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# Cross Cultural Comparisons of Tax Compliance Behavior

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# CROSS CULTURAL COMPARISONS OF TAX COMPLIANCE BEHAVIOR

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## **ABSTRACT**

To fully understand differences in compliance behavior across cultures one needs to understand differences in the tax administration and differences in the citizen attitudes toward the governments of the respective countries. Cross-cultural comparisons of behavior that focus exclusively on the effects of cultural norms are insufficient for such understanding because the behavioral issues in tax compliance research involve complex interactions between individuals and governments that extend beyond tax reporting itself. Results from laboratory experiments conducted in different countries demonstrate that observed differences in tax compliance levels can be explained by differences in tax administration and in the perceived fiscal exchange provided by the respective governments.

## I. INTRODUCTION

One of the more vexing problems for policy makers in developing and transition economies is encouraging high levels of tax compliance, independent of the overall tax “take” from GDP. Even if one begins from a position that government should be small, high tax compliance is necessary for efficiency and equity (McKee, 2000). Many development organizations stress the importance of reducing tax evasion as a tool for economic development and growth (see, for example, International Monetary Fund, 1999). For, as Cowell (1990) notes, “... the issue of evasion is, unlike other illegal activities, inseparably bound up with the instruments of fiscal control that the government attempts to use in carrying out its economic policy.” That is, the reduction of tax evasion is not simply tied to the need for government to raise revenue but it is, rather, a broader issue for the development of a civil order.

But, reducing tax evasion is not only a matter of applying higher penalties and/or increasing the frequency of audits. To develop policies for the reduction of tax evasion it is essential to understand the behavioral aspects of the tax compliance decision. This is true when one is designing a tax enforcement regime anew or simply devising policies to encourage tax compliance within the existing tax enforcement system. If individual attitudes toward compliance are a function of social and cultural norms, policies may have to be specifically designed for the culture in which it will be applied. The effects of culture on tax compliance levels are not well understood and this is the primary motivation for this paper.

Tax compliance behavior has been studied using both field data and data derived from laboratory experiments.<sup>1</sup> The advantage of laboratory experiments for the research reported in this paper is that the experimenter can hold the tax reporting institution constant (including the enforcement effort, the tax rate, and the subject income levels) in order to investigate compliance behavior across various cultural settings. Thus, the laboratory allows isolation of the cultural effects as a factor in tax evasion/compliance. This paper reports on laboratory investigations of tax compliance behavior in three different countries (the U.S., South Africa, and Botswana) applying the same tax reporting setting in each country.

To fully understand differences in compliance behavior across cultures one needs to understand differences in the tax administration and differences in the citizen attitudes toward the governments of the respective countries. Cross-cultural comparisons of behavior that focus exclusively on the effects of cultural norms are insufficient for such understanding because the behavioral issues in tax compliance research involve complex interactions between individuals and governments that extend beyond tax reporting itself. For example, interactions that involve government responsiveness and fairness have an effect on tax reporting behavior. As another example, while enforcement effort should affect tax compliance, there are other factors at work such as the perception that the government is using the tax revenues for socially desirable purposes. Further, individual tax compliance is likely affected by social norms. If tax evasion is considered acceptable behavior, the statutory penalties are less likely to be imposed by the courts.

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<sup>1</sup> Clotfelter (1983) has investigated individual compliance using data from the TCMP while Kinsey (1992) reports the results of a survey of taxpayers. Alm, Jackson, and McKee (1992a, 1992b, and 1993) have investigated behavior in a variety of laboratory settings.

On the other hand, if compliance is generally high, the tax cheaters that are caught will receive little sympathy from the courts or the public. Finally, in many countries tax audits may be triggered by a tax report that varies significantly from that reported by others in the cohort. Thus, there is a gain from coordination on whatever level of compliance that constitutes the norm. Understanding the genesis of the norm allows one to understand reasons for overall compliance behavior. This paper attempts to capture effects of these kinds, and differs from some of the previous investigations of the effects of cultural norms on economic behavior (e.g., Roth et al, 1991) in that it places greater emphasis on differences in formal institutions as a cause of behavioral differences.

The experimental results reported in this paper provide support for the hypothesis that tax compliance increases with individual perceptions that the tax system is fair and that the government is providing valued goods and services with the revenues. In all of the cultural settings investigated, compliance does increase with enforcement effort but this is a less effective mechanism where the tax regime is viewed as unfair. Thus, the results reported in this paper provide support for a model of tax compliance behavior that extends well beyond the typical “economics of crime” approach with its emphasis on enforcement effort and deterrence. The results reported in this paper support the view that tax enforcement should focus more on how taxpayers assess government service and less on punitive measures.

## II. THE ANALYTICS OF THE TAX COMPLIANCE DECISION

Suppose that an individual receives a fixed amount of income  $I$ , and must choose how much to declare to the tax authorities. Declared income  $D$  is taxed at the rate  $t$ . Unreported income is not taxed; however, the individual may be audited with probability  $p$ , at which point a fine  $f$  is imposed on each dollar of unpaid taxes.<sup>2</sup> If underreporting is detected the individual's income  $I_C$  equals

$$(1) \quad I_C = I - tD - ft(I-D),$$

while, if underreporting is not detected income  $I_N$  is

$$(2) \quad I_N = I - tD.$$

The individual chooses  $D$  to maximize the expected utility  $EU(I)$  of the evasion gamble, or

$$(3) \quad EU(I) = pU(I_C) + (1-p)U(I_N),$$

where utility  $U(I)$  is assumed to be a function only of income. This optimization generates the first-order condition

$$(4) \quad pU'(I_C)(f-1)t - (1-p)U'(I_N)t = 0,$$

where a prime denotes a partial derivative. This is the basic portfolio model of tax compliance (see Allingham and Sandmo, 1972).

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<sup>2</sup> For simplification, it is assumed that the tax authority uncovers all unreported income.

It is straightforward to show, within this model, that increases in the probability of an audit and/or the fine rate will increase compliance. One aspect that makes this an interesting research question is that there is considerable uncertainty concerning the actual audit strategies being employed by the tax authority. Audit probabilities are largely subjective since the tax authority does not have an incentive to reveal the entire audit mechanism (Alm, 1988). Individuals may have a tendency to overweight the probability of an audit. Such behavior would appear to support the high levels of compliance in the US where the objective probability of an audit is low.<sup>3</sup>

A further contributing factor to high compliance levels is a low tax rate. In the above model, the “evasion gamble” is less attractive, the lower the tax rate. In addition, to the extent that people view the public sector and paying taxes as a fiscal exchange, compliance is likely to increase when the services provided by the government are viewed as desirable and the decisions as to which services to provide are transparent and fair. This latter factor is not captured in the conventional portfolio model of tax compliance. Nevertheless, it is clear that these interactive effects may affect tax compliance decisions. For example, if individuals view the tax system as a fiscal exchange, then they may account for a general level of compliance behavior in their decision to comply or evade. Suppose that the government sums all tax payments, increases this sum by a multiple  $m$  to reflect the consumers’ surplus from a public good, and distributes the resulting public good in equal shares  $s$  to all individuals. Denoting the reported incomes of all other individuals as  $G$ , the (uncertain) income of the individual is increased by  $smt(D+G)$  in either state (audited or not) of the world. The manner by which the public good is selected may have an effect on the level of compliance. Alm, Jackson, and McKee (1993) find that compliance is higher when the public good is voted rather than imposed and when the outcome is one that is widely supported.

Finally, not captured in the conventional model either, there are the social norm effects described in the previous section. If the tax system is perceived as fair, the government is perceived as providing valued services, and individuals perceive that their neighbors are paying their fair share of taxes, the psychic costs of evasion will be higher than if these conditions are not met. Even simple personal ethics based on religion or cultural norms may affect tax compliance behavior independently of the fiscal exchange between the government and the taxpayers. Steenberg, McGraw, and Scholz (1992) present a model of a tax reporting schema where they model compliance intentions as being a function of “general tax beliefs” as to the fairness of the tax system and also various “inhibitors” which serve to alter the perception of the acceptability of tax evasion. The key inhibitors are guilt, social sanctions, and legal sanctions. The legal sanctions were covered in the discussion of auditing above and are part of the conventional model of Allingham and Sandmo (1972). The remaining inhibitors affect the non-pecuniary payoffs to evasion and, if present, should affect the behavioral intention to comply, or not, with the tax code. It is these inhibitors which may potentially vary across cultures and which will provide the source of differences in compliance.

With these factors in mind, it is now time to review the basic features of the personal income tax system and the role of government in the three countries reported in this research: US, South Africa, and Botswana. As we have seen, the basic features of the tax system and the role of government affect the level of the inhibitors and the perceptions of the fairness of the tax system.

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<sup>3</sup> In the U.S. the actual probability of an audit is less than two percent. In fact, for most lower income levels it is below one percent. Yet overall compliance rates are over 83 percent (see *Tax Notes*, 1996).

### III. PERCEPTIONS OF THE PUBLIC SECTOR IN THE THREE STUDY COUNTRIES

Tax compliance depends on the enforcement effort, as demonstrated above, but also on the inhibitors that are inherent in the individual-government relations in a given country or society. This section describes several features of the enforcement policies, the tax systems and the perceptions of the government for each of the three countries. The points raised here are summarized in Table 1.

**Table 1**  
**Features of the Tax System in the Study Countries**

Tax Feature	U.S.A.	South Africa	Botswana
Self	Yes	Yes	Yes
Reporting/Assessment			
Withholding	Yes	Yes	Yes
Highest Marginal Rate	33%	45%	25%
Audit Enforcement			
Financial Penalty	Yes (Interest Plus Up to 150 percent of Tax Owed)	Yes (Max: Double Tax Owed plus Interest)	Yes (Max: Tax Owed plus Interest)
Incarceration	Yes (Depends on Severity of Evasion)	Yes (Up to Two Years)	Yes (Up to One Year)
Mandatory Filing	Yes	No (Unless Tax Owed)	No (Unless Tax Owed)
Central Government	No	No	Yes
Tax Amnesty			

The self-assessment and audit processes are similar across the three countries although there are varying degrees of aggressiveness in enforcement. The US tax administration depends heavily on self-assessment and reporting of tax liabilities along with a system of tax withholding. The audit process is generally regarded with dread on the part of the taxpayer and there is a great deal of uncertainty surrounding the audit selection process and the determination of penalties. In fact, there is some evidence that the IRS intentionally fosters this uncertainty (see *Roberts v IRS*, 1984). Behavioral theories and evidence support the IRS's choice of this strategy.<sup>4</sup> This strategy has been effective but not without cost. A considerable portion of the public backlash against the IRS has been due to the perception that the IRS is capricious in its enforcement precisely because the rules and penalties are not stated explicitly. South Africa also relies heavily on self-reporting and a system of withholding. Tax evasion is treated as a serious crime.<sup>5</sup> The South African tax authority, like its US counterpart, exploits high profile cases to reinforce its reputation for tough enforcement. To date, there has been no public backlash in South Africa toward its policy of not revealing the audit rules or explicit policies. In Botswana, on the other hand, the attitude of the tax authority seems to be more accommodating. For example, a general tax amnesty was conducted in 1999. This has not happened in the U.S. or in South Africa.

<sup>4</sup> Becker's (1968) work on the economics of crime suggests that risk averse agents will respond to uncertainty in punishment by reducing their criminal activities.

<sup>5</sup> In a recent newspaper article, it was reported that Bishop Desmond Tutu's son Trevor was sentenced to 12 months in jail for tax evasion (*The Star*, October 28, 1999 p 6).

All three countries rely on some form of withholding during the year and individual self-assessment and reporting of final tax liabilities. The respective computations of the tax bases are quite similar across the countries. In the US the personal income tax (PIT) base consists of wages and salaries plus interest and dividend income plus modified capital gains. Various exemptions are granted in computing adjusted gross income and deductions may be applied which reduce the tax burden. In South Africa the PIT base consists of wages and salaries as well as passive income (interest and dividends included here) but not capital gains. As in the US, certain exemptions and deductions may be taken. Withholding is applied to wage and salary income and periodic payments (three times per year) are required on self-employed earnings. In Botswana, the PIT base includes wages and salaries as well as investment income (dividends and capital gains). Taxes on wages and salaries are withheld at source. Self-employed earnings require a periodic payment similar to the quarterly filing requirement in the US. Botswana makes explicit use of its PIT to attract foreign direct investment.

In Botswana the marginal tax rate is capped at 25 percent, which is lower than the rates in South Africa (45 percent) and other neighboring countries as well as the US (39 percent). Various exemptions and deductions are offered in Botswana as well (although there is no dependent deduction). Thus, there are substantial differences across the countries in terms of the marginal rates.

While the enforcement programs influence the individual tax compliance decision, there are other factors that motivate tax compliance. These have been identified as the non-sanction inhibitors earlier and include such elements as the perception of a beneficial fiscal exchange and the social norms of a culture. Thus, there are many similarities in the tax systems of the three countries but there are differences that affect the public perception of government and the equity of the tax system and with the penalties imposed for evasion.

In the U.S. the IRS houses an audit division and also a criminal investigation division (CID). The audit division reviews tax returns, assesses liability and imposes civil penalties. The CID investigates and prosecutes for fraud and for concealing income (legal or illegal). The IRS has a fairly active criminal prosecution program. The statistics of the IRS Criminal Investigation Division report that from FY 1998 through FY 2000 a total of 6,549 persons received prison sentences for tax evasion.<sup>6</sup>

In Botswana the investigation division carries out in depth examination of cases where tax evasion is suspected. It also maintains an intelligence database of all transactions relating to properties, tenders, vehicle registration and companies registration etc. Civil penalties can be imposed for failure to file if taxes are owed. These penalties consist of interest at the rate of 2 percent per month and a penalty not to exceed the tax owed. Criminal penalties not to exceed one year can be imposed for egregious evasion and or fraud.

In South Africa, any person required to render a return who fails to do so within the period mentioned above, is liable to a penalty not exceeding R2, 000 and/or to imprisonment for a period

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<sup>6</sup> This may be somewhat exaggerated. The IRS is often called upon to investigate individuals for tax evasion that are substantially suspected of other crimes such as narcotics or illegal gambling but for which sufficient evidence to obtain a conviction is not available.

not exceeding twelve months. Furthermore, his/her taxable income may be estimated and three times the amount of tax charged thereon. Any taxpayer who knowingly and willfully makes any false statement in his/her return or evades or attempts to evade taxation and any person who assists a taxpayer to do so, is liable to a penalty not exceeding R1, 000 and/or to imprisonment for a period not exceeding two years. The taxpayer is, in addition, liable to be assessed and charged three times the amount of the tax, which he/she sought to evade.

There are some interesting differences in how government is viewed in each country. In the US there is a tradition of democratic decision-making but the IRS is often viewed as invasive and the tax auditing system is sometimes seen as unfair. The US population seems to have a certain amount of trust for government although the tax authority is not highly regarded. Surveys report that many Americans feel that the audit and enforcement process is capricious<sup>7</sup> (see Yankelovich, Skelly, and White, Inc., 1984). Such sentiments do little to encourage compliance. Actions of the IRS seem to garner a great deal of negative publicity such as that arising from its recent decision to audit those claiming the earned income tax credit (EITC). Since the EITC is directed toward low-income people, such a strategy clearly caused a public relations problem and portrayed the IRS as attacking poor families with children.

Botswana is virtually unique among African countries. Although it was a colony (British) and only recently (1966) gained independence diamond-rich Botswana is one of Africa's oldest multiparty democracies and it has successfully made the transition to self-governance. Several elections have been held since independence and all have been quiet affairs with none of the violence or corruption charges that have accompanied elections in neighboring countries. In fact, The government of Botswana takes great pride in its stability and refers to itself as the "gem of Africa" in many official publications. A message is clear: the government is working and working for you – paying taxes is part of this social contract. The most recent election affirmed the ruling Botswana Democratic Party's position as it won 33 of the 40 seats in Parliament. The Botswana experience is in marked contrast with South Africa with its well-known history of apartheid. Indeed the recent elections in South Africa have been controversial and often accompanied by violence. Both the white and black populations have reason to be suspicious of the government. The white population has been concerned about protection of property rights (especially in the face of proposals for land reform) while the black population has little reason to trust any government until it has been demonstrated that such trust is warranted. That is, the political history of South Africa is much more conflictive. The newly formed government (led initially by Nelson Mandela) has not yet generated a track record of trust. Currently crime rates are very high

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<sup>7</sup> For example, tax and bond referenda are often more likely to receive voter approval when the uses of the revenues are tied to a specific purpose. Conversely, individuals react negatively to the perception that they have no control over the use of their taxes. In an Internal Revenue Service funded survey of taxpayers, Westat (1980a) finds the following kinds of taxpayer attitudes:

"I wouldn't mind it so much if I could designate where my tax dollars went to. I resent having to find out why frogs in South America croak and things like that. That goes against my grain."

"When we pay taxes, we like to know what it's going for."

Similarly, taxpayer focus group suggestions for increasing compliance as reported to Yankelovich, Skelly, and White, Inc. (1984) include the following kinds of ideas:

"Parochialize expenditures. Publicize local benefits of tax monies."

"Publicize national social programs which benefit from tax money."

"Allow people to earmark a portion of their tax payments. Give them choices."

"Illustrate benefits to all of us if taxes are paid."

(one of the highest in the world, in fact) and there is a feeling that the social order is somewhat fragile, although, the government has recently undertaken steps to address these sentiments. For example, the tax legislation of South Africa explicitly states that “taxes are not a punishment, they are the price paid for government services.”

The level of development and sophistication of the tax enforcement apparatus differs considerably across the three countries. While the US has one of the most advanced tax administration systems in the world, Botswana’s tax administration system is still developing. The situation in South Africa is somewhat between these poles. The South African Revenue Service (SARS) notes that, “effective collection of revenue relies heavily on the efficiency of technology, which is used to support the business system. It is thus very important from a technological point of view that in order to succeed as a business organization, changes have to be made to keep up to date with the rest of the world.” To this end, SARS has implemented a modern computerized tax collections and administration monitoring system. This system was installed in July of 1997. The primary objectives satisfied by this system are improved data integrity, a reduction in human intervention, and an increase in effectiveness and productivity.

The resources available for tax auditing in Botswana are quite low. The audit branch is typically understaffed and the low pay relative to the private sector has led to considerable staff turnover. These characteristics imply a low level of audit activity and a resulting low audit probability. In 1991, Botswana obtained a computer network in order to monitor large taxpayers and to identify the most productive centers of information from which significant data can be extracted. A concept of “exincome” was developed to build the tax intelligence system. Exincome monitors the exchange of goods and services, which as they flow from one person to another, one person’s expenditure becomes another’s income.

Botswana offered an income tax amnesty in 1999. There are no data available at this time on the results of the amnesty. In Botswana there is a filing requirement although it is not generally enforced. Penalties are imposed for unpaid taxes (evasion) but not for failure to file itself if no taxes are owed. This may imply a greater level of trust of citizens by the government or it may simply reflect a lack of resources necessary to process additional tax returns.

A perception that the government is corrupt will reduce the willingness to comply with taxes. Transparency International, a global coalition against corruption based in Denmark, has published a “1999 Corruption Perception Index” which relates the perceptions of the degree of corruption as seen by business people, risk analysts and the general public (10 being highly clean and 0 being highly corrupt.) The results for selected countries are presented in Table 2. The difference between the scores for Botswana and South Africa are considerable (Botswana’s score is some 20 percent higher than South Africa’s). This difference may be perceived to be even larger due to the geographic proximity of the countries.

**Table 2**  
**Corruption Indices and Ranks (Lowest to Highest)**

Country	Rank	Index
Denmark	1	10
Finland	2	9.8
United States	18	7.5
Botswana	24	6.1
South Africa	34	5
Nigeria	98	1.6
Cameroon	99	1.5

Source: Transparency International: <http://www.gwwdg.de/~uwvw/>

Perhaps more telling measures of government fairness are reported in Table 3. The GINI coefficients indicate that income inequality is greatest in South Africa and the level of civil liberties is the lowest. Further, economic mobility within South Africa is also low at this time.

**Table 3**  
**Measures of Equality and Government Fairness**

Country	GINI	Civil Liberties	Size of Government	Freedom to Compete
U.S.A.	1991 – 37.94	1	17.4	10.0
Botswana	1986 – 54.21	2	24.6	7.5
South Africa	1993 – 62.30	Fail (>5)	21.1	5.0

Notes: Higher GINI coefficient implies more inequality. Lower Civil Liberties score implies greater freedom. Size of Government is computed as % of GDP. Freedom to Compete refers to businesses and ability to compete in national markets.

Thus, the above data may be summarized as follows. On the basis of government openness and equality, the U.S. is ranked first among the three countries studied. However, the tax system and perception of the public sector in Botswana is rated highest. South Africa is rated lowest on both the government fairness and the tax system characteristics. There are three different pools drawn from the U.S. and the comparisons are discussed in the next section.

## IV. EXPERIMENTAL DESIGN AND HYPOTHESES

### A. Experiment Design and Subject Decision Setting

The experimental design replicates most of the elements of the basic structure (Table 1) of the personal income tax system in the three countries. In the experiment, individuals receive income, they pay taxes on income voluntarily reported and they face a probability of audit, and, if they are detected cheating, pay a penalty on taxes not reported. Of course, incarceration is not a possible penalty in the experimental setting. In this institution there are three basic fiscal parameters that affect decisions on tax compliance: tax rate, probability of detection, and penalty

(or fine) rate. The maintained hypothesis is that risk attitudes are the same across the cultures being investigated. This is tested with a willingness to bear risk experiment and confirmed with the results being reported below. The experimental setting controls for tax rate, probability of detection, and penalty rates. The different pools are subjected to the same parameters. Thus, the observed differences in tax compliance behavior are interpreted as being motivated by: differences in those institutional features affecting attitudes toward the government (the fiscal exchange) and by other possible factors that may be described as differences in the inhibitors or social norms across the countries. To the extent that social norms can be influenced by the same factors that affect attitudes toward government, or by the perceived fiscal exchange, the maintained hypothesis is that all these factors can be represented by the perceptions about government fairness.

Much of the previous experimental investigations of tax compliance have utilized neutral language but there have been some that specifically investigated the effects of context (tax language) on behavior in tax compliance experiments. Alm, McClelland and Schulze (1992) conclude that there is no difference in behavior in experiments that use neutral terminology versus those that use tax specific language. Wartick, Madio, and Vines and (1998) show that there are behavioral differences but these are apparent with adult subjects not with student subjects that Alm, McClelland and Schulze used.

For the purposes of the present research it is necessary to utilize tax context. That is, in order to investigate the effects of cultural and institutional background on the tax compliance decision, the experimental interface used in this paper contains the full tax language. Actually, the tax context is *emphasized* in order that the cultural effects, if such exist, will have the best opportunity to manifest themselves. This feature of the design is intended to ensure that the subjects will bring to the lab their experiences and perceptions of the field setting.<sup>8</sup> Absent the tax language, it may be that the subjects perceive the experiment as a risk setting rather than a tax setting. The approach in this paper intentionally departs from some of the basic precepts of experimental economics (Smith, 1982) since the objective is to investigate the tax compliance decisions across cultures and it is a key component of the design that the tax language and setting be used in the experiment design. Further, the laboratory setting will employ treatments that involve changing basic parameters of the tax compliance enforcement system such as the audit and penalty rates. Thus, the differences across the cultures may be investigated as both shift effects and as affecting the responsiveness to changes in the enforcement parameters (interaction effects).

These experiments are fully computerized.<sup>9</sup> The screen image (see Appendix A) the subjects interact with is a simplified tax form and the language on the screen and in the instructions describes the setting as tax reporting decision. Thus, subjects are told they have received income and are required to disclose this income to a tax authority that will impose a tax, at a stated rate, on any disclosed income. The subjects are told that only they know their income and that they may disclose any amount from zero to the amount of income they have received.

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<sup>8</sup> Subjects were recruited on the basis that they had tax filing experience. While some were students many were not and all had filed their own tax returns. The pool characteristics are discussed in greater detail below.

<sup>9</sup> The experiments were conducted using the portable experimental laboratory of Georgia State University. This facility consists of 16 networked notebook computers transported to the site for the purpose of conducting the laboratory experiments. The fifteen subject computers are situated in folding partitions to ensure private decisions. The instructions for the experiments are conveyed via a portable projector demonstrating the subject interface and through a set of verbal instructions.

The subjects are further told that they may be audited and any income not disclosed will be detected and a fine imposed. All of the relevant parameters are described in the instructions and are provided on the screen at all times the subjects are making their decisions.<sup>10</sup>

The experimental software is extremely interactive. The computer screen informs the subjects of the base audit probability and penalty. When the subject enters a proposed income disclosure, the screen updates the audit probability. The actual probability is determined by the formula:  $\text{Actual Probability} = \text{Base Probability} + 0.001 (\text{Actual Income} - \text{Disclosed Income})$ .<sup>11</sup> The subjects are free to experiment with different disclosure decisions until they actually click on the “File Taxes” button. The screen updates and informs the subjects of the actual probability of being audited whenever the subjects enter an income level to disclose. The screen also informs the subjects of the outcome (take home income) that would be added to their balance if they were audited and if they were not audited. While the subjects may input different values and observe the prospective results, there is a time limit imposed – subjects must click on the “File Taxes” button within two minutes and are warned when the time limit is approaching. This simulates the necessity of filing within the legal time limit.

Once all of the subjects have disclosed their income, the audit process is begun. While the base audit probability is the same for all subjects, the effective audit probabilities differed due to the level of income reported. The computer screen informs the subjects of the outcome of their individual audit process. If they are audited, they are told the level of the fine imposed and the resulting final income for the period. If they are not audited, they are so informed. The person running the experiment announces the total number of subjects audited at the end of each round.

Several treatments are conducted (see Table 4). The experiments employ a within subject design. Thus, each subject sees several treatments during a session and the order of the treatments was changed for each session. There are several reasons for the within subject design. First, it increases statistical power since the characteristics of the subjects are held constant while the decision treatment is altered. Second, there was limited time available at some of the sites where the experiments were to be conducted and the number of sessions that would be possible to conduct each site was unknown until the experimenters actually arrived on site. To ensure that the data sets would encompass a sufficient number of treatments and be comparable, it was decided that the design would involve having each subject participate in three different settings (series A) lasting a total of nine decision rounds (three rounds in each setting). A second series (series B) of experiments was run in which the only treatment variable was the audit rate which changed every two rounds. The parameters for each treatment setting are reported in Table 4. The subjects received the same income (405 lab dollars) in each round. They were not informed of the number of rounds that a given treatment would be in effect, nor were they informed of the number of treatments they would face during the session. The exchange rate from lab dollars to local

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<sup>10</sup> The design and implementation was constructed to minimize the problems addressed in Roth et. al. (1991) associated with conducting experiments in different environments. Specifically, the language in all settings is English, the experimenter was the same person in all cases, and the currency conversions were handled such that the subjects were paid the same multiple of the average student earnings in each labor market.

<sup>11</sup> Thus, the audit probability begins at a base level and increases (linearly) with the level of unreported income. This was introduced to increase realism. In tax systems that utilize taxpayer provided information, it is generally the case that the likelihood of an audit increases the greater the non-compliance (Alm, Cronshaw, and McKee, 1993).

**Table 4**  
**Experimental Design (Parameters)**

Treatments	Audit		Expected Value	
Part A	Probability	Fine Rate	Of Audit	Tax Rate
Treat A1	0.10	1.5	0.15	0.30
Treat A2	0.30	3.0	0.90	0.30
Treat A3	0.10	3.0	0.30	0.30
Treat A4	0.30	1.5	0.45	0.30
Treatments				
Part B				
Treat B1	0.10	3.0	0.3	0.30
Treat B2	0.20	3.0	0.6	0.30
Treat B3	0.30	3.0	0.9	0.30
Treat B4	0.40	3.0	1.2	0.30

currency was announced prior to the start of the experiment. The audit rates reported in Table 4 represent the base audit probability but the actual audit probability is endogenous since it varies inversely with the amount disclosed (as discussed above). The fine rates represent the multiplier imposed on unpaid taxes if the individual was audited. The expected value of audit is simply the product of the audit probability and fine rate. This single metric is useful for comparing across treatments although it has no behavioral implications.

The individual compliance decision for a given set of parameters and a given cultural baseline is a function of risk attitudes. All subjects participated in an initial experiment designed to investigate risk attitudes. In this experiment the subjects choose either a certain payoff or a gamble over ten different probabilities of the high payoff from the gamble. The structure of the choices is shown in Table 5. Subjects select Option A or B for all 10 choices. When the tax

**Table 5**  
**Experimental Parameters for Risk Attitude Assessment**

Choice	Payoff to Option A	Payoff to Option B	Expected Value for B
1	\$3	\$6 if a 1 is rolled and \$1 otherwise	\$1.50
2	\$3	\$6 if a 1 or 2; \$1 otherwise	\$2.00
3	\$3	\$6 if a 1 through 3; \$1 otherwise	\$2.50
4	\$3	\$6 if a 1 through 4; \$1 otherwise	\$3.00
5	\$3	\$6 if a 1 through 5; \$1 otherwise	\$3.50
6	\$3	\$6 if a 1 through 6; \$1 otherwise	\$4.00
7	\$3	\$6 if a 1 through 7; \$1 otherwise	\$4.50
8	\$3	\$6 if a 1 through 8; \$1 otherwise	\$5.00
9	\$3	\$6 if a 1 through 9; \$1 otherwise	\$5.50
10	\$3	\$6 if a 1 through 10; \$1 otherwise	\$6.00

compliance experiment is completed, one subject rolls a 10-sided die to determine which of the choices will be used to compute a payoff. For those choosing Option B the subject rolls a second

die to determine the payoff. The degree of risk aversion is determined by where the subject “crosses over” from Option A to Option B. A risk neutral subject would choose Option A when the probability of winning the large prize under Option B was 0.4 or greater. As a subject’s risk aversion increases, the probability required to cross over will increase. The data will be used to test whether the attitudes toward risk are the same for all subject pools.

## B. Subject Pools

The subject pools and the number of sessions with each pool are described in Table 6. For the purposes of the comparison of cultural responses there are pools from South Africa and Botswana and three different pools from the U.S. Since the cultural factors discussed in Section III relate to perceptions of the government and the personal taxation system, it is possible that there will be cultural effects within a country as diverse as the U.S. Thus, the investigation includes an analysis of the behavior in three different U.S. pools.

**Table 6**  
**Experimental Design (Subject Pools)**

Country/Pool	Number of Sessions	Number of Subjects	Average Age	% Non-student
South Africa	6	88	28.4	33%
Botswana	6	99	25.4	17%
U.S. State	2	20	22.65	10%
U.S. Private	1	10	24.1	10%
U.S. HBS	2	22	22.45	5%

There are some clear differences in age and occupation mix in the pools. However, in each pool (except one) there are several non-students. Further, a condition for participation was some experience in filing taxes. It is clear that these samples are not representative of the population of the respective countries. The samples are younger than the population at large and better educated. However, the pools are quite similar across locations and this allows for the comparison analyses reported below. For the purposes of comparative analysis one pool must be selected as a baseline. In this case the subjects located at a large state university are designated as the “US Baseline”. The remaining U.S. pools are drawn from a private university (US Private) and a state historically black school (US HBS). The motivation for this selection is to identify pools according to their revealed behavior toward government provision of goods and services. The US Private pool has selected a non-public sector university and may be inferred to regard the government provided services as inferior on some basis. As compared with the US Baseline, the compliance rate for the US P pool is predicted to be lower. The US HBS pool will have a more positive view of the public sector that is providing an educational opportunity and will be expected to have a higher compliance rate than the US Baseline. The pools in South Africa and Botswana are drawn from the populations associated with large state universities in both countries.

The subjects’ earnings were paid in the local currency (dollars, rand, and pula). The payment rate in all sessions is approximately three times the wage that the subjects would earn in

occupations located near the university. This ratio is applied in the US pool and in South Africa and Botswana as well.<sup>12</sup> By all casual observations, the subjects were highly motivated by the payoffs.

Personnel at the universities located at the sites recruited subjects to participate in the experimental sessions.<sup>13</sup> Subjects with some experience in filing tax returns were specifically selected with a mix of students and non-students comprising each pool. The fractions of non-students were not constant across the pools but were 10 percent or higher except at one site (US HBS). The age range of the subjects varied across the subject pools in accordance with occupations. For this experimental investigation, the objective was to create in the laboratory a setting with the properties of a tax-filing problem. This would have the purpose of reminding the subjects of the naturally occurring setting they face when selecting their tax compliance strategy in the field.

### C. Hypotheses Investigated

The literature suggests that subjects will bring to the laboratory their perceptions of the consequences and ethics of tax evasion if the experimental setting reinforces this through the use of tax language in the experimental instructions. Since the experimental parameters (tax rate, laboratory income, and enforcement) are the same for all subject pools, the cultural background is an orthogonal treatment. Thus, the central hypothesis is that observed differences in behavior across the pools will be due to social or cultural factors and these are hypothesized to lead to different reactions to the *same experimental parameters*. The following hypotheses are suggested by the theory and can be tested based on the experimental design:

**H1:** Compliance levels *increase* as the audit probability increases and as the penalty rate increases. This holds for all pools.

This is the usual “economics of crime” result for tax compliance behavior. As the evasion gamble is made less attractive, fewer people will choose to evade. If this hypothesis is not rejected, it will provide also evidence that the subjects understood the experimental setting. The experiments reported here are intentionally very context intensive. The main hypothesis focuses on differences due to cultural effects. The discussion in Section III leads to the following prediction:

**H2:** The compliance rate will be ranked *highest to lowest* in the following order: Botswana, USHBS, US State, USP, and South Africa.

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<sup>12</sup> The objective here was not to investigate the effects of scaling payoffs as in Kachelmeier and Shehata (1992) but to focus on the effects of “culture” on compliance.

<sup>13</sup> Sessions were conducted at Georgia State University (US Baseline), University of Pretoria in South Africa, University of the North in South Africa, University of Botswana, Albany State University in Georgia (US HBS), USA, and at Emory University (US Private) in Georgia, USA. The subjects were told that the experiments would be conducted by personnel from other institutions and that their behavior would not be reported to anyone at their own institutions.

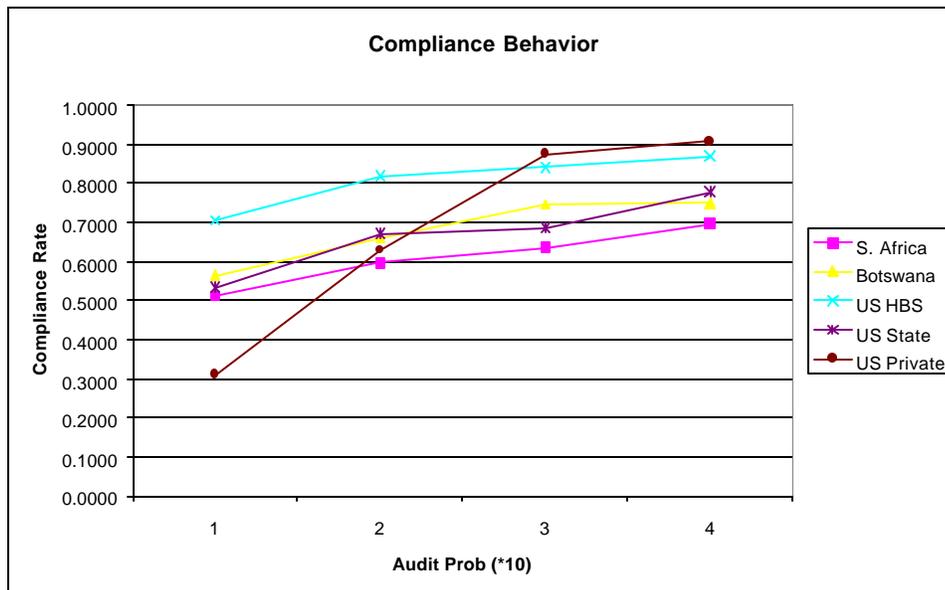
## V. EXPERIMENTAL RESULTS

There are a large number of treatments and sessions embodied in the data set generated by this experiment series. The summary statistics are presented in Table 7. The subjects in each pool appeared to understand the setting. In the B series of experiments only the audit probability was changed as a treatment variable. The results from the B Treatments (Table 7 and Figure 2) show that compliance increases systematically as the audit probability increases and that the general pattern is the same for all of the subject pools. As Figure 2 also shows, there are some clear differences in behavior across the pools.

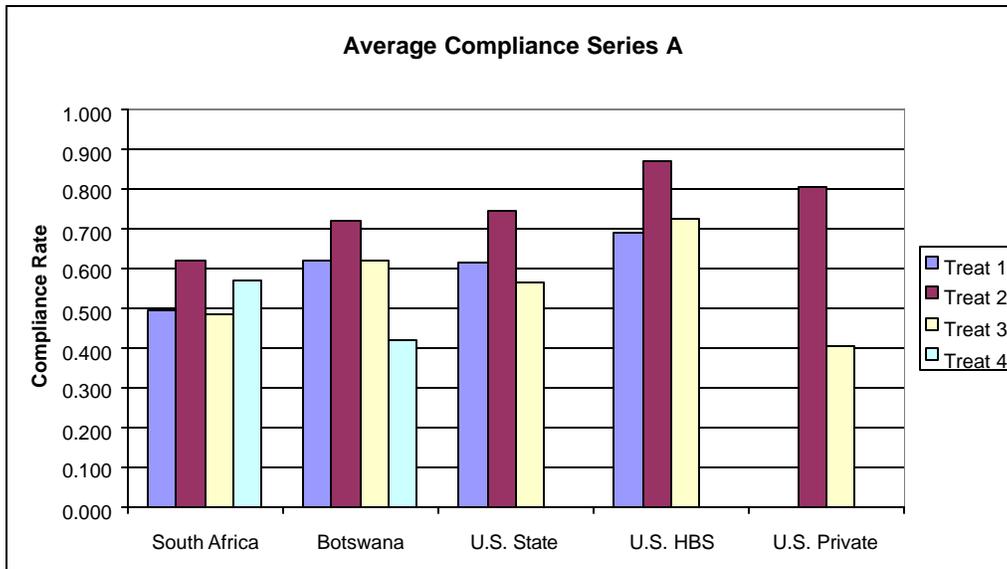
**Table 7**  
**Summary Statistics: Average Compliance Rates**

Treatments	South Africa	Botswana	U.S. State	U.S. Private	U.S. HBS
<b>Part A</b>					
Treat A1	0.494	0.617	0.616		0.691
Treat A2	0.618	0.721	0.743	0.803	0.872
Treat A3	0.485	0.622	0.563	0.404	0.724
Treat A4	0.569	0.418			
<b>Part B</b>					
Treat B1	0.5128	0.5649	0.5342	0.3109	0.7060
Treat B2	0.5974	0.6598	0.6719	0.6293	0.8199
Treat B3	0.6366	0.7468	0.6881	0.8747	0.8420
Treat B4	0.6974	0.7496	0.7794	0.9080	0.8710

**Figure 2**  
**Series B Compliance Behavior by Audit Probability**



**Figure 1**  
**Average Compliance by Subject Pool and Treatment (Series A)**



When the changes involve tradeoffs between audit rate and penalty as in the A treatments, the observed behavior appears less consistent based on the results reported in Table 7 and Figure 1. Thus, the compliance rate is uniformly higher in Treatment A2 than in A1, which is a predicted response to the higher enforcement effort. However, compliance is **not** uniformly higher in A4 than in A1 (for those pools in which A4 was run). Nor is compliance in A3 always greater than A1 as predicted. These results suggest that the subjects are making more complex tradeoffs between audit probabilities and penalty rates. It is also interesting to note observed regularities across the subject pools. The compliance rates in the South African pool are generally lower for all levels of enforcement than those in the U.S. State pool and the Botswana pool. This is expected if the subjects are reacting to the differences in the fiscal setting across the countries as described above. More detailed discussions of the behavior differences are taken up in the discussion of the econometric results below.

Since the actual audit probability a subject faces is determined by his or her own level of compliance, the effective audit probability can be used as a gauge of the willingness to bear risk of an audit. The averages of the effective audit rates are reported in Table 8. The A series treatments do not cover all treatments for all pools and so a full comparison is not possible. Nevertheless, a pattern emerges that can be recognized. The subjects apparently respond to the nominal probability of an audit less than they incorporate the expected value of the audit process itself. Thus, the effective audit probabilities are similar for Treatments A2 and A4 and for Treatments A1 and A3. The penalty rates are twice as high for A4 relative to A2 and for A3 relative to A1. It appears that the subjects have selected compliance levels that are a response to the baseline audit probabilities rather than the overall expected penalty rates.

**Table 8**  
**Summary Statistics: Average Effective Audit Probabilities (Nominal Probability)**

Treatments	South Africa	Botswana	U.S. State	U.S. Private	U.S. HBS
<b>Part A</b>					
Treat A1	0.305 (0.10)	0.255 (0.10)	0.256 (0.10)		0.226 (0.10)
Treat A2	0.455 (0.30)	0.414 (0.30)	0.404 (0.30)	0.380 (0.30)	0.352 (0.30)
Treat A3	0.308 (0.10)	0.231 (0.10)	0.277 (0.10)	0.341 (0.10)	0.212 (0.10)
Treat A4	0.474 (0.30)	0.536 (0.30)	N/A	N/A	N/A
<b>Treatments Part B</b>					
Treat B1	0.297 (0.10)	0.276 (0.10)	0.289 (0.10)	0.379 (0.10)	0.219 (0.10)
Treat B2	0.363 (0.20)	0.339 (0.20)	0.333 (0.20)	0.350 (0.20)	0.273 (0.20)
Treat B3	0.447 (0.30)	0.403 (0.30)	0.426 (0.30)	0.351 (0.30)	0.364 (0.30)
Treat B4	0.523 (0.40)	0.501 (0.40)	0.489 (0.40)	0.437 (0.40)	0.452 (0.40)

The data from the Series A sessions were analyzed using a series of econometric models and results are reported in Table 9. The dependent variable is the compliance rate (disclosed income divided by actual income). Since this dependent variable is censored at 0 and 1.0, a Tobit estimation technique was used. The variable names, constructed variable definitions, predicted signs on the coefficients are shown in the tables along with the estimated results. The right hand side variables are the basic characteristics of the individuals (age and occupation), the basic treatment variables (audit probability and penalty rate) and the pool dummy variables. The predicted signs for the audit rate and penalty rate variables are generated by Hypothesis 1 and the predicted sign on age and occupation are generated from the discussion of the literature in Sections III and IV. The pool dummies are used both alone (as intercept effects) and interactively with the tax policy variables. The omitted dummy variable is South Africa. Since the compliance rate is predicted to be lowest for this pool, the predicted signs for the remaining subject pool dummy variables are all positive (Hypothesis 2). This is also true of the interaction dummy variables.

The econometric results (Table 9) generally support Hypothesis 1 as comparison of the predicted signs on the enforcement variables with the estimated results show. The individual compliance increases with the audit probability. However, the penalty rate is not generally successful in increasing compliance. When enforcement effort is coded as a single variable (Enforce) the results are consistent with the prediction; higher enforcement effort leads to greater compliance and A3. The penalty rates are twice as high for A4 relative to A2 and for A3 relative to A1. It appears that the subjects have selected compliance levels that are a response to the baseline audit probabilities rather than the overall expected penalty rates.

The data from the Series A sessions were analyzed using a series of econometric models and results are reported in Table 9. The dependent variable is the compliance rate (disclosed income divided by actual income). Since this dependent variable is censored at 0 and 1.0, a Tobit estimation technique was used. The variable names, constructed variable definitions, predicted signs on the coefficients are shown in the tables along with the estimated results. The right hand-

**Table 9**  
**Compliance Results (Dependent Variable = Compliance Rate) Tobit Estimation**

Independent Variable	Predict	Model 1	Model 2	Model 3	Model 4
Constant	+	0.4113 (5.311)	0.3807 (4.548)	0.4253 (5.802)	0.4541 (6.261)
Age	+	0.00345 (1.744)	0.00333 (1.674)	0.0053 (2.689)	0.00487 (2.514)
Occupation (S = 1)	-	-0.0787 (2.238)	-0.0815 (2.306)	-0.0395 (1.153)	-0.0322 (0.942)
Audit Probability	+		0.6251 (5.285)		
Penalty Rate	+		0.00763 (0.481)		
Enforce (Audit Prob. * Penalty Rate)	+	0.2171 (6.818)			
U.S. State	+	0.1285 (3.235)	0.1387 (3.448)		
Botswana	+	0.1511 (6.358)	0.1569 (6.518)		
U.S. Private	+	-0.0633 (1.077)	-0.0479 (0.797)		
U.S. HBS	+	0.2756 (7.081)	0.2858 (7.243)		
US State*Audit Prob.	+			1.0896 (2.522)	
Bot*Audit Prob.	+			0.2322 (1.260)	
USHBS*Audit Prob.	+			1.3380 (3.174)	
US P*Audit Prob.	+			0.5665 (1.903)	
US State*Penalty	+			-0.0201 (0.620)	
Bot*Penalty	+			0.0483 (3.084)	
USHBS*Penalty	+			0.0220 (0.703)	
US P*Penalty	+			*	
US State * Enforce	+				0.2434 (3.611)
US HBS * Enforce	+				0.5026 (7.501)
Bot * Enforce	+				0.2529 (7.013)
US P * Enforce	+				0.1567 (1.588)
Log-likelihood		-1614.89	-1619.12	-1622.81	-1626.39

side variables are the basic characteristics of the individuals (age and occupation), the basic treatment variables (audit probability and penalty rate) and the pool dummy variables. The predicted signs for the audit rate and penalty rate variables are generated by Hypothesis 1 and the predicted sign on age and occupation are generated from the discussion of the literature in Sections III and IV. The pool dummies are used both alone (as intercept effects) and interactively with the tax policy variables. The omitted dummy variable is South Africa. Since the compliance rate is predicted to be lowest for this pool, the predicted signs for the remaining subject pool dummy variables are all positive (Hypothesis 2). This is also true of the interaction dummy variables.

The econometric results (Table 9) generally support Hypothesis 1 as comparison of the predicted signs on the enforcement variables with the estimated results show. The individual compliance increases with the audit probability. However, the penalty rate is not generally successful in increasing compliance. When enforcement effort is coded as a single variable (Enforce) the results are consistent with the prediction; higher enforcement effort leads to greater compliance.

The cross cultural effects are investigated by introducing the subject pools as dummy variables and by interacting the pool dummy variables with the tax policy variables related to enforcement. In models 1 and 2, the potential cultural effects are introduced as pure shift variables and here the results are generally consistent with support for Hypothesis 2. Since the South Africa subject pool is predicted to have the lowest compliance rates, the coefficients on the pool dummy variables are predicted to be positive. This is generally the case. The consistent exception is for the US Private pool where the coefficient is not significantly different from zero. Model 1 has the best overall fit. Here the magnitude of the shift variables is US HBS (approximately 0.28), Botswana (0.15), US State (0.13), and US Private (0.00 – not significant). This is not exactly consistent with Hypothesis 2 where the predicted order was Botswana, US HBS, US State, US Private, and South Africa. The compliance behavior in South Africa and the US Private pool is not statistically different. The highest overall compliance behavior was recorded by the sample drawn from the US HBS pool.

Finally, models were run in which the pool dummy variables were interacted with the tax treatment variables (models 3 and 4). In model 3 the audit rate and penalty rate variables are interacted separately and some interesting behavioral patterns emerge. First, in all cases except Botswana the subjects increase compliance when the audit rate increases. However, the pool from Botswana does respond positively to increased penalty rates.<sup>14</sup>

This divergent behavior suggests that it may be useful to investigate the response to the composite enforcement variable when interacted with the pool dummy variables (model 4). In all pools except the US Private, the response to increased enforcement is positive and significant.

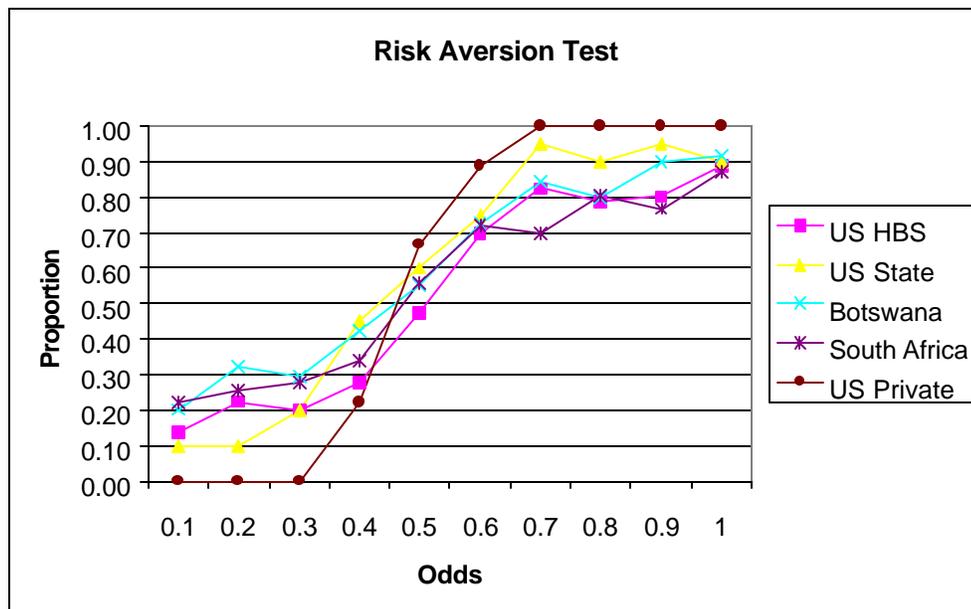
As noted above, the behavioral differences across the subject pools could be argued to be due to differences in risk attitudes or to cultural differences toward taking gambles rather than the

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<sup>14</sup> The interaction between the penalty rate and the US Private pool dummy was omitted since this pool only saw one penalty rate (Table 4).

institutional features of the fiscal sectors in the countries. The data from the risk experiments allow the conjecture to be investigated. In Figure 3, for each subject pool, the proportion choosing Option B (the gamble) is plotted against the probability of winning the large prize. With the exception of the results for the US Private school pool, the behavior of the subject pools would appear to be identical. This is confirmed with a Chi-square test (contingency table). The Chi-Square statistic is not significant (in fact it is 0.000 for Botswana, South Africa, and US HBS; it is 1.20 for US Baseline) for any pool except the US Private one. For the remaining subject pools the willingness to bear risk in this simple setting is statistically identical. Thus, the observed differences in behavior are not due to differences in risk attitudes across the pools. This strengthens the conjecture that differences are due to cultural factors attributable to differences in the fiscal setting in the countries.

**Figure 3**  
**Risk Behavior of the Subjects**



## VI. CONCLUDING COMMENTS

Tax compliance (evasion) is a complex decision that is motivated by a variety of factors. The threat of detection and punishment is clearly a factor and evidence from a variety of sources support the proposition that increased enforcement leads to increased compliance. This result is similar to that for other illegal activities and is consistent with the economics of crime approach to the analysis of tax compliance. However, observed compliance levels are typically higher than warranted by the level of enforcement. This has led to the formation of theories based on exceptional risk aversion (such as prospect theory and rank dependent expected utility). Another promising line of inquiry has been the effect of social norms on compliance behavior. There is evidence that these norms are influenced by the tax regime and by the responsiveness of

government to the wishes of the citizens. Thus, some cultural differences in compliance behavior are expected and these differences should be related to tax regimes and government behavior.

The results reported in this paper generally support these arguments. The predicted ordering of compliance (highest to lowest) was: Botswana, US HBS, US State, US Private, and South Africa. The observed ordering was: US HBS, Botswana, US State, US Private equal to South Africa.

Strictly cultural differences such as risk attitudes or reluctance to engage in gambles do not appear to explain compliance differences. The subject pools generally exhibit the same attitudes toward risk in a simple gamble experiment (that is context free). While the available data are not sufficient to eliminate *all* such effects, the statistical results reported in this paper suggest that the observed differences in compliance behavior are closely related to the differences in tax institutions and government behavior. Further, the evidence is that these factors are capable of explaining the observed cultural effects.

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### **WEB ADDRESSES**

Transparency International: <http://www.gwwdg.de/~uwvw/>

South Africa Revenue Service (SARS): <http://www.sars.gov.za/>

Botswana Institute for Development Policy Analysis (BIDPA): <http://www.bidpa.bw/>

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Republic of South Africa, *Income Tax Act no 58*, 1962 (as amended), Government Printer, Pretoria, South Africa.

# APPENDIX

## The Subject Screen

**Tax Form**

**1040TC Tax Experiment** Experimental Economics Georgia State University

Experiment Status: Period: 1 Exchange Rate: 1

**Tax Policy** Tax Rate (%): 20  
Probability of audit(%): 30  
Penalty on unpaid taxes (%): 200

**Personal information** Income: 100  
Tax Income: 100 Tax Owed: 20

**Tax Report**

Report Fields

Reported Tax Income: 45.25  
Reported Tax: 9.05

Your after-tax earnings if audited: \$ 69.1  
Your after-tax earnings if NOT audited: \$ 90.9

Click on "File Taxes" to confirm.

File Taxes...

Your accumulated after-tax earnings until current period are: Lab \$ 0

Next Period...

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