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## Effects of Culture on Tax Compliance: A Cross Check of Experimental and Survey Evidence

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Center for Research in Economics, Management and the Arts

**Effects of Culture on Tax Compliance:  
A Cross Check of Experimental  
and Survey Evidence**

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# Effects of Culture on Tax Compliance: A Cross Check of Experimental and Survey Evidence

Ronald G. Cummings, Jorge Martinez-Vazquez,  
Michael McKee, Benno Torgler\*

## ABSTRACT

There is considerable evidence that enforcement efforts can increase tax compliance. However, there must be other forces at work because observed compliance levels cannot be fully explained by the level of enforcement actions typical of most tax authorities. Further, there are observed differences, not related to enforcement effort, in the levels of compliance across countries and cultures. To fully understand differences in compliance behavior across cultures one needs to understand differences in tax administration and citizen attitudes toward governments. The working hypothesis is that cross-cultural differences in behavior have foundations in these institutions. Tax compliance is a complex behavioral issue and its investigation requires the use of a variety of methods and data sources. Results from laboratory experiments conducted in different countries demonstrate that observed differences in tax compliance levels can be explained by differences in the fairness of tax administration, in the perceived fiscal exchange, and in the overall attitude towards the respective governments. These experimental results are shown to be robust by replicating them for the same countries using survey response measures of “tax morale.”

JEL classification: H260, C910

*Keywords:* Tax Compliance, Tax Evasion, Tax Morale, Culture

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## **I. Introduction**

One of the more vexing problems for policy makers in developing and transition economies is encouraging high levels of tax compliance. This issue is independent of the overall tax “take” from GDP. For, even if one begins from a position that government should be small, high tax compliance is necessary for efficiency and equity (McKee, 2003) as well as for the development of social capital (Slemrod, 1998).<sup>1</sup> 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.” Reducing evasion is not simply tied to government’s revenue; it is a broader issue for the development of a civil order (Knack and Keefer, 1997).

But, reducing tax evasion is not only a matter of applying higher penalties and/or increasing the frequency of audits. Indeed, extreme penalties may backfire by creating a setting in which bribery and corruption are more prevalent. The result may be lower tax compliance and a general loss of trust in the public institutions.

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 whether 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, then enhancing these norms may be a desirable policy option. The extent of the impact of cultural or social norms and of social capital on tax compliance behavior is not well understood. Addressing this knowledge gap is the primary motivation for this paper.

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<sup>1</sup> 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).

Tax compliance is a complex behavioral issue and its investigation requires the use of a variety of methods and data sources as each instrument has advantages and shortcomings. Tax compliance behavior has been studied using both field data and data obtained via laboratory experiments.<sup>2</sup> The strength of laboratory experiments is the potential to control for extraneous factors and to manipulate the variables of interest. Survey data allow the inclusion of many socio-economic, demographic and attitudinal variables to permit the use of multivariate analyses. The joint use of both instruments provides a robustness test; if both instruments show the same tendencies we can have greater confidence in the results. In this paper we utilize both field and laboratory data to investigate the effects of cultural norms on compliance behavior.

The current paper reports on laboratory investigations of tax compliance behavior in South Africa and Botswana (with the U.S. providing a counterpoint) applying the same tax reporting setting in each experimental setting. Analyzing South Africa and Botswana helps to reduce the lack of empirical evidence outside the U.S. in the tax compliance literature. We have chosen Botswana and South Africa as they are relatively stable countries in the Sub-Saharan Africa. This reduces possible “noises and biases” in cross-culture comparison and thus offers the possibility to better analyze the effects of social norms on compliance. Finally, some similarities in the tax system and the possibility to conduct the laboratory experiments in the same language plus geographical proximity justify our choice. To be able to attribute differences in tax compliance behavior to cultural factors requires that the sources of such factors be explained. This requires moving beyond the lab to obtain an understanding of the relationship between governments and the people. To that end, the laboratory investigations are complemented by the analysis of data

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<sup>2</sup> Clotfelter (1983) and Feinstein (1991), e.g., have investigated individual compliance using data from the TCMP while Kinsey (1992), Smith (1992), Sheffrin and Triest (1992) and Forest and Sheffrin (2002) report the results of surveys of taxpayers. Alm, Jackson, and McKee (1992a, 1992b, and 1993) as well as Alm, McClelland, and Schulze

from a set of surveys of individual perceptions of government and taxation in these same countries. The laboratory experiments were conducted in fall of 1999 and the survey data were collected during 1995/1995 and 1999/2000.

There is considerable literature suggesting that compliance with rules is affected by social norms (Elster, 1989; Naylor, 1989).<sup>3</sup> Some sources of such norms are the overall level of trust in the government and the overall level of social capital. For example, interactions that demonstrate government responsiveness and fairness have a positive effect on tax reporting behavior as will the perception that the government is using the tax revenues for socially desirable purposes. The current paper 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. Thus, there is a somewhat extensive discussion of such factors in section III of the paper. Further, the use of survey data permits a broader exploration of the effects of social norms on tax compliance behavior, at the same time it provides a robustness check on the findings from using a single methodology.

The experimental and survey 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. We may define tax morale as the *intrinsic motivation to pay taxes*. It is the individuals' *willingness* to pay taxes or, in other words, the moral obligation to pay taxes or the belief in contributing to the society by paying taxes. In all of the cultural settings investigated, compliance does increase with enforcement effort but this is observed to be a less effective mechanism where the tax regime is viewed as unfair.

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(1992, 1999) and Alm, Sanchez, and de Juan (1995) have investigated compliance behavior in a variety of laboratory settings.

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.<sup>4</sup>

## II. The Analytics of the Tax Compliance Decision

We begin with a basic model based on Allingham and Sandmo (1972) and Yitzhaki (1974). 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>5</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. It is straightforward to show, within this model, that increases in the probability of an audit and/or the fine rate will increase compliance. The effect of the tax rate is ambiguous unless the fine is applied

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<sup>3</sup> If tax evasion is considered acceptable behavior, the statutory penalties are less likely to be imposed by the courts. 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.

<sup>4</sup> See Alm and Martinez-Vazquez (2003).

proportionally to the tax evaded (as in equation 1) in which case as the tax rate increases evasion falls (Yitzhaki, 1974).

Given the enforcement resources available to most governments, the observed high compliance rates are inconsistent with rational behavior. Uncertainty regarding the actual audit practices may play a significant role. 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>6</sup> Nevertheless, extreme degrees of risk aversion would be required to explain the observed levels of tax compliance in most countries. Thus, other factors must be at work.

Tax compliance is enhanced when individuals view the paying of taxes as a fair fiscal exchange. In such situations compliance is likely to increase, *ceteris paribus*. In particular, when the services provided by the government are viewed as widely desired and the decisions as to which services to provide are transparent and fair, compliance is likely to be higher than when these conditions are not met. 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 perceive that the provision of government goods and services is contingent on tax collections, 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 and this sum is increased by a multiple  $m$  to reflect the consumers' surplus from a public good. The government distributes the resulting public good in equal share  $s$  to all individuals.

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<sup>5</sup> For simplification, it is assumed that the tax authority uncovers *all* unreported income.

<sup>6</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).



Denoting the reported incomes of all other individuals as  $G$ , the expected utility of the individual is increased by  $U(smt(D+G))$  in either state (audited or not) of the world.

The manner by which the public budget is determined is likely to have an effect on the level of compliance. Alm, Jackson, and McKee (1993) find that compliance is higher when the public good is voted on, rather than imposed, and when the outcome is known to be widely supported. Further, the manner in which the enforcement rules are determined can also influence compliance (Alm, McClelland, and Schulze, 1999).

Social norms and morals have been cited as reasons for high compliance with rules (Elster, 1989) and collective actions (Naylor, 1989). 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 (Steenbergen, McGraw, and Scholz, 1992).

The genesis of the social norms is the interesting question.<sup>7</sup> Our position is that these norms evolve from the perceptions that the government is trustworthy, that the tax enforcement mechanisms are fair, and that the fiscal exchange is beneficial. 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: South Africa, Botswana, and the U.S..

### **III. Perceptions of the Public Sector**

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. Of necessity, this section is largely descriptive and the elements of the tax structure are summarized in Table 1. The comparison

between Botswana and South Africa is certainly natural. Although geographic neighbors, the social histories of the two countries could not be more dissimilar. The US comparison provides a counterpoint.

The self-assessment and audit processes are similar across the three countries although there are varying degrees of aggressiveness in enforcement. South Africa relies heavily on self-reporting and a system of tax withholding. Tax evasion is treated as a serious crime.<sup>8</sup> The South African tax authority 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 South Africa as of the time this study was conducted.

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).

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 South Africa the PIT base consists of wages and salaries as well as passive income (interest and dividends included here) but not capital gains. In Botswana, the PIT base includes wages and salaries as well as investment income (dividends and capital gains). In Botswana the marginal tax rate is capped at 25 percent, which is lower than the rates

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<sup>7</sup> See the discussion in Alm and Martinez-Vazquez (2003)

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 maximum marginal rates. 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. 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.

Table 1 – Features of the Tax System in the Study Countries (effective in year 2000)

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

In Botswana the investigative division carries out in-depth examination of cases where tax evasion is suspected. Civil penalties can be imposed for failure to file if taxes are owed. These penalties consist of interest at the rate of two 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

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<sup>8</sup> In a recent South African 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, Johannesburg, SA).

fraud. In South Africa the penalty structure is generally harsher. 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 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. 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 but this may be somewhat exaggerated.<sup>9</sup>

There are some interesting differences in how government is viewed in each country. Botswana's political history 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 for you –

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<sup>9</sup> 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 secure a conviction is not available.

paying taxes is part of this social contract. Acemoglu, Johnson and Robinson (2002) credit pre-colonial institutions developed by the Tswana tribes, and little disturbed by British colonial rule, with the visible success of Botswana, the fastest growing economy in the world over the past 35 years. The institutions based on private property encouraged cooperation and participation in the economy, and helped to constrain political elites. The Botswana experience is in marked contrast with South Africa with its well-known history of apartheid and social discord. Indeed 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) had not, as of the time of our data collection, generated a record sufficiently long to establish trust. Currently crime rates are very high (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 “taxes are not a punishment, they are the price paid for government services.” 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 (see Yankelovich, Skelly, and White, Inc., 1984; Westat, 1980). Such sentiments do little to encourage compliance.

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 and enjoys little resources. The situation in South Africa is somewhat between these poles. The South African Revenue Service (SARS) implemented a modern computerized tax collections and administration monitoring system in 1997, which is hoped to improve data integrity, reduce human intervention, and increase effectiveness and productivity.

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. 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. Economic mobility within South Africa is also low at this time. Further, we can observe that South Africa has a higher ethnic diversity than Botswana. Several studies have shown that ethnic fractionalization may negatively influence economic success and the quality of institutions (see, e.g., Easterly and Levine, 1997; La Porta et al., 1999; Alesina et al., 2002). Easterly and Levine (1997) found that for Africa a higher ethnic diversity goes in line with low schooling,

underdeveloped financial systems, distorted foreign exchange markets, and insufficient infrastructure.

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

| Country              | Rank | Index |
|----------------------|------|-------|
| Denmark              | 1    | 10    |
| <b>United States</b> | 18   | 7.5   |
| <b>Botswana</b>      | 24   | 6.1   |
| <b>South Africa</b>  | 34   | 5     |
| Nigeria              | 98   | 1.6   |
| Cameroon             | 99   | 1.5   |

Source: Transparency International: <http://www.transparency.org>

Thus, the above discussion 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.

Table 3—Measures of Equality and Government Fairness

| Country      | GINI         | Civil Liberties | Size of Government | Freedom to Compete | Ethnic |
|--------------|--------------|-----------------|--------------------|--------------------|--------|
| U.S.A.       | 1991 – 37.94 | 1               | 17.4               | 10                 | 0.4901 |
| Botswana     | 1986 – 54.21 | 2               | 24.6               | 7.5                | 0.4102 |
| South Africa | 1993 – 62.30 | Fail (>5)       | 21.1               | 5                  | 0.7517 |

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.

Higher Ethnic score implies a stronger ethnic fractionalization. Source: Alesina et al. (2002)

#### IV. Survey Data Analysis

The above tables report some aggregate evidence of differences across South Africa and Botswana (and by comparison, the U.S.) but more detailed analysis is possible using some surveys conducted to investigate tax morale in various countries. In this paper we employ data from two different surveys: the World Values Survey and the Afrobarometer. The World Values Survey (WVS) is the better known of the two; it was conducted for the first time in 1981-1984 and it now covers more than 40 societies around the world based on representative national samples. To more closely match the time period for our experimental data, we work with data from the third year survey, covering the United States (year 1995) and South Africa (year 1996)<sup>10</sup>. To assess the level of tax morale from the WVS we use the following question:

*“Please tell me for each of the following statements whether you think it can always be justified, never be justified, or something in between: ... Cheating on tax if you have the chance”.*

The question leads to a ten-scale index of tax morale with the two extreme points “never justified” and “always justified”. The scale has been recoded into a four-point scale (0, 1, 2, 3), with the value 3 standing for “never justifiable”. The points 4-10 have been integrated in the value 0 due to a lack of variance.

The second data source, the Afrobarometer, is a relatively new survey that measures the social, political and economic atmosphere in more than ten countries in Africa. The advantage of this data set is that it allows us to work with the newest data covering Botswana (year 1999) and South Africa (year 2000). The Afrobarometer focuses more closely on self-reported compliance. The following question is used in the Afrobarometer to measure tax honesty:

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<sup>10</sup> Unfortunately, the third country for which we have experimental data, Botswana, it has not yet been included in the World Values Survey.



*We would like to remind you that your responses to this interview are confidential. Here is a list of actions ordinary people are taking in a political system. For each of these, please tell me whether you have engaged in this activity or not? Avoid paying income taxes.*

We have coded the variable as follows: Yes, often; Yes, a few times; Yes, once or twice: (0), No, but would do it if had the chance: (1), No, would never do this: (2).<sup>11</sup>

In what follows we use data from the two surveys to conduct a multivariate analysis of tax morale in the three countries. A dummy variable is used to control for differences among the three countries, and several variables are used to control for additional factors affecting tax morale. Given the scaled ranking information of the dependent variables, we use ordered probit estimation. However, because in ordered probit the estimating equation has a nonlinear form, we can interpret directly only the sign of the estimated coefficients and not their size. The marginal effects need to be calculated explicitly they indicate the change in the share of taxpayers (or the probability of) belonging to a specific tax morale/honesty rank, when the independent variable increases by one unit. In the results we present only the marginal effects for the highest tax morale/honesty rank.

The World Values Survey allows the use of *weighted* ordered probit estimations to correct for the samples' size and thus enable us to get results reflective of the national distribution. To get an equal number of weighted observations for each survey the original weight variable was multiplied by a constant for each country.

The World Values Survey also allows a check of whether a higher trust in the state leads to a higher tax morale. We will use three variables for this purpose: "trust in the legal system," "trust in the government," and "satisfaction with national officers." We hypothesize that the more citizens trust the government, the legal system and the national officers, the higher is the intrinsic motivation to pay taxes. A higher trust might tend to increase taxpayers' positive attitudes and commitment to

the tax system and tax-payment, which has finally a positive effect on tax compliance (see, e.g., Smith, 1992; Smith and Stalans, 1991).

Taxes paid by individuals can be interpreted as the price paid for government's positive actions. Taxpayers generally are sensitive to the way the government uses tax revenues. Thus, individuals' tax compliance might be influenced by the benefits received from the government in the form of public goods and services relative to the price they have to pay for them. Individuals might feel cheated if taxes are not spent adequately. Therefore, taxpayers perceive their relationship with the state not only as a relationship of coercion, but also as one of exchange. With trust in the legal system, we also include a variable that focuses more on the constitutional level, on how the relationship between the state and its citizens is established.

The estimation results are reported in Tables 4 and 5. Table 4 reports the empirical results for Botswana and South Africa. We observe that individuals in Botswana are more compliant than those in South Africa. The marginal effects indicate that being from Botswana rather than from South Africa increases the probability of stating the highest tax honesty by more than 8 percentage points. Thus, the findings show that tax compliance is unambiguously higher in Botswana. Certain demographic factors also affect compliance, but for space reasons are discussed here (see the Table 4).

Table 5 presents the results comparing South Africa with the United States. It appears that individuals from the U.S. have a significantly higher tax morale than those from South Africa. Being from the United States rather than from South Africa reduces the probability of stating that tax evasion is "never justified" by more than 4 percentage points. To investigate whether the difference between South Africa and the United States is driven by a higher trust, we include the trust variables into the estimations after equation 4. The findings show that the differences remain statistically

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<sup>11</sup> Answers with "don't know" and missing values were not coded and were dropped from the sample.

significant. Interestingly, all trust variables are statistically significant with a positive sign, with marginal effects between 2.8 and 4.1 percentage points. Thus, it seems that the relationship between the state and the taxpayers can be maintained by positive actions, well functioning institutions, implementing a positive social capital atmosphere. Such a strategy will be honored with higher tax morale/compliance. Again, some control variables are significant (see Table 5).

Table 4 - Determinants of Tax Compliance in Botswana (1999) and South Africa (2000)

| <i>Ordered Probit Estimation</i>           | <i>EQ1</i>    |                |             | <i>EQ2</i>    |                |              | <i>EQ3</i>    |                |              |
|--|---------------|----------------|-------------|---------------|----------------|--------------|---------------|----------------|--------------|
|  | <i>Coeff.</i> | <i>t-ratio</i> | <i>Marg</i> | <i>Coeff.</i> | <i>t-ratio</i> | <i>Marg.</i> | <i>Coeff.</i> | <i>t-ratio</i> | <i>Marg.</i> |
| <b><i>a) Socio-Demographic Factors</i></b> |               |                |             |               |                |              |               |                |              |
| WOMAN                                      | 0.096*        | 1.790          | 0.024       | 0.087         | 1.542          | 0.022        | 0.034         | 0.556          | 0.008        |
| AGE  | 0.008***      | 3.265          | 0.002       | 0.010***      | 3.850          | 0.003        | 0.010***      | 3.731          | 0.003        |
| EDUCATION                                  | -0.014        | -0.746         | -0.004      | -0.012        | -0.573         | -0.003       | -0.004        | -0.180         | -0.001       |
| <b><i>b) Race</i></b>                      |               |                |             |               |                |              |               |                |              |
| WHITE                                      | 0.506***      | 4.644          | 0.125       | 0.616***      | 5.239          | 0.153        | 0.593***      | 4.862          | 0.146        |
| COLOURED                                   | 0.687***      | 5.244          | 0.169       | 0.729***      | 5.532          | 0.181        | 0.739***      | 5.571          | 0.182        |
| OTHER                                      | 0.378***      | 2.207          | 0.093       | 0.464***      | 2.635          | 0.115        | 0.470***      | 2.679          | 0.116        |
| <b><i>c) Employment Status</i></b>         |               |                |             |               |                |              |               |                |              |
| OCCUPATION                                 |               |                |             | -0.221***     | -3.182         | -0.055       |               |                |              |
| EMPLOYER                                   |               |                |             |               |                |              | -0.035        | -0.246         | -0.009       |
| MINER                                      |               |                |             |               |                |              | 0.586         | 1.266          | 0.144        |
| FARMER                                     |               |                |             |               |                |              | -0.070        | -0.520         | -0.017       |
| DOMESTIC                                   |               |                |             |               |                |              | 0.321***      | 3.078          | 0.079        |
| ARMED SERVICES/POLICE/SECURITY             |               |                |             |               |                |              | -0.016        | -0.082         | -0.004       |
| STUDENT                                    |               |                |             |               |                |              | 0.428***      | 3.833          | 0.105        |
| DISABLED                                   |               |                |             |               |                |              | 0.455         | 1.068          | 0.112        |
| NEVER HAD A JOB                            |               |                |             |               |                |              | 0.168**       | 2.050          | 0.041        |
| <b><i>d) Culture</i></b>                   |               |                |             |               |                |              |               |                |              |
| BOTSWANA                                   | 0.352***      | 5.711          | 0.087       | 0.338***      | 4.987          | 0.084        | 0.354***      | 5.167          | 0.087        |
| Observations                               | 3059          |                |             | 2752          |                |              | 2752          |                |              |
| Prob(F-statistic)                          | 0.000         |                |             | 0.000         |                |              | 0.000         |                |              |

Notes: Dependent variable: tax compliance on a three-point scale. In the reference group are MAN, BLACK, WORKER, SOUTH AFRICA. Significance levels: \* 0.05 < p < 0.10, \*\* 0.01 < p < 0.05, \*\*\* p < 0.01. Marginal effect = highest tax morale score (2).

Table 5 - Determinants of Tax Morale in South Africa (1996) and the United States (1995)

| <i>Weighted Ordered Probit</i>      | <i>EQ4</i>    |                |              | <i>EQ5</i>    |                |              | <i>EQ6</i>    |                |              | <i>EQ7</i>    |                |              |
|-------------------------------------|---------------|----------------|--------------|---------------|----------------|--------------|---------------|----------------|--------------|---------------|----------------|--------------|
| <i>Independent Variables</i>        | <i>Coeff.</i> | <i>t-ratio</i> | <i>Marg.</i> | <i>Coeff.</i> | <i>t-ratio</i> | <i>Marg.</i> | <i>Coeff.</i> | <i>t-ratio</i> | <i>Marg.</i> | <i>Coeff.</i> | <i>t-ratio</i> | <i>Marg.</i> |
| <b>a) Demographic Factors</b>       |               |                |              |               |                |              |               |                |              |               |                |              |
| WOMAN                               | 0.102***      | 4.182          | 0.036        | 0.101***      | 4.015          | 0.035        | 0.111***      | 4.459          | 0.039        | 0.116***      | 4.611          | 0.04         |
| <b>b) Marital Status</b>            |               |                |              |               |                |              |               |                |              |               |                |              |
| MARRIED                             | 0.225***      | 7.970          | 0.078        | 0.221***      | 7.591          | 0.077        | 0.233***      | 8.025          | 0.081        | 0.225***      | 7.868          | 0.077        |
| LIVING TOGETHER                     | -0.100**      | -2.198         | -0.035       | -0.089*       | -1.795         | -0.031       | -0.065        | -1.387         | -0.023       | -0.095**      | -2.015         | -0.033       |
| DIVORCED                            | 0.133***      | 2.794          | 0.047        | 0.136***      | 2.818          | 0.047        | 0.176***      | 3.642          | 0.061        | 0.177***      | 3.524          | 0.061        |
| SEPARATED                           | 0.129         | 1.296          | 0.045        | 0.181         | 1.615          | 0.063        | 0.136         | 1.299          | 0.047        | 0.15          | 1.284          | 0.052        |
| WIDOWED                             | 0.279***      | 3.804          | 0.097        | 0.318***      | 4.051          | 0.11         | 0.263***      | 3.51           | 0.091        | 0.280***      | 3.748          | 0.096        |
| <b>c) Employment Status</b>         |               |                |              |               |                |              |               |                |              |               |                |              |
| PART TIME EMPLOYED                  | -0.062        | -1.479         | -0.022       | -0.044        | -1.033         | -0.015       | -0.064        | -1.484         | -0.022       | -0.079*       | -1.852         | -0.027       |
| SELFEMPLOYED                        | 0.001         | 0.008          | 0.000        | -0.007        | -0.106         | -0.003       | -0.016        | -0.246         | -0.006       | 0.031         | 0.452          | 0.011        |
| UNEMPLOYED                          | -0.160***     | -4.776         | -0.056       | -0.177***     | -5.042         | -0.061       | -0.185***     | -5.266         | -0.064       | -0.142***     | -4.114         | -0.049       |
| AT HOME                             | 0.151***      | 3.208          | 0.053        | 0.116**       | 2.379          | 0.040        | 0.120**       | 2.498          | 0.042        | 0.176***      | 3.541          | 0.061        |
| STUDENT                             | -0.171***     | -3.750         | -0.060       | -0.238***     | -5.029         | -0.083       | -0.185***     | -3.975         | -0.064       | -0.171***     | -3.719         | -0.059       |
| RETIRED                             | 0.245***      | 4.352          | 0.085        | 0.234***      | 4.007          | 0.081        | 0.243***      | 4.228          | 0.084        | 0.248***      | 4.419          | 0.086        |
| <b>d) Economic Situation</b>        |               |                |              |               |                |              |               |                |              |               |                |              |
| UPPER CLASS                         | 0.03          | 0.295          | 0.010        | 0.075         | 0.72           | 0.026        | 0.02          | 0.193          | 0.007        | 0.037         | 0.344          | 0.013        |
| UPPER MIDDLE CLASS                  | 0.200***      | 4.426          | 0.070        | 0.214***      | 4.626          | 0.074        | 0.203***      | 4.364          | 0.07         | 0.163***      | 3.49           | 0.056        |
| LOWER MIDDLE CLASS                  | 0.088**       | 2.154          | 0.031        | 0.093**       | 2.218          | 0.032        | 0.074         | 1.736          | 0.026        | 0.074         | 1.73           | 0.025        |
| WORKING CLASS                       | 0.335***      | 8.686          | 0.117        | 0.353***      | 8.884          | 0.123        | 0.315***      | 7.874          | 0.109        | 0.310***      | 7.69           | 0.107        |
| <b>e) Culture</b>                   |               |                |              |               |                |              |               |                |              |               |                |              |
| SOUTH AFRICA                        | -0.125***     | -3.744         | -0.434       | -0.187***     | -5.22          | -0.065       | -0.161***     | -4.550         | -0.056       | -0.135***     | -3.856         | -0.047       |
| <b>f) Trust</b>                     |               |                |              |               |                |              |               |                |              |               |                |              |
| TRUST IN GOVERNMENT                 |               |                |              | 0.107***      | 7.281          | 0.037        |               |                |              |               |                |              |
| TRUST IN LEGAL SYSTEM               |               |                |              |               |                |              | 0.082***      | 5.481          | 0.028        |               |                |              |
| SATISFACTION WITH NATIONAL OFFICERS |               |                |              |               |                |              |               |                |              | 0.120***      | 9.462          | 0.041        |
| Observations                        | 4156          |                |              | 3958          |                |              | 3971          |                |              | 3939          |                |              |
| Prob(F-statistic)                   | 0.000         |                |              | 0.000         |                |              | 0.000         |                |              | 0.000         |                |              |

Notes: Dependent variable: tax morale on a four point scale. In the reference group are MEN, SINGLE, FULL TIME EMPLOYED, LOWER CLASS, USA. Significance levels: \* 0.05 < p < 0.10, \*\* 0.01 < p < 0.05, \*\*\* p < 0.01. Marginal effect = highest tax morale score (3). Weighting variable: original weight variable was multiplied by a constant for each country, in order to produce an equally weighted N for each survey.

## V. Experimental Design and Hypotheses

The investigations using the survey data provide support for the conjectures concerning the perceptions of government effectiveness and fiscal exchange as reported in section III above.

Laboratory experiments may be used to generate data to provide a more detailed analysis of the effects of these morale factors when the enforcement regimes are altered.

### a) The Role of Laboratory Experiments

Tax evasion is, by definition, a hidden activity. There are data from various audit programs but these do not permit investigation of changes in audit regimes since audit policies change slowly and often not in the manner desired by the investigator. Thus, field data typically do not include sufficient policy changes to allow the analyst to ascertain the effects of individual policy parameters on compliance. Further, for cross-country comparisons of behavior the field data are usually insufficient for the identification of the factors that affect individual compliance behavior.

Investigation of the effects of cultural norms in the laboratory raises the question as to whether it is possible to convey these norms to the subjects in the lab. Some experimental designs seek to *overcome* norms via the use of neutral language. The objective here is to examine the effect of cultural factors and social norms on tax compliance behavior. Thus, to ensure that the subjects treat the laboratory setting as a tax compliance decision, the experimental structure incorporates tax language and terminology. This provision in the instructions and subject setting ensures that the subjects incorporate social norms and cultural factors in their tax reporting

decision.<sup>12</sup> The laboratory setting employs 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).

The effect of context in tax compliance experiments has been investigated in the literature. While much of the previous experimental investigations of tax compliance have utilized neutral language, 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, based on experiments with student subjects, 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 the student subjects that Alm, McClelland and Schulze used. 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 effect, if such exists, will have the best opportunity to manifest itself.<sup>13</sup>

## b) Experiment Design and Subject Decision Setting

The experimental design replicates most of the elements of the basic structure of the personal income tax system in the three countries described in Table 1. In the experiment,

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<sup>12</sup> We do, however, impose the same tax policy parameters on all subject groups. This is necessary in order to evaluate behavior across different cultures and countries.

<sup>13</sup> Subjects were recruited on the basis that they had tax filing experience. While some were students most were not and all subjects had filed their own tax returns in the past. The pool characteristics are discussed in greater detail below.

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 financial penalty on taxes not reported. Of course, incarceration is not a possible penalty in the experimental setting. 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.<sup>14</sup>

These experiments are fully computerized.<sup>15</sup> The screen image (see Appendix) 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

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<sup>14</sup> An element of the argument here is the role of fiscal exchange in the subjects' perception of government and the resulting effect on tax compliance. There is no public good included in the experimental setting. The objective is to observe behavior in a tax-like setting where the individuals bring their perceptions of government to the decision setting. This is encouraged via the language in the instructions and on the decision screen. Inclusion of a "public good" in this setting (as in Alm, Jackson and McKee, 1993) would be an artificial construct and likely confound the decision environment.

<sup>15</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.

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. 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>16</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>17</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.

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<sup>16</sup> The design and implementation was constructed to minimize the problems addressed in Roth et. al. (1991) and Roth (1995) 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 market earnings in each labor market. Since the portable lab was used, the subjects saw exactly the same interface in all cases.

<sup>17</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.



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 6). 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 6. 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 currency was announced prior to the start of the experiment. The audit rates reported in Table 6 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.

Table 6 – Experimental Design (Parameters)

| Treatments Part A | Audit Probability | Fine Rate | Expected Value 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     |

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 A-1. Subjects select the safe or the risky option for all ten choices. After the tax compliance experiment is completed the risk screen reappears with the subject's choices indicated. One subject rolls a 10-sided die to determine which of the choices will be used to compute a payoff. For those choosing the risky option the subject rolls a second die to determine the realized payoff. The degree of risk aversion is measured by the probability of the

high payoff from the risk gamble that the individual requires in order to switch from the safe gamble.

### c) Subject Pools

The subject pools and the number of sessions with each pool are described in Table 7. 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. A comparison of the behavior across subject pools in South Africa and Botswana confirmed (via comparisons of compliance behavior) that these samples could be pooled. The original intent was to pool over the US subjects. However, in this case, there were sufficient differences in behavior that we could not support pooling the US subjects. 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.

Personnel at universities located at the sites recruited subjects (students and staff) to participate in the experimental sessions.<sup>18</sup> A couple of caveats are in order. There are some clear differences in age and occupation mix in the pools. However, in each pool (except one) there are many non-students. 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, a condition for participation was individual experience in filing taxes. The fractions of

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<sup>18</sup> Sessions were conducted at Georgia State University (labeled 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.

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 as did 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.

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 individuals in the US Private pool have selected a private 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. This is especially true of the particular HBS selected since it offers an educational opportunity (heavily subsidized) to a population that has historically not had this available. The subject pools in both 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. The payment rate in all sessions is approximately three times the average wage in the region. This ratio is applied in the US pool and in South Africa and Botswana as well. By all casual observations, the subjects were highly motivated by the cash payoffs.

Table 7 – 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%            |

d) Hypotheses Investigated

The experimental literature suggests that subjects will bring to the laboratory their perceptions of the consequences and ethics of tax evasion when 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 of the various subject pools represents 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 hypothesis is 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 about perceptions on the public sector leads to the following prediction, which we test:

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

## VI. 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 8.

Table 8 – Summary Statistics – Average Compliance Rates

| Treatments Part A | South Africa | Botswana | U.S. State | U.S. Private | U.S. HBS |
|-------------------|--------------|----------|------------|--------------|----------|
| 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    |            |              |          |
| Treatments Part 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   |

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 8 and Figure 2) show that compliance increases systematically as the audit probability increases and that the general pattern is the same for all subject pools. As Figure 2 also shows, there are some clear differences in behavior across the pools.

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

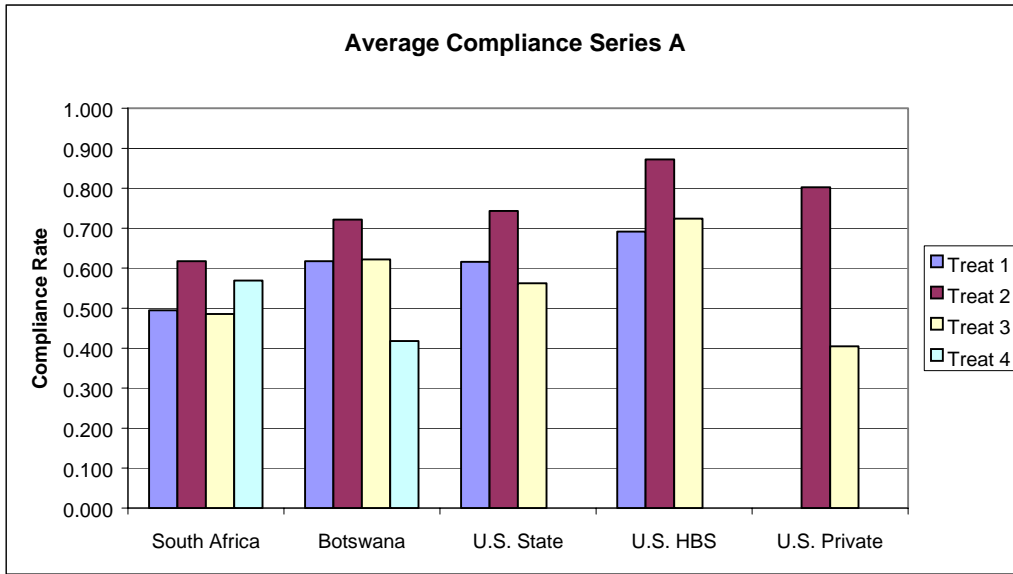
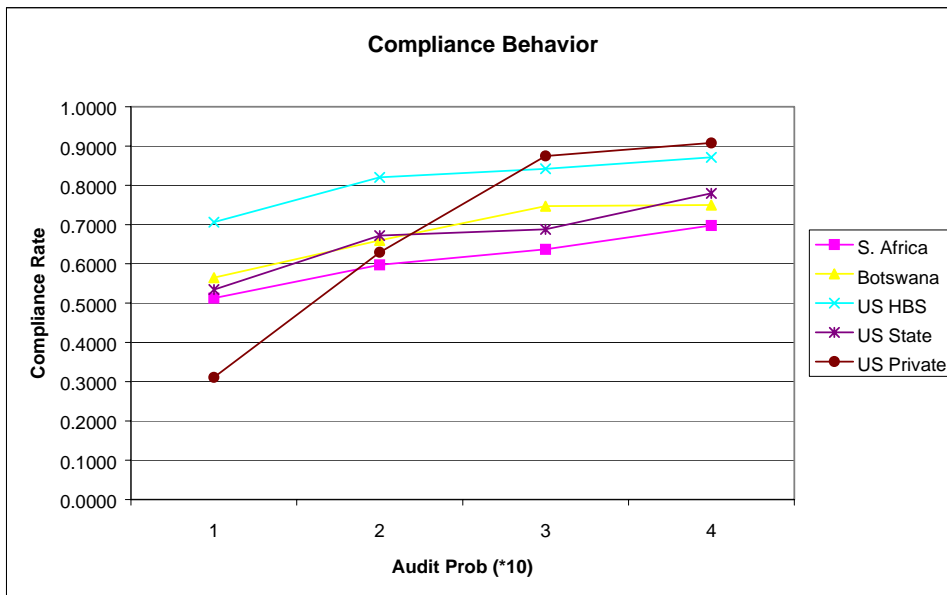


Figure 2 – Series B Compliance Behavior by Audit Probability



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 8 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 9. 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 9 – Summary Statistics – Average Effective Audit Probabilities (Nominal Probability)

| Treatments Part A | South Africa | Botswana     | U.S. State   | U.S. Private | U.S. HBS     |
|-------------------|--------------|--------------|--------------|--------------|--------------|
| 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          |
| Treatments Part 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 10. The dependent variable is the compliance rate (disclosed income divided by actual income). Since this dependent variable is truncated 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. Predicted Hypothesis 1 generates signs for the audit rate and penalty rate variables and the predicted sign on age and occupation are generated from the discussion and previous findings in the literature concerning these attributes. 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 and increasing in size as we move up through the different pools (Hypothesis 2). This is also true of the interaction dummy variables.

Comparing the predicted with the estimation results (Table 9) it is clear that the data generally support Hypothesis 1. 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 effects of culture 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.

Table 10 – Tobit Estimation of Compliance Results (Dependent Variable = Compliance Rate)

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

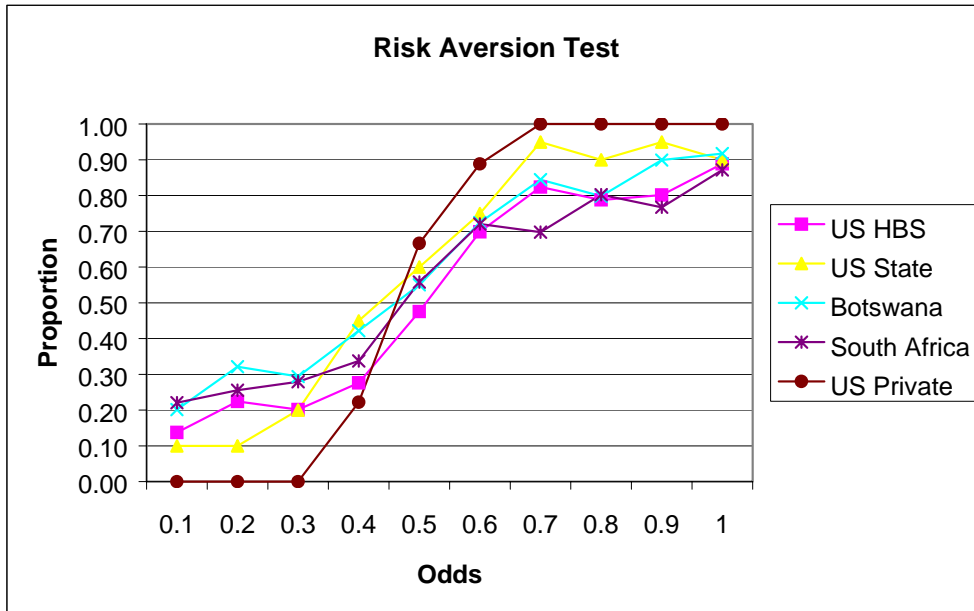
Finally, models were run in which the pool dummy variables were interacted with the tax treatment variables (models 3 and 4). In model 3 the audit rate and penalty rate variables are interacted separately and some interesting behavioral patterns emerge. First, in all cases except Botswana the subjects increase compliance when the audit rate increases. However, the pool from Botswana does respond positively to increased penalty rates.<sup>19</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 institutional features of the fiscal sectors in the countries. The data from the risk experiments allows us to investigate this conjecture. 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.<sup>20</sup> Thus, the observed differences in behavior would *not* appear to be 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.

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<sup>19</sup> The interaction between the penalty rate and the US Private pool dummy was omitted since this pool only saw one penalty rate (Table 6).

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

<sup>20</sup> This was confirmed via a Kolmogorov-Smirnov test.

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. From the experimental results, the predicted ordering of compliance (highest to lowest) based on a comparative analysis of the political and fiscal systems facing each subject pool 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 analysis in the paper suggests 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.

A significant contribution of this paper to the literature on cross cultural effects on tax compliance is to use survey data on tax morale as a robustness test of the results obtained through laboratory experiments. Survey data allow us to explore from a different perspective the effects of social norms on tax compliance. The results we obtain provide support for the findings from the laboratory experiments that more trust in government, public officials and the legal system tend to increase tax compliance. In line with the experimental evidence we observe that individuals in Botswana are more compliant than those in South Africa and it appears that individuals from the U.S. have a significantly higher tax morale than those from South Africa. Thus, our experimental

and survey results support each other. The findings clearly indicate the relevance of models of tax compliance that go beyond the conventional “economics of crime” approach and which capture the role of institutions, more in particular how individuals perceive their governments, in explaining why individuals pay taxes.

## References (books and papers)

- Acemoglu, D., S. Johnson, and J. A. Robinson, A. James (2002). "An African Success Story: Botswana," CEPR Discussion Paper 3219.
- Alesina, A., A. Devleeschauwer, W. Easterly, S. Kurlat and R. Wacziarg (2002). Fractionalization. NBER Working Paper No. 9411.
- Allingham, M.G. and A. Sandmo, (1972), "Income Tax Evasion: A Theoretical Analysis," *Journal of Public Economics*, 1: 323-338.
- Alm, J., (1988), "Uncertain Tax Policies, Individual Behavior, and Welfare," *American Economic Review*, 78: 237-245.
- Alm, J. B.R. Jackson, and M. McKee, (1993), "Fiscal Exchange, Collective Decision Institutions, and Tax Compliance," *Journal of Economic Behavior and Organization*, 22: 285-303.
- \_\_\_\_\_, (1992a). "Institutional Uncertainty and Taxpayer Compliance," *The American Economic Review*, 82: 1018-1026.
- \_\_\_\_\_, (1992b). "Estimating the Determinants of Taxpayer Compliance with Experimental Data," *National Tax Journal*, 65:107-114.
- Alm, J., G.H. McClelland, and W.D. Schulze (1999), "Changing the Social Norm of Tax Compliance by Voting," *Kyklos*, 52: 141-171.
- \_\_\_\_\_, (1992). "Why Do People Pay Taxes?" *Journal of Public Economics*, 48: 21-38.
- Alm, J., I. Sanchez, and A. de Juan (1995), "Economic and Non-economic Factors in Tax Compliance," *Kyklos*, 48: 3 – 18.
- Alm, J. and J. Martinez-Vazquez (2003), "Institutions, Paradigms, and Tax Evasion in Developing and Transition Countries," in *Public Finance in Developing and Transition Countries*, eds. J. Martinez-Vazquez and J. Alm, Edgar Elgar: 146-178.
- Becker, G.S., (1968). "Crime and punishment: An economic approach," *The Journal of Political Economy*, 76: 169-217.
- Becker, W., H. Buchner, and S. Sleeking (1987). "The impact of public transfer expenditures on tax evasion: An experimental approach," *Journal of Public Economics*, 34: 243-52.



- Clotfelter, C., (1983), "Tax Evasion and Tax Rates," *Review of Economics and Statistics*, 65: 363-373.
- Cowell, F.A., (1990), *Cheating the Government: The Economics of Evasion*, MIT Press, Cambridge, MA.
- Easterly W. and R. Levine (1997). "Africa's Growth Tragedy: Policies and Ethnic Divisions," *Quarterly Journal of Economics*, 111: 1203-1250.
- Elffers, H., (1991). *Income Tax Evasion: Theory and Measurement*, Deventer: Kluwer Academic Publishers.
- Elster, J. (1989). "Social Norms and Economic Theory," *The Journal of Economic Perspectives*, 3: 99-117.
- Feinstein, J. S. (1991). "An Econometric Analysis of Income Tax Evasion and Its Detection," *RAND Journal of Economics*, 42: 14-35.
- Forest, A. and S. M. Sheffrin, (2002), "Complexity and Compliance: An Empirical Investigation," *National Tax Journal*, 55: 75-88.
- Kinsey, K., (1992), "Deterrence and Alienation Effects of IRS Enforcement: An Analysis of Survey Data," in Slemrod (ed.), *Why People Pay Taxes. Tax Compliance and Enforcement*. University of Michigan Press, Ann Arbor, MI: 259-285.
- Knack, S. and P. Keefer, (1997), "Does Social Capital Have an Economic Payoff? A Cross-country Investigation," *Quarterly Journal of Economics*, 112: 1251-88.
- La Porta, R., F. Lopez de Silanes, A. Shleifer and R. Vishny (1999). "The Quality of Government," *Journal of Law, Economics and Organization*, 15: 222-279.
- Martinez-Vazquez, J., G. B. Harwood, and E. R. Larkins, (1992), "Withholding position and income tax compliance: Some experimental evidence," *Public Finance Quarterly*, 20: 152-174.
- McKee, M., (2003), "High Tax Compliance Leads to *Smaller* Government," manuscript, Department of Economics, University of Tennessee.
- Naylor, R., (1989), Strikes, Free Riders, and Social Consensus, *Quarterly Journal of Economics*, 104: 771-786.
- Roberts v Internal Revenue Service*, 584 Federal Supplement: 1241 (Eastern District, Michigan, 1984).

- Roth, A.E., V. Prasnikar, M. Okuno-Fujiwara, and S. Zamir, (1991), “Bargaining and Market Behavior in Jerusalem, Ljubljana, Pittsburgh, and Tokyo: An experimental study,” *American Economic Review*, 81: 1068-1095.
- Sheffrin, S. M. and R. K. Triest (1992), “Can Brute Deterrence Backfire? Perceptions and Attitudes in Taxpayer Compliance,” in: J. Slemrod (ed.), *Why People Pay Taxes. Tax Compliance and Enforcement*, Ann Arbor: University of Michigan Press: 193-218.
- Slemrod, J. (ed.), (1992), *Why People Pay Taxes: Tax Compliance and Enforcement*, University of Michigan Press, Ann Arbor, MI.
- Smith, K. W. (1992), “Reciprocity and Fairness: Positive Incentives for Tax Compliance,” in: J. Slemrod (ed.), *Why People Pay Taxes. Tax Compliance and Enforcement*. Ann Arbor: University of Michigan Press: 223-258.
- Smith, K. W. and L. J. Stalans (1991) “Encouraging Tax Compliance with Positive Incentives: A Conceptual Framework and Research Directions,” *Law and Society Review*, 13: 35-53.
- Smith, V., (1982), “Microeconomic Systems as an Experimental Science,” *American Economic Review*, 72: 923-955.
- Sobel, J., (2002), “Can We Trust Social Capital?,” *Journal of Economic Literature*, vol XL: 139-154.
- Steenbergen, M. R., K. H. McGraw, and J. T. Scholz, (1992), “Taxpayer Adaptation to the 1986 Tax Reform Act: Do New Tax Laws Affect the Way Taxpayers Think About Taxes?” in: J. Slemrod (ed.), *Why People Pay Taxes. Tax Compliance and Enforcement*. Ann Arbor: University of Michigan Press.
- Tax Notes*, (1996) “IRS Updates Estimates on Individual Tax Gap,” May 13, p 857.
- Wartick, M.L., B. Madio, and C. Vines, (1998), “Reward Dominance in Tax Reporting Experiments: the role of context,” University of Kentucky working paper.
- Webley, P., H. Robben, H. Elffers, and D. Hessing (1991). *Tax Evasion: An Experimental Approach*, Cambridge, UK: Cambridge University Press.
- Westat, Inc. (1980), “Individual Income Tax Compliance Factors Study Qualitative Research Results,” Prepared for the Internal Revenue Service, February 4, 1980, by Westat, Inc. (Rockville, MD).
- Yankelovich, Skelly, and White, Inc. (1984), “Taxpayer Attitudes Survey: Final Report,” Public Opinion Survey Prepared for the Public Affairs Division, Internal Revenue Service, December 1984, (New York, NY).

Yitzhaki, S., (1974), “A Note on Income Tax Evasion: A Theoretical Analysis.” *Journal of Public Economics*, 3: 201-202.

**References (web addresses)**

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

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

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

**References (statutes)**

Republic of Botswana, *Income Tax Act*, 1995, Government Printer, Gaborone, Botswana.

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

Fig A-1 – the subject screen

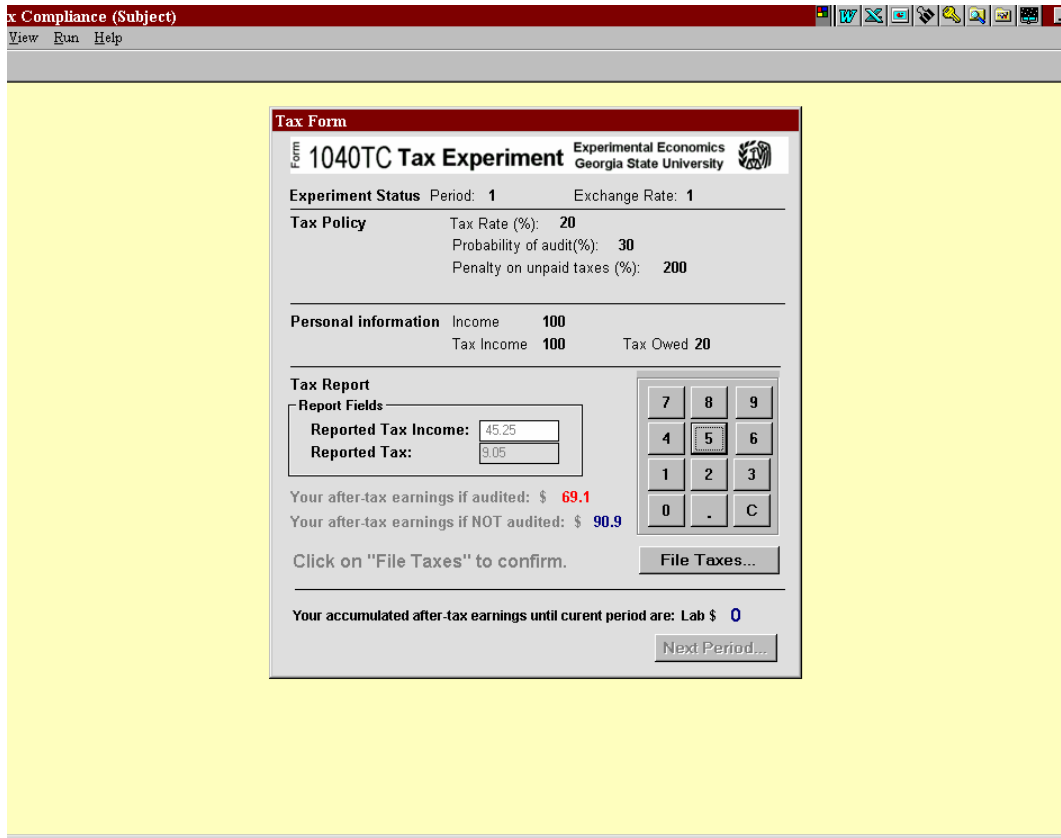


Table A-1 – Experimental Parameters for Risk Attitude Assessment

| 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               |