILAND	NO	4	1	0	0
TUNISIA	NO	4	2	2	2
TURKEY	NO	4	1	6	2
UNITED KINGDOM	NO	2	4	2	2
URUGUAY	NO	5	1	0	0
YUGOSLAVIA	NO	4	0	0	0
WEST GERMANY	NO	7	1	0	0
MISC.	NO	36	10	62	5
MISC. TREATY	YES	8	2	7	0

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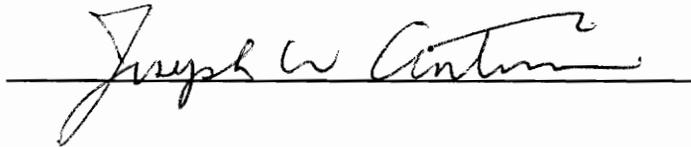
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A handwritten signature in cursive script, reading "Joseph W. Antenucci", is written over a horizontal line.