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Effects of Tax Morale on Tax Compliance: Experimental and Survey Evidence

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JEL classification: H20, C90

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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 compliance.

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 as well as for the development of social capital (Slemrod, 1998).[1] 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." While reducing evasion improves the 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 simply a matter of applying higher penalties and/or increasing the frequency of audits. Extreme penalties may backfire by creating a setting in which bribery, and corruption, are more prevalent and the end result may be lower tax compliance and a general loss of trust in the public institutions. Designing effective policies for reducing tax evasion requires understanding the behavioral aspects of the tax compliance decision. If we find that individual attitudes toward compliance are a function of social and cultural norms, enhancing these norms is a desirable policy instrument to complement the usual enforcement options. The effect of cultural or social norms and of social capital on tax compliance behavior is not well understood and addressing this gap is the focus of the present paper.

There is considerable literature suggesting that compliance with rules is affected by social norms (Elster, 1989; Naylor, 1989). 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

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[1] 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).

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.

Tax compliance is a complex behavioral issue and investigation requires the use of a

variety of methods and data sources as each instrument has strength and weaknesses. Since

evasion is an illegal activity, field data are often incomplete. This places considerable emphasis

on direct data collection through laboratory experiments and surveys. The comparative advantage

of laboratory experiments is the potential to control for extraneous factors and to manipulate the

variables of interest. Survey based analyses allow the inclusion of many socio-economic,

demographic and attitudinal variables to permit the use of multivariate analyses. In this paper we

utilize both field and laboratory data to investigate the effects of cultural norms on compliance

behavior.[2] The use of both survey and experimental data permits a broader exploration of the

effects of social norms on tax compliance behavior while providing a robustness check.

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* arising from the moral obligation to pay taxes or the

belief in contributing to society by paying taxes. To the extent that the trust in the fiscal exchange

contributes to the social norm of paying taxes, these norms are a proximate cause of higher

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[2] Tax compliance behavior has been studied using both field data and data obtained via laboratory experiments.
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

compliance. In the cultural settings investigated, compliance does increase with enforcement effort but the effect is less where the tax regime is viewed as unfair. Thus, the results reported in this paper provide support for a model of tax compliance behavior that extends well beyond the typical "economics of crime" approach with its emphasis on enforcement effort and deterrence.

Botswana and South Africa have experienced strikingly different social histories, despite being neighbors. Thus, these countries offer a natural experiment for the investigation of the effects of tax morale stemming from perceptions of government. Analyses of data from surveys of public attitudes toward government show that perceptions of government fairness and efficacy are considerably higher in Botswana and self-reported tax compliance appears to be higher as well. Using controlled laboratory experiments we are able to confirm that these reported differences in tax attitudes can be explained by social norms. In our experiments we impose the same tax reporting and enforcement regimes in sessions conducted in both countries. Given our experimental control, we argue that observed differences in compliance behavior are the result of differences in social norms. Similarities in the tax systems allow us to employ the same jargon in each country and since English is widely used in both countries we are able to conduct the experiments in a common language. These facilitate our comparison of tax compliance behavior across these otherwise widely divergent countries. Our laboratory experiments were conducted in the fall of 1999 and the survey data were collected during 1999 – 2000.

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

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of taxpayers. Alm, Jackson, and McKee (1992a, 1992b, and 1993) as well as Alm, McClelland, and Schulze (1992, 1999) have investigated compliance behavior in a variety of laboratory settings.

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.[3] If underreporting is detected the individual's income I_C equals

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

while, if underreporting is not detected income I_N is

(2) $I_N = I - tD.$

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

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

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

order condition

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

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 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 role. Audit probabilities are largely subjective since the tax authority does not

have an incentive to reveal the entire audit mechanism (Alm, 1988) and individuals may have a

tendency to overweight the probability of an audit. Such behavior could support high levels of

compliance even with low objective probability of an audit (Bernasconi, 1998). Nevertheless,

extreme degrees of risk aversion would be required to explain observed levels of compliance. Other

factors must be at work.

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[3] For simplification, is it assumed that the tax authority uncovers *all* unreported income.

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 determining the services provided are transparent and fair, compliance is likely to be higher. 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.

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 political 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). Taken together these factors would lead us to modify equation 4 above to the following:

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

where γ denotes the psychic cost associated with evading taxes even if one is not caught. The greater the moral support for government the higher the size of γ.

The genesis of the social norms is the interesting issue (see Alm and Martinez-Vasquez, 2003). If these norms evolve from the perceptions that the government is trustworthy, that tax enforcement mechanisms are fair, and that the fiscal exchange is beneficial, then we should see differences in tax compliance that are correlated with these perceptions. With these factors in

mind, we review the basic features of the personal income tax system and the role of government in South Africa and Botswana.

III. Perceptions of the Public Sector and Political Institutions

Tax compliance clearly depends on enforcement effort but also on the inhibitors that are inherent in the individual-government relationships. This section describes several features of the enforcement policies, the tax systems and the perceptions of the government for each of the countries. Of necessity, this section is largely descriptive and the measures qualitative. The elements of the tax structure are summarized in Table 1. For the personal income tax (PIT), the self-assessment and audit processes are similar in both countries although there are varying degrees of aggressiveness in enforcement. Both countries rely on some form of withholding during the year and individual self-assessment and reporting of final tax liabilities. Tax evasion is treated as a serious crime in South African; the tax authority exploits high profile cases to reinforce its reputation for tough enforcement.[4] The South Africa Revenue Service (SARS) has a policy of not revealing the audit rules or penalties. 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 had not happened in South Africa when the present study was conducted.

The respective computations of the tax bases are quite similar in South Africa and Botswana. In South Africa the PIT base consists of wages and salaries as well as passive income (e.g., interest and dividends) but not capital gains. In Botswana, the PIT base includes wages and salaries as well as all investment income (interest, dividends, and capital gains). In Botswana the marginal rate is capped at 25 percent, which is lower than the rates in South Africa (45 percent)

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[4] About the time of our experiments, a South African newspaper article 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).

and other neighboring countries. Various exemptions and deductions (but no dependent deduction) are offered in Botswana. Thus, there are substantial differences across the countries in terms of maximum marginal rates.

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 fraud. In South Africa the penalty structure is generally harsher. Any person required to file 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. Further, 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.

The level of sophistication of the tax enforcement apparatus differs considerably between Botswana and South Africa. 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. Botswana's tax administration system is evolving but enjoys little resources. Both countries take steps to associate taxation with the provision of government services. For example, the tax legislation of South Africa explicitly states, "taxes are not a punishment, they are the price paid for government services."

A comparison of tax morale in Botswana and South Africa is certainly natural. Although geographic neighbors, the social histories of the two countries could not be more dissimilar. 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 – paying taxes is part of this social contract. Acemoglu, Johnson and Robinson (2002) report that pre-colonial tribal institutions developed by the Tswana tribes, encouraged cooperation and participation 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 elections in South Africa held prior to our period of analysis 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. The political history of South Africa has been 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. 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.[5]

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[5] From an analysis of 1997 Interpol data, Schönteich (2000) reports that, of 110 countries listed, South Africa had the

The perceived quality of political institutions is argued to affect taxpayers' willingness to comply with the taxes. If taxpayers perceive that their interests (preferences) are properly represented in political institutions and they receive a desirable mix of public goods, their willingness to pay taxes increases. On the other hand, a state in which corruption is rampant is one in which citizens have little trust in authority and thus a low incentive to cooperate. A more encompassing and legitimate state will lead to higher tax compliance. Such a state may tend to increase taxpayers' positive attitudes and commitment to the tax system, with an accompanying positive effect on tax compliance (see, e.g., Smith, 1992; Smith and Stalans, 1991). Taxes are the price paid for government services and taxpayers generally are sensitive to the way the government uses tax revenues. Therefore, taxpayers perceive their relationship with the state not only as a relationship of coercion, but also as one of exchange. Individuals will feel cheated if taxes are not spent efficiently.

Table 2 provides detailed institutional comparisons. Transparency International's Corruption Perception Index, which relates corruption perceptions of various countries' government, indicates considerable differences between Botswana and South Africa: Botswana's score is some 20 percent higher (better) than South Africa's. These results are consistent with the Quality of Governance Index provided by Kaufmann et al. (2003). Botswana has higher control of corruption values than South Africa. Similarly, the rule of law index, which measures the degree of agents' confidence in and compliance with the rules of society, is more than three times larger in Botswana. Consequently, the respect of citizens for the state and the institutions that govern economic and social interactions is higher in Botswana. The capacity of the government to effectively formulate and implement sound policies (represented as the government effectiveness

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highest per capita rates of murder and rape, the second highest rate of robbery and violent theft, and the fourth highest rates of serious assault and sexual offences. Between 1997 and 1999, the number of reported crimes in South Africa

and regulatory quality) is higher in Botswana, which also has a higher level of political stability and absence of violence. Only voice and accountability are higher in South Africa, referring to the process by which governments are selected, monitored and replaced. Overall, the values of these six governance dimensions for the periods 1998 and 2000, based on several hundred variables measuring perceptions of governance and derived from 25 different data sources, clearly indicate a higher level of institutional quality in Botswana compared to South Africa. These results are also supported by the *International Country Risk Guide* (ICRG), constructed by Stephen Knack and the IRIS Center, University of Maryland and provided by the PRS Group, which offers an alternative set of data to the Quality of Governance Index, with special emphasis on aspects affecting private foreign investment decisions.

Table 2 also shows that political rights and the level of civil liberty are similar in both countries. To measure the variable income inequality – we use the newest available data set, Estimated Household Income Inequality (EHII), constructed by Galbraith and Kum (2003)[6]. The GINI coefficients indicate that income inequality is slightly greater in Botswana. The Index of Economic Freedom clearly indicates a higher fiscal burden[7] for South Africa, but also less government interventions in South Africa. The Polity IV data set shows in line with previous data sets that Botswana has more stable political institutions than South Africa.

Some studies have shown that there is the tendency that ethnic fractionalization negatively influences economic success and the quality of institutions (see, e.g., Easterly and Levine, 1997;

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increased by 12% and the number of reported violent crimes increased by 13%.

[6] Galbraith and Kum (2003) estimate gross household income inequality from a regression between the Deininger and Squire (1996) inequality measures and the UTIP-UNIDO pay inequality measures.

[7] The index of fiscal burden measures the burden a government imposes on its citizens. The following variables have been integrated in the index: top income tax rate, tax rate an average taxpayer faces, top corporate tax rate and government expenditures measured as a percentage of GDP. To get the index, the scores of the income tax rate and the corporate tax rate are measured separately and then averaged to get a single taxation score. The final score for the fiscal burden consists of the averaged scores for income and corporate taxation and for government expenditures.

La Porta et al., 1999; Alesina et al., 2002). Easterly and Levine (1997) found for Africa that greater ethnic diversity goes in line with low schooling, underdeveloped financial systems, distorted foreign exchange markets, and insufficient infrastructure.

IV. Survey Data Analysis

The above tables report some aggregate evidence of differences across South Africa and Botswana but more detailed analysis is possible using surveys.   We utilize the data from the Afrobarometer, a relatively new survey measuring the social, political and economic atmosphere in more than ten countries in Africa. This data set allows us to incorporate the newest data covering Botswana (year 1999) and South Africa (year 2000). The Afrobarometer has a focus on self-reported compliance. The following question is used in the Afrobarometer to measure tax honesty:

> *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). [8]

We use data from the survey to conduct a multivariate analysis of tax compliance in the two countries. A dummy variable is used to control for unobserved differences across the two 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

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[8] Answers with "don't know" and missing values were not coded and were dropped from the sample.

calculated explicitly they indicate the change in the share of taxpayers (or the probability of) belonging to a specific honesty rank, when the independent variable increases by one unit. In the results we present only the marginal effects for the highest honesty rank.

The estimation results are reported in Table 3. Examining these results, we observe that individuals in Botswana are more compliant than those in South Africa. The marginal effects indicate that being a resident of Botswana rather than of South Africa increases the probability of reporting the highest tax honesty by around 6 percentage points and this result is robust across various specifications.

V. Experimental Design and Hypotheses

The results generated from the survey data support our basic argument that compliance will be higher in countries with higher tax morale. However, we cannot answer questions concerning the response to changes in enforcement with these survey data since the data do not cover policy shifts. Laboratory experiments may be used to generate data that can be used to investigate responses to shifts in enforcement efforts.

a) The Role of Laboratory Experiments

Tax evasion is, by definition, a hidden activity. While there are data from various audit programs, these field data typically do not include sufficient policy changes to allow the analyst to ascertain the effects of individual policy parameters on compliance. Field data generally do not include sufficient variation in policy parameters to allow cross-country comparisons of 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. To induce the subjects to

treat our laboratory setting as a tax compliance decision, the experimental structure incorporates

tax language and terminology, which encourages the subjects to incorporate social norms and

cultural factors in their tax reporting decision.[9] 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).[10] In sum, the tax context is *emphasized* in order that the cultural effect, if such exists, will

have the best opportunity to manifest itself.[11]

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 study countries as described in Table 4. In the experiment,

individuals receive income, they pay taxes on income voluntarily reported and they face a

probability of audit, and, if they are detected cheating, pay a 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

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[9] Our experimental setting imposes the same tax policy parameters on all subject groups. This is necessary in order to evaluate behavior across different cultures and countries.

[10] The effect of context in tax compliance experiments has been investigated. While many of the previous experimental investigations of tax compliance have utilized neutral language, some have specifically investigated the effects of context (tax language) on behavior in 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) find there are behavioral differences with *adult* subjects.

[11] Subjects were recruited on the basis that they had tax filing experience; all had filed tax returns in the past.

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.[12]

These experiments are fully computerized.[13] The screen image (see Appendix Figure A1) the subjects interact with is a simplified tax form and the language on the screen and in the instructions describes the setting as tax reporting decision. Thus, subjects are told they have received income and are required to disclose this income to a tax authority that will impose a tax, at a stated rate, on any disclosed income. The subjects are told that only they know their income and that they may disclose any amount from zero to the amount of income they have received. 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.[14]

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[12] There is no explicit public good included in our experimental setting. Our 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 confound the decision environment being investigated.

[13] The experiments were conducted using the portable experimental laboratory of Georgia State University. This facility consists of up to 20 networked notebook computers transported to the site for the purpose of conducting the laboratory experiments. The 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 read by the same experimenter in all sessions.

[14] 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 for all experiments, the subjects saw exactly the same interface in all cases.

The experimental software is highly 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: Actual Probability = Base Probability + 0.001 (Actual Income – Disclosed Income).[15] The subjects are free to experiment with different disclosure decisions until they actually click on the "File Taxes" button. The screen updates and informs the subjects of the actual probability of being audited whenever the subjects enter an income level to disclose. The screen also informs the subjects of the outcome (take home income) that would be added to their balance if they were audited and if they were not audited. While the subjects may input different values and observe the prospective results, there is a time limit imposed – subjects must click on the "File Taxes" button within two minutes and are warned when the time limit is approaching. This simulates the necessity of filing within the legal time limit.

Once all of the subjects have disclosed their income, the audit process is begun. While the base audit probability is the same for all subjects, the effective audit probabilities differed according 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 total number of subjects audited is provided at the end of each round.

Several treatments are conducted (see Table 4). The experiments employ a within subject design. Thus, each subject sees several treatments during a session and the order of the treatments was changed for each session. There are several reasons for the within subject design. First, it

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[15] 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.

increases statistical power since the characteristics of the subjects are held constant while the decision treatment is altered. Second, there was limited scheduled time at some of the sites where the experiments were conducted and the number of sessions that would be possible to conduct each site was unknown until the experimenters actually arrived on site. To ensure that the data sets would encompass a sufficient number of treatments and be comparable, it was decided that the design would involve having each subject participate in three different settings (series A) lasting a total of nine decision rounds (three rounds in each setting). A second series (series B) of experiments was run in which the only treatment variable was the audit rate which changed every two rounds.

The parameters for each treatment setting are reported in Table 4. The subjects received the same income (405 lab dollars) in each round. They were not informed of the number of rounds that a given treatment would be in effect, nor were they informed of the number of treatments they would face during the session. The exchange rate from lab dollars to local 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.

The individual compliance decision for a given set of parameters and a given cultural baseline is expected to be a function of risk attitudes. All subjects participated in an initial experiment designed to elicit 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 either the safe or 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. This is an early variant of the experimental design used by Holt and Laury (2004).

c) Subject Pools

The subject pools and the number of sessions with each pool are described in Table 5. For the purposes of the comparison of cultural responses there pools from South Africa and Botswana were recruited in similar fashion through the respective universities. A comparison of the behavior across subject pools within South Africa and Botswana confirmed (via comparisons of compliance behavior) that these within country samples could be pooled. Personnel at the universities (state institutions) recruited subjects (students and staff) to participate in the experimental sessions.[16] As Table 5 reports, there are some clear differences in age and occupation mix in the pools. In each pool there are many non-students. These samples are not representative of the populations of the respective countries. The pool is younger than the general population and better educated. A condition for participation was individual experience in filing taxes. The fractions of non-students were not constant across the pools but were greater than 15 percent in both pools. 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

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[16] Sessions were conducted at University of Pretoria in South Africa, University of the North in South Africa, and University of Botswana. The participants 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.

setting with the properties of a tax-filing problem. This reminds the subjects of the naturally

occurring setting they face when selecting their tax compliance strategy in the field.

The subjects' earnings were paid in the local currency (Rand and Pula). The payment rate

in all sessions is approximately three times the average wage in the region. By all casual

observations, the subjects were highly motivated by the cash payoffs.

d) Hypotheses Investigated

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 both countries.

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 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 both subject pools, the

cultural background of the two subject pools represents an orthogonal treatment. Thus, the central

hypothesis is that observed differences in behavior across the pools is due to social or cultural

factors. These factors are predicted to lead to systematically different reactions to the *same*

experimental parameters. The experiments reported here are intentionally very context intensive.

The main hypothesis focuses on differences due to cultural effects. The discussion in Section III

and the results in Section IV concerning perceptions of the public sector, the quality of the

political institutions and the level of tax compliance obtained with survey data lead to the following prediction:

H2: The compliance rate will be higher in Botswana than in South Africa, *ceteris paribus*.

VI. Experimental Results

Summary statistics are presented in Table 6. 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 6 and Figure 2) show that compliance increases systematically as the audit probability increases and that the general pattern is the same for both subject pools. As Figure 2 also shows, there are some clear differences in behavior between the subjects from Botswana and South Africa.

When the changes involve tradeoffs between audit rate and penalty, as in the A treatments, we find that compliance is generally higher in Botswana as reported in Table 6 and Figure 1. The results suggest that the subjects are able to make 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 subject pool are generally lower for all levels of enforcement than those in 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 7. 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

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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.

The data from the Series A sessions were analyzed using a series of econometric models

and results are reported in Table 8. The dependent variable is the compliance rate (disclosed

income divided by actual income). Since this dependent variable is truncated at 0 and 1, a Tobit

estimation 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. Hypothesis 1 generates

predicted 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. South Africa is used as the pool dummy variable and it is entered both alone (as

intercept effect) and interactively with the tax policy variables. Since the compliance rate is

predicted to be lower for South Africa (Hypothesis 2), the predicted sign is negative for the

dummy variable used alone.

Comparing the predicted with the estimation results (Table 8) it is clear that the data

generally support Hypothesis 1. Individual compliance increases with audit probability and

penalty rate. The Age variable has the expected sign while the Occupation dummy variable is not

significant in any specification. These variables are correlated, as expected given our pool

characteristics.

The effects of tax 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 model 2 the potential cultural effects are introduced as pure shift variables and here the results do not reject Hypothesis 2; the coefficient on the South Africa subject pool is negative and significant. Interacting the pool dummy variable with the tax treatment variables (model 3) shows that the tax culture effect overwhelms the enforcement efforts. Increasing audit probability and/or the penalty for South African subject leads to lower compliance.

The observed behavioral differences across the subject pools could be argued to be due to differences in risk attitudes (e.g., cultural differences toward taking gambles) rather than the institutional features of the fiscal sectors in the countries. The data from the risk attitude experiments allows us to investigate this conjecture. In Figure 3 the proportion choosing Option B (the gamble) is plotted against the probability of winning the large prize. The risk taking behavior of the subject pools would appear to be identical and this is confirmed with a Chi-square test (not significant at 0.00).[17] Thus, the observed differences in behavior would *not* appear to be due to pool specific differences in risk attitudes. While we cannot eliminate all individual factors, the result for risk attitudes strengthens our conjecture that differences are due to cultural factors attributable to differences in the fiscal setting in the countries.

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. 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). A promising line of inquiry has been the effect of social norms on compliance behavior. There is evidence that these norms are influenced by the tax regime and by the responsiveness of government to the wishes of the citizens. Thus, some cultural differences in compliance behavior are expected and these differences should be related to tax regimes and government behavior. The results reported in this paper generally support these arguments. We predicted that compliance would be higher in Botswana and this is confirmed by the results from the survey data and the experimental investigations. An alternative explanation of differences in risk attitudes or a reluctance to engage in gambles is rejected by the data. The two subject pools exhibit the same attitudes toward risk in a simple context free gamble experiment.[18] This is a useful result; policy makers are able to influence the perception of the public sector much more readily than they can alter the underlying risk behavior of constituents.

A significant contribution of this paper to the literature on cross cultural effects on tax compliance is the joint use of survey data on tax morale and explicit laboratory experiments investigating compliance behavior. Our experimental and survey results provide mutual support. Our results demonstrate that the quality of political institutions has an observable impact on tax compliance. 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.

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[17] Confirmed via a Kolmogorov-Smirnov test.
[18] 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.

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

Tax Feature	South Africa	Botswana
Self Reporting/Assessment	Yes	Yes
Withholding	Yes	Yes
Highest Marginal Rate	45%	25%
Audit Enforcement Financial Penalty	Yes (Max: Double Tax Owed plus Interest)	Yes (Max: Tax Owed plus Interest)
Incarceration?	Yes (Up to Two Years)	Yes (Up to One Year)
Mandatory Filing	No (Unless Tax Owed)	No (Unless Tax Owed)
Central Government Tax Amnesty	No	Yes

TABLE 2 – Governance and Country Indicators

	Botswana	South Africa	Year
CPI [a]	6.1 (Ranking 24)	5 (Ranking 34)	1999
GOVERNANCE INDICATORS [b]			
Control of Corruption	0.53	0.42	1998
	1.02	0.57	2000
Rule of Law	0.66	0.21	1998
	0.67	0.28	2000
Regulatory Quality	0.69	0.33	1998
	0.79	0.12	2000
Government Effectiveness	0.52	0.17	1998
	0.98	0.43	2000
Political Stability	0.89	-0.80	1998
	0.90	-0.13	2000
Voice and Accountability	0.77	0.87	1998
	0.78	1.05	2000
ICRG [c]			
Composite Risk Rating	81.00	66.75	January, 1999
Political Risk Rating	76.00	69.00	January, 1999
Economic Risk Rating	42	31.5	January, 1999
Law and Order	4	3	January, 1999
Bureaucratic Quality	2	2	January, 1999
Ethnic Tensions	5	3	January, 1999
Democratic Accountability	3	4	January, 1999
Corruption in Government	3	3	January, 1999
External Conflict	10	9	January, 1999
Government Stability	11	11	January, 1999
Internal Conflict	12	9	January, 1999
EHII INEQUALITY [d]	48.37	44.68	1998
Index of Economic Freedom [e]			
Fiscal Burden	2.6	4.3	1999
Government Intervention	4.5	2.5	1999
Property Rights	2	3	1999
Regulation	3	2	1999
Informal Market	4	4	1999
POLITY IV [f]			
Institutionalized Democracy	9	9	1999
Regime Durability	33	5	1999
ETHNIC FRACTIONALIZATION [g]	0.410	0.752	1997-2001

Notes: [a] Transparency International Corruption Perceptions Index (10= highly clean, 1= highly corrupt). [b] Source Kaufmann et al. (2003). Values between –2.5 and 2.5, with higher scores corresponding to better institutions (outcomes). [c] The higher the rating, the lower the risk and vice versa, see Knack (1999). [d] Higher GINI coefficient implies more inequality (source: Galbraith and Kum 2003). [e] The scores range from 1 to 5 (1=environment/set of policies are most conducive to economic freedom, 5= least conducive), see 2005 Index of Economic Freedom handbook, chapter 5 (see http://www.heritage.org/research/features/index/. [f] The Democracy indicator is an additive eleven-point scale (0-10). Regime Durability: number of years since the most recent regime change or the end of transition period defined by the lack of stable political institutions (see http://www.cidcm.umd.edu/inscr/polity/). [g] Higher ethnic score implies a stronger ethnic fractionalization (source: Alesina et al. 2002).

Table 3- Determinants of Tax Compliance in Botswana (1999) and South Africa (2000)

Ordered Probit	*EQ1*			*EQ2*			*EQ3*		
Independent Variables	*Coeff.*	*t-ratio*	*Marg.*	*Coeff.*	*t-ratio*	*Marg.*	*Coeff.*	*t-ratio*	*Marg.*
a) Socio-Demogr. Factors									
FEMALE	0.092*	1.79	0.023	0.084	1.523	0.022	0.029	0.478	0.007
AGE	0.010***	3.265	0.003	0.012***	4.593	0.003	0.012***	4.348	0.003
EDUCATION	0.004	-0.746	0.001	0.009	0.484	0.002	0.016	0.832	0.004
b) Employment Status									
OCCUPATION				-0.140**	-2.039	-0.036	0.136	0.999	0.034
EMPLOYER							0.73	1.405	0.184
MINER							-0.022	-0.163	-0.005
FARMER							0.351***	3.452	0.089
DOMESTIC							-0.052	-0.269	-0.013
ARMED SERVICES/POLICE/SEC							0.363***	3.235	0.092
STUDENT							0.384	0.932	0.097
DISABLED							0.105	1.296	0.027
NEVER HAD A JOB									
c) Culture									
BOTSWANA	0.238***	5.711	0.06	0.215***	3.256	0.055	0.236***	3.540	0.06
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, WITHOUT AN OCCUPATION, 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 4 – 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

Table 5 – 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%

Table 6 – Summary Statistics – Average Compliance Rates

Treatments Part A	South Africa	Botswana
Treat A1	0.494	0.617
Treat A2	0.618	0.721
Treat A3	0.485	0.622
Treat A4	0.569	0.418
Treatments Part B		
Treat B1	0.5128	0.5649
Treat B2	0.5974	0.6598
Treat B3	0.6366	0.7468
Treat B4	0.6974	0.7496

Table 7 – Summary Statistics – Average Effective Audit Probabilities (Nominal Probability)

Treatments Part A	South Africa	Botswana
Treat A1	0.305 (0.10)	0.255 (0.10)
Treat A2	0.455 (0.30)	0.414 (0.30)
Treat A3	0.308 (0.10)	0.231 (0.10)
Treat A4	0.474 (0.30)	0.536 (0.30)
Treatments Part B		
Treat B1	0.297 (0.10)	0.276 (0.10)
Treat B2	0.363 (0.20)	0.339 (0.20)
Treat B3	0.447 (0.30)	0.403 (0.30)
Treat B4	0.523 (0.40)	0.501 (0.40)

Table 8 – Tobit Estimation with Experiment Data (Dependent Variable = Compliance Rate)

| Independent Variable	Predict	Model 1	Model 2	Model 3
Constant		0.1734 (1.64)	0.2412 (2.29)	0.3524 (3.64)
Age	+	0.0100 (3.91)	0.0114 (4.48)	0.0111 (4.36)
Occupation (S = 1)	-	0.0537 (1.22)	0.0355 (0.81)	0.0389 (0.89)
Audit Probability	+	0.0249 (1.82)	0.0368 (2.70)	
Penalty Rate	+	0.0411 (2.28)	0.0245 (1.36)	
South Africa	-		-0.1574 (6.32)	
S. Africa*Penalty.	+			-0.0332 (3.10)
S. Africa*Audit Probability	+			-0.1663 (4.24)
Log-likelihood		-1320.51	-1300.61	-1306.13
LR chi sq		38.31	78.12	67.07
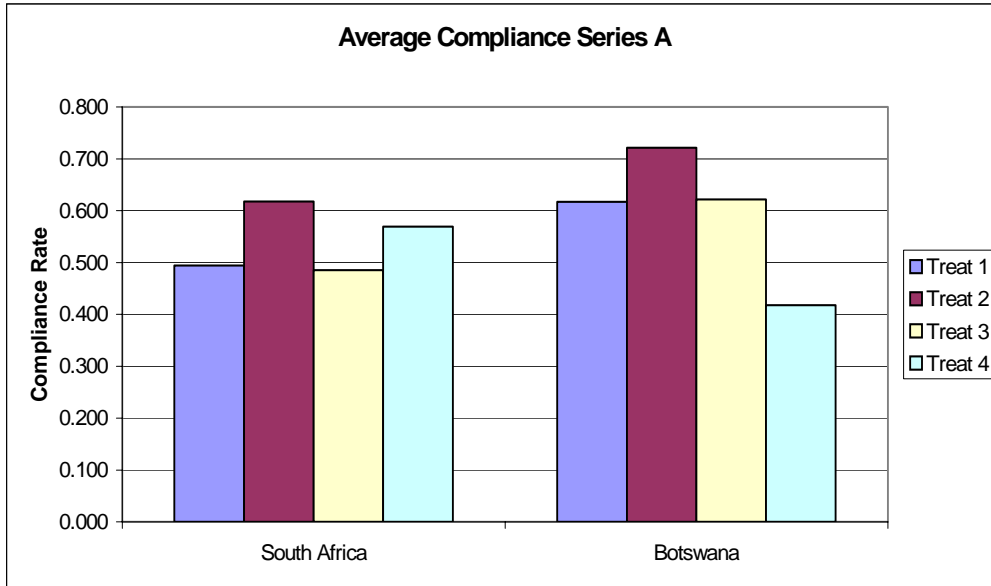
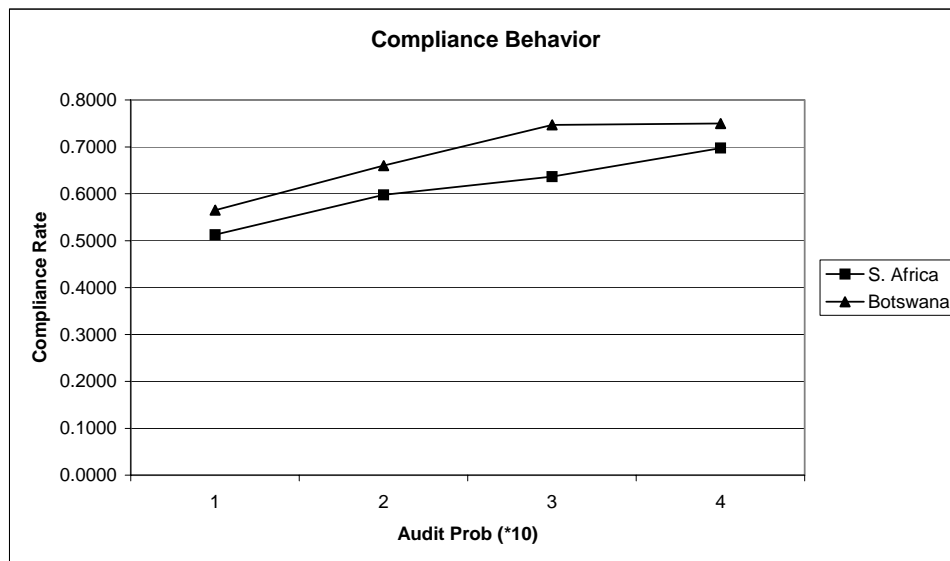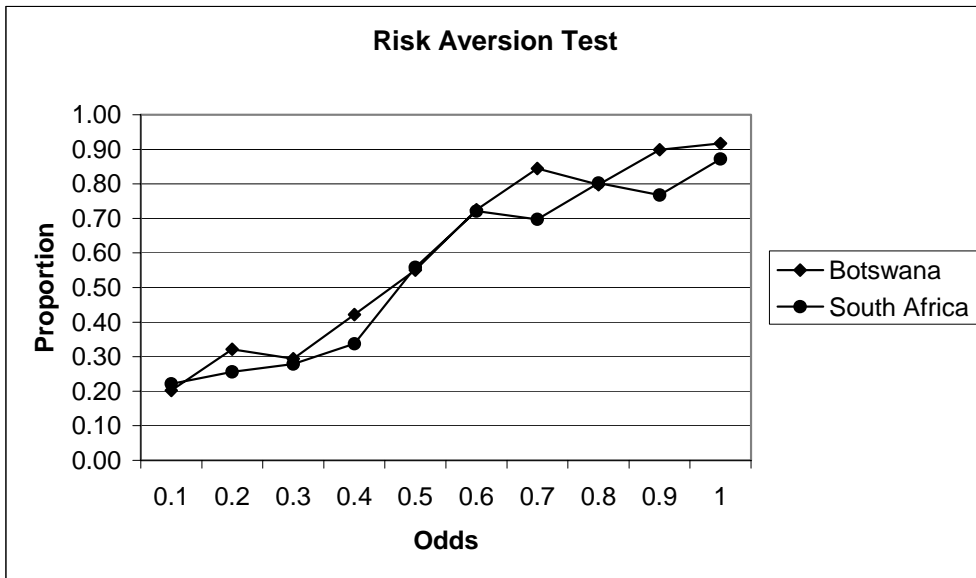Figure 1 – Average Compliance by Subject Pool and Treatment (Series A)

Figure 2 – Series B Compliance Behavior by Audit Probability

Figure 3 – Risk Behavior of the Subjects

Risk Aversion Test

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*, vol 1, pp 323-338.

Alm, J., (1988), "Uncertain Tax Policies, Individual Behavior, and Welfare," *American Economic Review*, vol 78, 237-245.

Alm, J., B.R. Jackson, and M. McKee, (1992a). "Institutional Uncertainty and Taxpayer Compliance," *The American Economic Review*, 82, 1018-1026.

Alm, J., B.R. Jackson, and M. McKee, (1992b). "Estimating the Determinants of Taxpayer Compliance with Experimental Data," *National Tax Journal*, 65, 107-114.

Alm, J., B.R. Jackson, and M. McKee, (1992b), (1993), "Fiscal Exchange, Collective Decision Institutions, and Tax Compliance," *Journal of Economic Behavior and Organization*, vol 22, 1993, pp 285-303.

Alm, J., G.H. McClelland, and W.D. Schulze (1999), "Changing the Social Norm of Tax Compliance by Voting," *Kyklos*, 52, 141-171.

Alm, J., G.H. McClelland, and W.D. Schulze (1992). "Why Do People Pay Taxes?" *Journal of Public Economics*, 48, 21-38.

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 (2), 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 (2), 243-52.

Clotfelter, C., (1983), "Tax Evasion and Tax Rates," *Review of Economics and Statistics*, vol 65, pp 363-373.

Cowell, F.A., (1990), *Cheating the Government: The Economics of Evasion*, MIT Press, Cambridge, MA.

Deininger, K. and L. Squire (1996). "A New Data Set Measuring Income Inequality," *World Bank Economic Review*. 10 (3): 565-591.

Easterly W. and R. Levine (1997). "Africa's Growth Tragedy: Policies and Ethnic Divisions," *Quarterly Journal of Economics*. 111 (4): 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 (1), 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, pp. 75-88.

Kaufmann, D., A. Kraay, and M. Mastruzzi (2003). Governance Matters III: Governance Indicators for 1996-2002, World Bank, June, 30.

Galbraith, J. K. and H. Kum (2003). Estimating the Inequality of Household Income: Filling Gaps and Fixing Problems in Deininger & Squire, UTIP Working Paper No. 22, October.

Kinsey, K., (1992), "Deterrence and Alienation Effects of IRS Enforcement: An Analysis of Survey Data," in: Slemrod, J. (ed.), (1992), *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, pp 1251-88.

Knack, S. (1999). Aid Dependence and the Quality of Governance, IRIS Center, Working Paper, University of Maryland.

La Porta, R., F. Lopez de Silanes, A. Shleifer and R. Vishny (1999). "The Quality of Government," Journal of Law, Economics and Organization, 15 (1), 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 (2), 152-174.

Naylor, R., (1989), Strikes, Free Riders, and Social Consensus, *Quarterly Journal of Economics*, vol 104, pp 771-786.

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.

Schönteich, M. (2000), "South Africa's Position in Africa's Crime Rankings," African Security Review, vol 9 (4), downloadable under http://www.iss.co.za/Pubs/ASR/9No4/Contents.html.

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 Slemrod, J. (ed.), (1992), *Why People Pay Taxes: Tax Compliance and Enforcement*, University of Michigan Press, Ann Arbor, MI: 9-37.

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).

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

References (web addresses)

Transparency International: http://www.transparency.org/surveys/index.html#cpi

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

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

Freedom House: http://www.freedomhouse.org/research/index.htm

Index of Economic Freedom: http://www.heritage.org/research/features/index/

Polity IV: http://www.cidcm.umd.edu/inscr/polity/

References (statutes)

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

Republic of South Africa, *Income Tax Act no 58*, 1962 (as amended), Government Printer, Pretoria, South Africa.
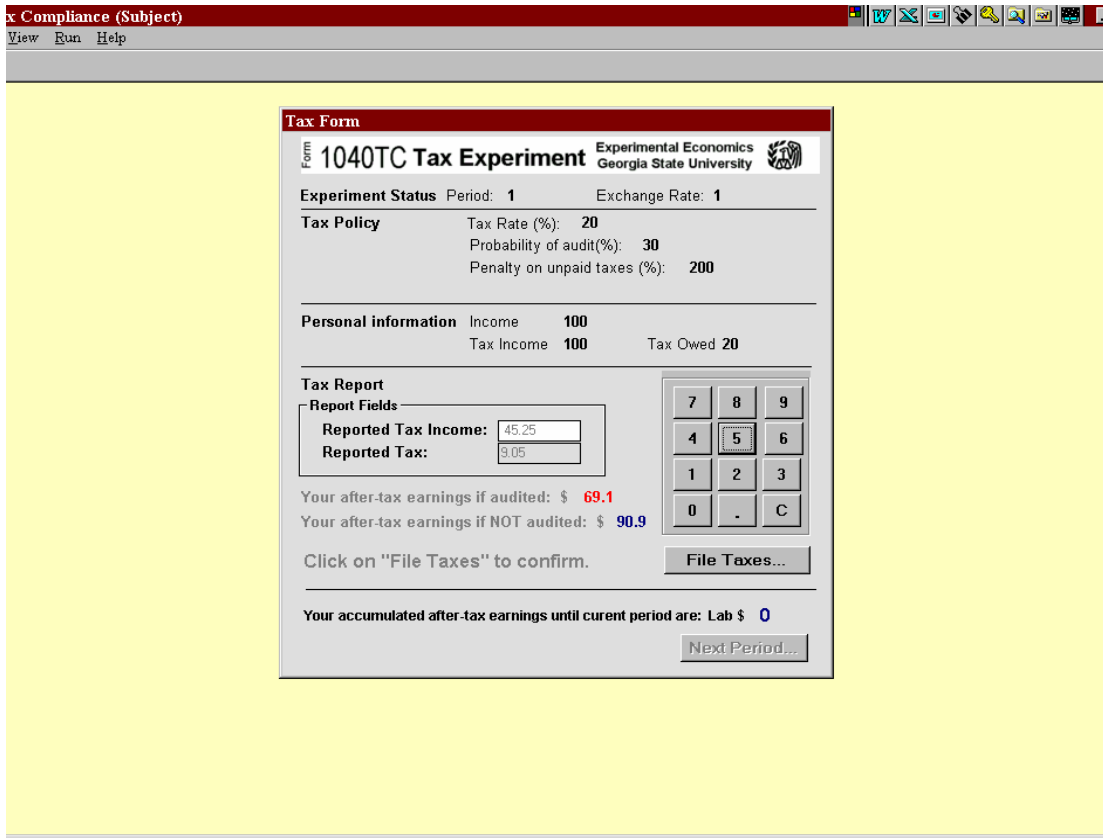
Figure A-1 – The Subject Screen

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