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Do Audits Enhance Compliance? An Empirical
Assessment of VAT Enforcement

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Abstract

Tax administrations spend large amounts of their resources in monitoring and controlling tax evasion. Is it worth it? What is the optimal level of enforcement tax administrations must execute? What is the role of institutional enforcement in enhancing compliance? This paper analyzes the effects of audits and audit policies in enhancing individual compliance with taxes. Based on new tax return and audit data for individuals in two countries I contend that audits did not yield better compliance among those found cheating but did yield positive effects among those taxpayers who were previously moderately in compliance. Cheaters compensate the monetary losses accrued by the fines and new assessments by furthering noncompliance after audits, while it appears that compliers took the audits threats more seriously. Audits have under noncompliance environments the undesired effect of inducing to even more tax evasion among those who aggressively cheat on their taxes.

Resumen

Las administraciones tributarias destinan gran parte de sus recursos en monitorear y controlar la evasión fiscal. ¿Vale la pena? ¿Cuál es el nivel óptimo de enforcement que las administraciones tributarias deben ejecutar? ¿Cuál es el rol de enforcement institucional para promover el cumplimiento? Este documento de trabajo analiza el efecto que tienen las auditorías en promover el cumplimiento impositivo de los individuos. Basado en información obtenida en dos países distintos sobre declaraciones de impuestos e información individual de auditorías, sostengo que estas no generan un mejor cumplimiento entre aquéllos que son encontrados evasores pero sí producen efectos algo positivos entre aquellos contribuyentes que previamente fueron moderadamente cumplidores. Los evasores compensan con más evasión ulterior las pérdidas monetarias producto de las multas por incumplimiento, mientras que los cumplidores toman las amenazas de auditoría más seriamente. En sociedades de bajo cumplimiento, las auditorías tienen el efecto indeseado de inducir una mayor evasión tributaria entre aquéllos que agresivamente defraudan al fisco.

Introduction

Tax administrations spend large amounts of their resources in monitoring and controlling tax evasion. Is it worth it? What is the optimal level of enforcement tax administrations must execute? What is the role of institutional enforcement in enhancing compliance? This paper analyzes the effects of audits and audit policies in enhancing individual compliance with taxes. Based on new data for two countries I contend that audits did not yield better compliance among those found cheating but did yield positive effects among those taxpayers who were previously moderately in compliance. Cheaters compensate the monetary losses accrued by the fines and new assessments by furthering noncompliance after audits, while it appears that compliers took the audits threats more seriously.

This paper analyzes the findings of individual taxpayers filing information of VAT in Argentina and Chile between 1997 and 2000. I benefited from tax administration generous support that allowed me to assemble two randomly selected samples of taxpayers subjected to audit enforcement and tax individual information for a control group to evaluate audit efficacy in generating better individual compliance. From the analysis of this data I render additional support to the inconclusive effects of audits upon individual compliance, and I hypothesize that audits are more effective among risk averse. Given the legal culture and tax morale of a country, audit can be an effective general deterrence instrument in highly compliance environment but not very effective within noncompliance societies.

I compare performance of Chile and Argentina that have a similar tax system but different performance. By international standards Chile has a good compliance rate. Approximately 22% of VAT fails to be collected, while in neighbor Argentina tax evasion roughly doubles the noncompliance of Chile. The tax design, structure, rates and VAT tax base in both countries is comparable. Exemptions are limited to very few activities (mostly public transportation and strategic sectors), tax base is estimated between 52% and 58% of GDP, and tax rates have been in the second half of the 1990s 18% in Chile and 21% in Argentina. The structure, scope and institutional capacities of both tax administrations are also similar, raising questions as of the extent of tax administration enforcement in inducing compliance behavior.

In this paper I analyze for the first time the after enforcement individual compliance level by comparing the impact of audits. Most studies of tax compliance have relied on self-report or aggregate information, and rarely depended on individually filed tax information. I rely here on official data of actual tax returns to assess post enforcement compliance. In both Argentina and Chile, the effects of audit enforcement are overestimated. Taxpayers who have previously cheated on taxes generally continue to do so. In Chile,

however, the scale of noncompliance is lower allowing its Tax Administration Office (SII) to be more effective in targeting tax evaders compared to Argentine's tax administration (AFIP). The effect of specific enforcement on compliance, however, is meager.

This paper also sheds light on the limitations of particular or specific deterrence in the tax field. Once a critical mass of tax evaders is reached and the tipping point of compliance equilibrium is passed, cheaters will continue to cheat because reversing into compliance becomes unattainable. Where most taxpayers cheat individual deterrence does not generate the incentives for enforced and noncompliant taxpayers to reverse course. This is particularly relevant in Argentina where the overwhelming majority of taxpayers sanctioned by the TA continued cheating afterwards.

In the following section I briefly summarize propositions of compliance behavior. Section 3 presents the data, hypotheses and methods. Section 4 describes the findings using descriptive statistical analyses. Section 5 presents the results of a regression analysis to explain the changing rate of individual compliance. Section 6 summarizes the findings, discusses them in the context of the proposed hypothesis, and debates the role of tax administration in enhancing compliance.

Theory

Compliance with taxes had been associated to the perceived probability of detection and severity of punishment (Allingham and Sandmo 1972, Slemrod 1985, Martinez Vazquez and Rider 2002).¹ According to deterrence theory the reasons for compliance are instrumental: Taxpayers comply because the benefits outweigh the costs.² Decisions to comply are closely associated to the individual risk aversion, the opportunities to cheat and the perceived probabilities of detection and sanctions. Therefore, when individuals have contact with authorities, they are only interested in securing a favorable outcome.

The effect of audits upon compliance remains understudied. The scant empirical research evaluates the indirect impact of audits upon general tax

¹ For these authors and many others, compliance is based on the likelihood of detection (based on audit probabilities), the severity of the sanctions (the type and rate of penalties), the burden of taxation (tax rates), and the size of individual income. Variations in individual compliance are determined by the interplay of the tax system and the structure of enforcement. In particular Martinez Vazquez and Rider (2002) have convincingly claimed lately that taxpayers drift between different modes of tax evasion according to the perceived likelihood of detection of a particular mode.

² Other theories of law abidance emphasize elements of trust, moral obligation, sense of duty, and procedural fairness rather than sheer self-interest (Levi 1988; Tyler 1990; Braithwaite 1989). At times, people obey the laws if their voices can be heard, if the rules are perceived as moral, and if the authorities are perceived as legitimate, regardless of the outcome. Thus, law enforcement contact will yield future law abidance if such contact is perceived as fair. Here we restrict our analysis to standard deterrence models

compliance (see Dubin et al 1990, Beron et al 1992, and Plumley 2002). In particular Dubin et al (1990) using state-level aggregate data have found a statistically significant effect of audit rates upon some measures of compliance (such as more income reported and offsets to income and tax claimed) rendering support to the hypothesis that audit rates positively affect higher compliance. It is unclear, however, how the mechanism work. It must be assumed that people learn that more audits increases the subjective perception of getting caught cheating and therefore reduce noncompliance. In short, audit rates can enhance general deterrence in the USA.

In this paper I address the particular effect of tax audits upon personal tax behavior. Although some studies have been conducted on the effects of audits upon taxpayers' perceptions of self-reported intentions for future compliance (Andreoni et al. 1998; Erard 1992; Scholz 1998), to my knowledge there are very few studies that actually measure tax compliance based on tax return information. In other words, research that compares tax behavior prior to the contact and after tax enforcement is scarce.³

Prior audits have a cumbersome effect on future tax behavior. Audited taxpayers might feel that their chances to be re-audited increase or conversely once being audited the likelihood of another audit decreases. They might experience audit as traumatic or alternatively not as badly as originally perceived. Accordingly, audit can either increase or decrease subsequent compliance. The few available studies have been inconclusive on the effects of audits upon compliance. The experimental data (Webley et al 1991, Alm et al 1992, Bergman and Nevarez 2005) suggest that subjects tend to report higher compliance in later rounds after enforcements. Conversely, the scattered empirical data could not corroborate these findings. For example, using TCMP data Erard (1992), could not find conclusive evidence to support improved compliance after audits. It appears that some taxpayers are deterred by audits while others do not.

In an early work by Long and Schwartz (1987) using 1969 TCMP individual data the authors found that the magnitude of noncompliance among those who were found cheating does not change, whereas it appears to be a moderate improvement among smaller non-compliers. In a refined model specification of the experimental design, Bergman (forthcoming) shows that the divergent trend of subsequent compliance after enforcement is due to the different pools of participants. Entrenched cheaters are not deterred by audits while moderate cheaters appeared to be deterred. In short, it is assumed to be a wide variance in reaction to audits; while some taxpayers take audit threats very seriously for others there are no tangible improvements in subsequent compliance.

³ This is mainly attributable to the secrecy of tax information and to legal impediments, particularly in the U. S., as well as in the countries of Western Europe.

If this assumption holds it might partially explain the shortcomings of tax administrations in countries where tax evasion is very high, and the inability to reduce persisting tax evasion within trades or sectors even in more compliance environments (Davis *et al.* 2003). Since audit rates are effective upon taxpayers prone to compliance, where those are in abundance (as in the US, Western Europe and Chile) audits are effective general deterrence instruments. However, where most people cheat considerably (as in most developing countries, including Argentina) the pool of taxpayers prone to compliance shrinks and therefore audits do not generate general deterrence. This analysis of compliance after audits has also other theoretical and practical implications. First, it tests propositions of specific deterrence using official data under a time series design. Second, since there is a need to understand tax decisions in a field that individual behavior does rarely become public, this study allows for pure and uncontaminated measures of personal utility. Third, tax administrations can empirically test the effects of tax enforcement on tax behavior.

Hypotheses and Data

In the appendix, I specify the characteristics of the information provided by the VAT and income tax return data I collected for this analysis. Surveys could not, unfortunately, complement sample.⁴ In this paper I can only test several deterrence propositions.

Hypotheses

This paper tests the implications of deterrence theory that remains the cornerstone of tax administration policies.

Taxpayers who cheat on their taxes do so knowing about the risk of detection and sanctions. Therefore, I assume that beyond the unknown chances of being punished, taxpayers who cheat considerably do so because there are other consideration related to opportunities, competitiveness and personal values that at times overrides sheer calculation of probabilities of detection. I hypothesize that penalties do not affect future compliance, and due to other reasons taxpayers who were assessed with fines and past tax liabilities will compensate those “losses” with additional future liabilities. In short, *penalties and additional assessment incurred by audits are positively correlated to future noncompliance.*

Since selection for audits are not random but biased by the TA’s suspicion of noncompliance, I expect taxpayers to have lower compliance that

⁴ Ideally, self- report data could be matched with respondent’s tax return information and the enforcement information generated by the TA; however, I was not permitted to assemble this database due to legal impediments.

the rest of the population. More importantly, however, given that audits do not enhance higher compliance I expect that difference between audited and the rest of taxpayers will stay the same or even widen. I hypothesize that *audits do not increase compliance and they might even decrease enforced tax contribution.*

Finally, I tentatively assume that the variance in responses among audited taxpayers is heavily determined by the aggressiveness of prior reporting. *The more aggressive the tax evader the less likely s/he will change compliance behavior. Conversely, the more moderate the previous evasion the more likely taxpayers will increase tax reporting.*

Data and Method

The VAT is the pillar of the tax system, and it is the tax most thoroughly audited. I use a well-developed methodology, the Debit/Credit ratio (this is a proxy to the ratio of sales over purchases for a selected period of time). *Debits* are the total value added tax *charged* by taxpayers when they sell goods or services. *Credits* are the value-added tax already *paid* by taxpayers when they purchase goods or services needed for manufacturing, retailing, etc. The difference between debits and credits is the taxpayer net VAT liability.⁵ I contrast debits and credits as well as the ratio before and after the enforcement.

To control for seasonal and size effects, in the aggregate estimation I compare the behavior of the enforced group to the aggregate behavior of a control group compiled from the non-enforced taxpayers that share similar characteristics.⁶ For the multivariate analysis I compare the individual contributions of taxpayers in similar months.

In the sample I excluded for Argentina 350 cases, due to incomplete information and those that belong to the largest category of taxpayers.⁷ In Chile I excluded 125 cases for similar reasons. I measure compliance of the treatment group with a control non-sanctioned group in both countries. If the gap widens, it indicates that enforcement has had a negative effect on compliance.⁸

⁵ If the ratio is lower than 1 it means that taxpayers had more credits than debits for a given period. The higher the ratio, the higher the gross profit. Typically, manufacturing industries (that purchase raw materials) have lower debit/credit ratio than services. This is because the payroll component, (which is exempted from VAT) is heavier in the service sector. The lower the Debit/ Credit ratio, the more suspicious tax evasion becomes. However, the type of industry and the size of firms matter. For example, a service enterprise (a bank or an insurance company) with a debit/credit ratio lower than 1.5 would be considered a “high risk” tax evasion. However, a car-manufacturer, a food processing firm, or a building company with the same debit/credit ratio might be considered very profitable enterprises. Compliance analysis must account for sector and size of the firm.

⁶ Each case of enforced taxpayer has been matched to a “twin”, non-enforced taxpayers. The “twin” case shares the same location, the same trade or activity code, and the same level of tax payments.

⁷ A segment of the major 2,000 taxpayers of the country are routinely audited on a rotating basis. Those largest taxpayers that were included in the original sample were excluded from the analysis.

⁸ It should be remembered that taxpayers were selected to enforcement because they have lower D/C ratio than the median for the activity code. Thus, a reduction of the gap means that their d/c ratio is closer to the median, i.e., less noncompliant with respect to the industry.

In addition to the compiled tax information, socio-demographic data were collected only for the sole proprietor category in Argentina (34% of the sample). This is because the TA does not keep accurate information on corporations (66% of the sample). For Chile the information is somewhat richer and has data on corporations. I also collected additional information on previous enforcement contacts. The data collection process has been verified as correct through a sub-sample verification and by crosschecking with other sources of internal information.

A final methodological note. Comparing VAT returns between short periods could pose several problems. Ideally, periods of comparison should be at least a year, in order to neutralize seasonal and fiscal credit biases.⁹ That data is available for Chile but unfortunately not for Argentina. In order to overcome these problems, I took two steps. First, I estimated two sets of comparisons, one that included at least the average d/c ratio for four months, and another that included eight months, depending on the data. Secondly, I compared prior and post enforcement periods for the same filing months. By comparing identical periods for different years, I have controlled for possible seasonal effects.

Results

Aggregate Variation

The most puzzling result is that, on average, audits do not affect the level of future individual compliance. On the contrary, the gap between pre- and post-audit compliance rate for certain groups widens. The comparison between the audited and non-audited control group shows that on average non-audited taxpayers have better compliance than audited taxpayers after enforcement.

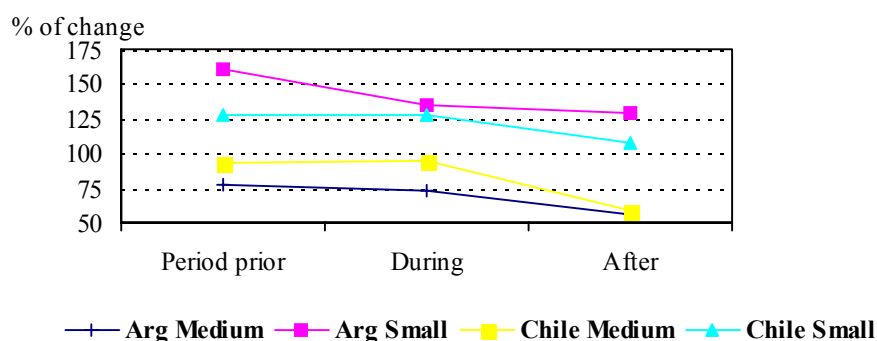
Figure 1 describes the median of groups in the period prior, during, and after audits.¹⁰ For simplicity I present the results of medium and small size businesses that constituted 93% of the samples. This chart represents the net balance paid to the TA (debits minus credits for the given period). Each line indicates the ratio of the audited group with respect to the non-audited control group in each category. For example, the median of the Argentine audited medium size business group prior to audits was 77% of the median of

⁹ Some sectors accumulate credits throughout a long period and generate debits (sales) in very short periods of time. For example, an apartment construction company accumulates credits while purchasing building materials throughout many months and sometimes years. Then it sells all the apartments in one month generating a large amount of debits. Since VAT is filed monthly, in that particular month the D/C ratio for that company would be unusually high.

¹⁰ I present here the median although the mean curves are similar for figures 1 and 2

the non-audited group for the same period. It was 74% for the period during audit and decrease to 61% for the 7 months period after audits.

FIGURE 1. **PRE AND POST AUDIT COMPLIANCE (MEDIAN)**

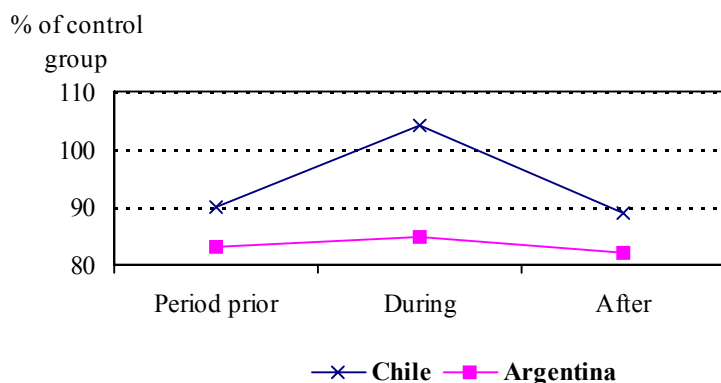


Source: Own elaboration based on audit tax return data, AFIP (1999) and SII (2002)

The medians of the four groups are lower after enforcement than the pre enforcement periods compared to the respective control groups. Taxpayers generally paid fewer taxes after enforcement (compared to the control group) than before or during enforcement. These, however, are aggregate measures that allow for a wide variation within each group.¹¹

In addition to the net amount paid in VAT, figure 2 describes the median of d/c ratio for the entire sample for the period prior, during and after audits. They use the same ratio of audited group with respect to the control group.

FIGURE 2. **AUDIT AND VAT COMPLIANCE (MEDIAN OF D/C RATIO)**



Source: Own elaboration based on audit tax return data, AFIP (1999) and SII (2002)

¹¹ A note of caution is called for. Since the control group includes a higher proportion of smaller firms, the percentage differences between the audited and non-audited groups look larger. Nevertheless, what matters is the trend because the reference is the same control group for the same periods.

In both Chile and Argentina the d/c ratio of audited taxpayers is smaller (less than 100) than the control group in the period prior to audit. Compliance increases slightly during audits and returns to previous levels or even decreases after audits finalized. This peculiar curve makes sense. Since audited taxpayers have been selected on the basis of a presumption of noncompliance, larger noncompliance should be expected among the audited group prior to audit. Therefore, a smaller median of 10% in Chile and 17% in Argentina compared to their respective control groups render support to the noncompliance selection bias of the audit selection department.

Several AFIP and SII officials contend that sudden increased compliance during audits is because taxpayers, while being audited, act more carefully and avoid misreporting sales.¹² I tested the officials' hypothesis and could not find substantial support for it. Reported sales among the audited sample did not increase significantly during the audit period compared to the non-audited taxpayers (see next tables 1 and 2). In fact 53% of the Argentine sample and 57% of Chilean sanctioned taxpayers actually decreased reported sales during audits. In short, the aggregate data is inconsistent and does not prove that auditors induce taxpayers to report higher sales. As will be discussed below, evasion strategies appeared to be the result of manipulation of fake purchases.

This general trend of compliance is confirmed by an in-depth analysis of pre and post audit tax return information. In tables 1 and 2 I present the median and mean of the variation pre and post enforcement for the whole sample. Each category has three indicators: the variation of debits from pre to post enforcement, the variation of credits, and the difference of d/c ratio from pre to post enforcement with respect to the d/c ratio of the period prior to audits. The last column for the median and mean tables denotes the differences between enforced and non-enforced taxpayers, and for Chile also between sanctioned and both non-sanctioned (1B) and non-audited taxpayers (1C). A negative or positive difference multiplied by 100 represents the percentage change. Finally, since the audited sample of Argentina include only 2% of the cases where no additional assessments were found in the audit, I only present one table for the entire sample, and treated all audited as sanctioned group (1D).

TABLE 1.A. CHILE: MEDIAN AND MEAN (95%) DEBITS, CREDITS AND D/C VARIATION BETWEEN PRE AND POST ENFORCEMENT PERIODS FOR AUDITED AND NON-AUDITED TAXPAYERS

	MEDIAN	MEAN (95)
ALL	317	312

¹² If such an assumption is correct, it might indicate that the actual level of compliance during audits should be considered the compliance base for the audited group. In other words the median of compliance for tax evaders (the audited-sanctioned group) should be at least 8% higher in Chile and 2% higher in Argentina.

	NON-AUDITED	AUDITED	DIFFERENCE	NON-AUDITED	AUDITED	DIFFERENCE
VARIATION DEBIT_9800	-0.014	0.018	0.033	0.008	0.073	0.065
VARIATION CREDIT_9800	0.0029	-	-0.007	0.0559	0.0787	0.023
DIFFERENCE DT7CT (%98)	-0.0220	0.0046	0.0265	-0.0213	0.0208	0.0421

Source: Own elaboration based on audit tax return data, AFIP (1999) and SII (2002)

TABLE 1.B. CHILE: MEDIAN AND MEAN (95%) DEBITS, CREDITS AND D/C VARIATION BETWEEN PRE AND POST ENFORCEMENT PERIODS FOR NON-SANCTIONED AND SANCTIONED TAXPAYERS

ALL	MEDIAN			MEAN (95)		
	NON-SANCTIONED	SANCTIONED	DIFFERENCE	NON-SANCTIONED	SANCTIONED	DIFFERENCE
	154	158				
VARIATION DEBIT_9800	0.048	-0.036	-0.084	0.124	0.024	-0.100
VARIATION CREDIT_9800	-0.0042	0.0057	0.010	0.0843	0.0785	-0.006
DIFFERENCE DT7CT (%98)	0.0553	-0.0359	-0.0912	0.0920	-0.0134	-0.1054

Source: Own elaboration based on audit tax return data, AFIP (1999) and SII (2002)

TABLE 1.C. CHILE: MEDIAN AND MEAN (95%) DEBITS, CREDITS AND D/C VARIATION BETWEEN PRE AND POST ENFORCEMENT PERIODS FOR NON-AUDITED AND SANCTIONED TAXPAYERS

ALL	MEDIAN			MEAN (95)		
	NON-AUDITED	AUDITED	DIFFERENCE	NON-AUDITED	AUDITED	DIFFERENCE
	317	158				
VARIATION DEBIT_9800	-0.014	-0.036	-0.022	0.008	0.024	0.016
VARIATION CREDIT_9800	0.0029	0.0057	0.003	0.0559	0.0785	0.023
DIFFERENCE DT7CT (%98)	-0.0220	-	-0.0140	-0.0213	-0.0134	0.0079

Source: Own elaboration based on audit tax return data, AFIP (1999) and SII (2002)

A significant finding is that in Chile among the audited only 158 of 312 taxpayers were assessed with additional tax liabilities. This 50% effective sanction rate seems puzzling and I will return to it later. At first glance, audits appear to have a positive effect on compliance. When the non-audited are compared to the audited group (as shown in table 1.A), audited taxpayers

show improvement in d/c ratio (the difference in the median is 2.65% and the mean 4.21% for the whole group). These results are misleading, however, because the large improvements are among the audited but the non-sanctioned taxpayers (see table 1.B). In short, previously compliant (those who were not assessed with additional liabilities) pay even more taxes after audits, contributing to the better overall compliant trend.¹³

The most meaningful comparison is, therefore, between the audited sanctioned and non-audited groups (table 1.C). The median and mean tables show that between 1998 and 2000 the reported credits (purchases) grew more than the reported debits (sales). This explains the reduction in the d/c ratio for the whole group in this period. The median debit of the sanctioned group (- 3.6%) fell more than the non-audited group (-1.4%) and the median credit (.57%) grew more than the control group (.29%). This means that, as a group, the trend of sanctioned taxpayers is to report lower sales and more purchases compared to the control group, leading to lesser compliance. While the non-audited group has reduced the d/c ratio by -2.2%, the sanctioned group median drop was -3.6%. In short, sanctioned group in Chile appear to show a moderate drop in compliance after enforcement, both by reducing the sales and increasing the reported purchases.

TABLE 1.D ARGENTINA: MEDIAN AND MEAN (95%) DEBITS, CREDITS AND D/C VARIATION BETWEEN PRE AND POST ENFORCEMENT PERIODS FOR AUDITED AND NON-AUDITED TAXPAYERS

ALL	MEDIAN			MEAN (95)		
	1227	756	1983	NON-AUDITED	AUDITED	DIFFERENCE
VARIATION DEBIT_9697	0.009	-0.014	-0.022	0.017	-0.005	-0.022
VARIATION CREDIT_9697	0.0319	0.0226	-0.009	0.0726	0.0475	-0.025
DT96/CT96	1.596	1.327		1.892	1.552	
DT97/CT97	1.5350	1.2684		1.8152	1.5181	
DIFFERENCE DT/CT	-0.0610	-	0.002	-0.0767	-	0.043
DIFFERENCE DT7CT (%96)	-0.0382	0.0589	-0.0062	-0.0405	0.0340	0.0187
		0.0444			-0.0219	

Source: Own elaboration based on audit tax return data, AFIP (1999) and SII (2002)

At first glance the data for Argentina shows that there appears to be no significant difference between the two groups' median d/c ratio. In order to closely examine this similarity, table 1.D presents also the d/c ratios for each group (rows 3 and 4) and the difference between periods (the fifth row). This closer analysis shows that the non-audited have unusually high d/c ratios.

¹³ We assume that there is no perfect compliance. It appears that most taxpayers cheat, however, the difference is in the size of noncompliance. Those who were non-sanctioned appear to be small cheaters.

That makes the comparison between these two groups very unstable. Although there is a similar median reduction for non-audited (-0.061) and the audited group (-0.059) yielding a positive 0.002 of the fifth row, the decrease of the audited group from 1.327 to 1.268 is 20% larger compared to the 1.596 to 1.535 of the control group.¹⁴ In short, audited taxpayers in Argentina decreased their compliance after enforcement more drastically than the non-audited group.

As mentioned above, to illegally reduce tax dues, taxpayers can manipulate sales in order to diminish their reported debits, or they can artificially increase credits by reporting fake purchases.¹⁵ Taxpayers who include fake or bogus invoices in their tax returns undertake the risks of detection and sanction, which at times might be very severe. In Argentina 65% of sanctioned/audited (compared to 48% of the control group) decreased the reported purchases during the audit period (which, indeed, augmented the average d/c ratio). This explains the compliance behavior during audits. The average better d/c ratio performance throughout audits (between 3%-9%, see figure 1 and 2) is explained by lower (and perhaps more accurate) reports of purchases for some taxpayers. However, once audits are closed, many of these taxpayers might feel "safer" to include a bogus invoice, assuming that another enforcement action in the near future is extremely unlikely. Since tax balances are carried forward, taxpayer purchases do not necessarily need to be reported in a given month in order to reduce the net debit-credit balance. If a taxpayer has overpaid in one month, tax liabilities can be deducted in the following months. This is what happened in the post-audit period and what explains the decrease in d/c ratio immediately after audits were discharged. Presumably, some audited taxpayers used fake invoices before and after audits. Other independent studies support these findings. A recent study by Fundación Mediterranea has found that the ratio between the reported fiscal credits by taxpayers and the theoretic fiscal credit derived from the analysis of national accounts increased from 1.34 in 1997 to 1.47 in 2001 (Argañaraz 2004). It seems that the use of fake invoices became the favorite strategy of tax evasion in Argentina (there are indication from personal interviews with tax administrators officials in Chile that this practice is also common in that country as well)

Finally, the abrupt change in compliance direction following the discharge of audits indicates that, on average, taxpayers came back to noncompliance practices. Moreover, the total amount of fines and additional

¹⁴ Non-audited median d/c ratio decrease -3.8%, while audited median d/c ratio decrease by -4.4%.

¹⁵ An "entire industry" of fake invoices exists. Taxpayers may use "advertisement purchases", "research and development endeavors", "representation expenses", etc., to justify fiscal credits, and thus reduce their tax dues. Given the fact that in this case those expenses never materialize, these claims are obviously fraudulent violations. However, this is very difficult to prove, and therefore such fraudulent claims are rarely detected. Taxpayers need only an invoice to prove any kind of expense, and there are many companies and individuals willing to take the risk and actually sell (for a price much lower than face value) a fake invoice.

taxes levied in audits account for 54% of the difference in net VAT payments between the pre-audit and post-audit period. In other words, the total reduction in VAT contributions of the enforced group (adjusted by the control groups) is almost twice as larger than the revenues raised by fines and additional enforcement assessments. The net effect of audits is puzzling. If audits had not taken place, and the compliance rate trend had continued at the rate of the pre-audit period, the net revenues from these taxpayers would have been greater. Clearly, taxpayers that were assessed with additional taxes and fines made up for their losses later with even greater noncompliance. Additional assessments were “compensated” for by future noncompliance.¹⁶

The assessed taxes and penalties and the level of post-audit noncompliance are positively correlated for both countries ($r = .28$). The size of the penalties and the magnitude of the distance between pre and post-enforcement tax report indicates that the larger the fine, the greater the post-noncompliance. In short, penalties have the undesired effect of reducing future compliance.

Several initial conclusions can be drawn. First, in both countries, the group of audited-sanctioned taxpayers decreases future compliance, in order to compensate for the “losses” produced by audits.¹⁷ Second, although the trend remains similar, in Chile the future noncompliance is more moderate than in Argentina. And third, the larger impact of audits is on the audited but non-sanctioned, i.e., the more compliant taxpayers. This final evidence is indicative that audit policies are more effective among those who take the threat seriously, i.e., are more deterred by the tax administration. The higher the tax evasion, the less likely the taxpayer will reduce noncompliance due to audit.

Summary

A descriptive analysis of the data supports the hypothesis on the negative effect of sanctions upon tax compliance. The univariate analysis is conclusive in asserting that sanctions, not being controlled by any other variable, cannot account for future compliance. It points rather in the other direction. Taxpayers tend to compensate for lost revenues.

Not only taxpayers do not improve compliance after enforcement, they appear to “recuperate” the losses of the enforcement with additional noncompliance. I have also shown that the net income of additional

¹⁶ This is particularly relevant for Argentina. I estimated the AFIP's lost revenues as a result of the increased subsequent noncompliance equals three months of tax dues for the entire sample. In other words, the increased noncompliance compensates for the taxpayers' assessed losses in just 90 days. Put it in another way, the new net revenues raised by the tax agency through audits will in fact be wiped out within the following 90 days of current revenues, as a result of post-audit noncompliance.

¹⁷ The data also indicates that smaller businesses have on average, larger future noncompliance

assessments and penalties raised by the tax agencies are wiped out by further noncompliance after enforcement. It appears to be the case that, on the aggregate, taxpayers “compensate” the losses by deepening tax evasion. The model presented in the next section renders additional proof about the negative association between fines and compliance.

Multivariate Analysis

Thus far I have analyzed data using aggregate behavior. I have suggested, however, that taxpayers react differently, and consequently the effect of enforcement differs. In this last section I present results of regression models to test the determinants of individual compliance. I test the change of individual compliance behavior after audits.

The dependent variable is the percentage of change in tax report, measured by the net payment to the agency after audit with respect to the period before audits. In short by how much taxpayers increase or decrease their net VAT payments after audits have been discharged. The independent variables included are:

- **Assessments (Ln_Assessment)**. This variable measures the log of the additional assessments as results from the audits. Additional assessments include fines and penalties. This variable tests the effect of pecuniary charges due to audits upon future compliance
- **Size of the firm. (Size)** A continuous variable that accounts for the size of the firms. It is the log of debits (a proxy for sales) for the period before audits.
- **Region**. Dummy variable where 1= interior and 0= metropolitan area (Greater Santiago for Chile, greater Buenos Aires for Argentina)
- **Difference in sales (Dif_Sales)** This variable measures the percentage of increase in debits to control for increase in tax reports due to natural increases in sales.
- **Negative previous balance (D_balance)**: A dummy variable signaling that a taxpayer in the period prior to audit did not paid VAT because it carried a balance in his favor. This control variable is very important for VAT analysis of compliance because taxpayers who accumulate balances of already VAT paid do not have to paid taxes and still be in compliance. This variable also assumes a strong association with the dependent variable because it is very unlikely that these taxpayers will continue to have negative payments for extended periods. Net tax payments are expected to improve significantly for this group.
- **No-Compliance**. Dummy variable for Chile, where a large segment of those audited have not been charged with additional assessments. (1= charged, 0= No additional charges)

This is a control variable from Chile where a large segment of audited were not sanctioned.

I present results for several models (two for Argentina and four for Chile) estimated by OLS. For both nations all cases eligible were included. Model 1 for each country tests the effect of audit assessment on future contribution, including two basic controls, size of the firm and region. Model 2 includes two relevant variables for VAT compliance, the difference in sales between periods and the status of carrying previous VAT negative balance. Model 3 adds the control of those who were found in noncompliance. This case is only relevant for Chile where 62% were found in noncompliance but the rest were in full compliance while in Argentina only 2% of cases rendered no additional assessments, therefore there are not enough cases in this country to control for full compliance. I introduce a dummy variable where 1= found in noncompliance. Given this result I estimate a fourth model for Chile that includes only those taxpayers found in noncompliance. This last fourth model allows for a better comparison with the second model for Argentina.

TABLE 2. REGRESSIONS MODELS FOR CHANGES IN TAX CONTRIBUTIONS IN ARGENTINA

	1			2		
	COEF.	STD. ERR.	T	COEF.	STD. ERR.	T
LN_ASSESSMENT	-6.51	1.61	-4.04	-7.24	1.52	4.77
SIZE_DA	6.58	1.80	3.65	9.36	1.73	5.42
REGION	17.90	5.48	3.27	13.84	5.16	2.68
DIF.SALES				6.69	1.47	4.55
D_BALANCE				90.87	11.96	7.6
NO-COMPLIANCE						
_CONS	-					-
	33.69	22.76	-1.48	-61.95	21.64	2.86
NUMBER OF OBS	724			724		
R-SQUARED	0.044			0.1587		
	72.18					
ROOT MSE	3			67.809		

Source: Own elaboration based on audit tax return data, AFIP (1999) and SII (2002)

TABLE 3. REGRESSIONS MODELS FOR CHANGES IN TAX CONTRIBUTIONS IN CHILE

	1			2			3			4			
	COEF.	STD. ERR.	T	COEF.	STD. ERR.	T	COEF.	STD. ERR.	T	COEF.	STD. ERR.	T	
LN_ASSESMENT	-0.58	0.63	-0.92	0.15	0.62	0.25	-6.56	2.96	-2.21	-6.89	3.11	-2.22	
SIZE_DA	1.09	2.25	0.49	3.12	2.19	1.43	4.07	2.22	1.84	6.43	3.38	1.9	
REGION	0.84	0.43	1.96	0.83	0.41	2.03	0.82	0.41	2	1.34	0.56	2.4	
DIF.SALES				2.98	1.35	2.2	2.73	1.35	2.02	3.40	1.51	2.25	
					11.1						17.8		
D_BALANCE				65.48	4	5.88	64.41	11.11	5.8	69.12	7	3.87	
NO-COMPLIANCE							-						
					34.3	-	99.99	43.22	-2.31		59.6		
_CONS	-	23.78	34.66	-0.69	74.79	1	2.18	8.79	49.73	0.18	24.20	3	-0.41
NUMBER OF OBS	568			568			568			304			
R-SQUARED	0.009			0.083			0.092			0.124			
	108.9			104.9			104.5			106.8			
ROOT MSE	1			3			3			4			

Source: Own elaboration based on audit tax return data, AFIP (1999) and SII (2002)

An initial and steady result across the models indicates that firms of the rural areas and the provinces tend to increase the level of tax payment after audits in both countries. Also, the larger the firm the higher the individual percentage increases in VAT payments.

As expected, the previous negative balance is positively associated with an increase in tax payment. Also, for both countries the difference in sales is statistically significant. Leaving other variables constant each percentage increase in reported sales has a 6.7% increase in net tax payments for Argentina and around 3% increase for Chile. This suggests that the increase in sales explains better compliance in Argentina. This finding is also consistent with the hypothesis that one of the best predictor of compliance is economic well-being (Serra 2003).

The most important finding, however, is the effect of the assessments upon future compliance. The coefficient is stable for both models in Argentina and it dramatically changes in Chile for the last two models. In Argentina every log unit increase of assessments due to audit yields significant lower tax contribution afterwards. In Chile the effect of assessments appears inconsistent because in models 1 and 2 there is a good portion of compliers that neutralizes such an effect. However, once these observations are controlled (with the dummy no compliance in model 3) the results appear to be robust. Moreover, the coefficients of the fourth model are very similar to the ones in Argentina, namely, for every log unite of additional assessment there is an ulterior reduction of 6%-7% in tax contribution after audits. Holding constant all other variables, the higher the additional assessments the

lower the future tax payments. In this sense, these models support the previous section analysis where a “compensation effect” appears to be present. These models also predict that higher penalties and fines will yield a decrease in the percentage of tax payments as a result of audits. Conversely, given the drastic change in the coefficients for Chile, those who were found in compliance appear to have increased percentage of VAT payments. In short, for taxpayers that take higher noncompliance risks enforcement do not deter future compliance behavior in Chile, while moderate or small tax evaders appear to be more deterred by personal enforcement.

Discussion and Summary

The political I have provided evidence to reject the claim that tax audits in these countries directly increases individual compliance. On the contrary, the results signal that sanctions have the perverse effect of increasing tax evasion to a large extent in Argentina, and to a considerable degree also in Chile. In comparable studies conducted in the U.S. the results have been mixed (Beron et al. 1992); however, this study has shown a neutral or even a perverse effect of decreasing compliance. Why does enforcement in two different tax environments like Chile and Argentina show these peculiar results?

One of the most plausible responses is that enforcement does not affect specific but general deterrence. The threat of punishment is credible among those who remain un-enforced. Once audits or other enforcement actions have occurred, the threat is not perceived as severe among cheaters. Many studies have provided compelling evidence that high risk of detection discourages noncompliance. My evidence suggests that there was no high risk of detection among the audited taxpayers, and those sanctioned appeared undeterred by future sanctions. Many studies suggest that audits have little specific deterrent value (Erard 1992; Mason and Kinsey 1996). This study not only supports that assertion but even provides additional proof that audits, under certain conditions, negatively affect the accuracy of subsequent tax reporting.

Chile’s higher compliance levels than Argentina notwithstanding, individual enforcement did not encourage better abidance. This article shows that Chileans cheaters do not appeared to be deterred by enforcement. Conversely, enforced taxpayers who have previously complied take the threats of audits seriously. This conclusion, however, says nothing about the large majority of non-enforced taxpayers. In other words, cheaters might always be cheaters, but in a world of legalists they might be circumscribed into a small target group. The post enforcement rise in reporting behavior of the non-sanctioned in Chile shows that compliers have taken enforcement very seriously. Nothing similar was found in Argentina.

Under wide compliance equilibrium (as in the case of Chile, the USA and many other nations where most taxpayers comply to the extent that others do so), audits and other enforcement measures serve better the general rather than the specific deterrence. Here, cheaters might continue to cheat, but the majority of honest taxpayers see the tax administration as capable of posing a credible threat, and more importantly, that compliance within the community is widespread. Conversely, under noncompliance equilibrium, enforcement fails to enhance specific deterrence and very likely fails to achieve general deterrence as well. This is because taxpayers are forced to cheat to keep the same level of operation (as all competitors do the same), and as the evidence suggest, they cheat even more after enforcement. Unless everybody stops evading at once, there is no coordinated solution that makes compliance a valuable strategy. This is because enforcement is effective to the extent that is circumscribed to a small group of free riders, or has the capability of monitoring the majority of the targeted populations. Therefore, the scale of tax evasion matters.

Does enforcement enhance wider compliance? The answer seems rather simple: it depends on the particular social context and on the given individual. Under social orders that enjoy larger compliance environment enforcement might enhance general deterrence. In societies where cheating is the norm individual enforcement does not foster higher individual compliance.

Appendix

Individual Records

I assembled the audit data that include samples from Argentina's tax agency and from Chile Tax administration. They were both collected under specific guidelines assuring anonymity of taxpayers. All results were reported to authorities.

Argentina: For the audited taxpayers, I used a randomly selected sample of all cases that were discharged in October and November of 1997. Large taxpayers and big corporations were excluded, as well as cases with incomplete information. The analysis is based on 1,086 audits, which represent 85% of the entire population. The two-month selection was selected randomly. In addition, a control group of 1,200 non-audited taxpayers was randomly selected by computerized matching information of audited cases. Each case has therefore a parallel non-audited match as control that shared similar levels of sales, similar location and same trade or activity code.

These audits were discharged in October and November of 1997. Given the fact that audits usually last for a period of 120 days, I collected tax return information on these taxpayers for the periods prior to the official notification of audits (December 1996- May 1997) and after the audits were closed (December 1997-May 1998). These data include the itemized information of two different tax returns: Income tax (filed yearly) and VAT (filed monthly). In addition, each taxpayer's record was completed by the audit discharge report, including the auditor's assessments of true liabilities plus any funds or additional assessments s/he might have found.

Chile: Similar data was collected while periods varied. Audit data include tax return information for three years from 1998 to 2000 and of taxpayers that were audited in 1999. This information allowed for extended periods of time for testing comparisons between pre and post audit periods. Total sample of audited was 372 and included all cases that were finished in months August-September 1999. The matching sample of 377 non-audited was drawn using similar criteria as in Argentina.

All the individual official data were processed by the AFIP nad SII information department. For every data set, I established the specification for sample selection, which required specially written computer programs. For all samples, there was random manual crosscheck of cases to assure that accurate information was drawn from the central data- base. In this way, information was validated.

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