Ç.Ü. Sosyal Bilimler Enstitüsü Dergisi, Cilt 26, Sayı 3, 2017, Sayfa 214-229

MATHEMATICAL ANALYSIS OF TAX PAYMENT TYPES FOR CORPORATE TAXPAYER

Ersin KIRAL[1]
Can MAVRUK[2]

ABSTRACT

This article analyzes corporate tax returns from tax evasion based on corporate taxpayers' payment types. A tax payment function is generated for tax evasion and four payment types of the tax evader are included. An application is provided to compare tax returns under new draft tax procedural law and existing law. The results demonstrate that: (1) after implementation of new draft law, 17% more tax return can be generated compared to honest tax return from settlement; (2) tax administration needs to raise audit rates to a mean of 41% to force corporate taxpayer to point of indifference; (3) the agent of the corporation will prefer payment types of remorse exemption, settlement, after statutory period and reduction in order; (4) the government should implement new policies to prevent corporate taxpayer from paying two times the amount of fine per tax item.

Keywords: Tax Evasion, Taxation and Revenue, Business Taxes

KURUMLAR VERGİSİ ÖDEMELERİ ÜZERİNE MATEMATİKSEL ANALİZ

ÖZ

Bu makale kurumlar vergi mükelleflerinin vergi ödeme şekillerine bağlı olarak eksik vergiden gelen kurumlar vergisi ödemelerini araştırmaktadır. Vergi kaçıranın dört vergi tipi için bir vergi ödeme fonksiyonu oluşturulmuştur. Mevcut vergi yasası ve yeni taslak yasa altında vergi ödemelerini karşılaştırmak amacıyla bir örnek verilmiştir. Sonuçlar gösteriyor ki (1) yeni taslak yasa hayata geçirildiğinde, uzlaşma durumunda vergi idaresi 17% daha fazla vergi toplayacaktır; (2) vergi idaresi kurumlar vergisi mükellefini kayıtsızlık noktasına zorlamak için ortalama %41 vergi denetim oranına ihtiyacı vardır; (3) kurum mükellefi sırasıyla pişmanlık muafiyeti, uzlaşma, süresi geçtikten sonra ödeme ve vergide indirim yollarını tercih edecektir; (4) hükümet, mükellefin her vergi için iki kat ceza ödemesini engelleyecek yeni vergi politikasını hayata geçirmelidir.

Anahtar Sözcükler: Vergi Kaçırma, Vergilendirme ve Gelir, Kurumlar Vergisi

[1] Assistant Prof. Dr., Cukurova University, School of Economic and Administrative Sciences, Dept. Of Econometrics, ekiral.cu.edu.tr
[2] Lecturer, Omer Halisdemir University, Vocational School of Social Sciences, Marketing Dept., can.mavruk@faculty.umuc.edu

Introduction

Tax farming against evasion is a challenging process for developing economies because of low tax declaration and low tax audit. Both obviously cause a tax revenue deficiency to Turkish Revenue Administration (TRA). Approximately ₺37 billion corporate tax (CT) revenue is generated (TRA, 2016b) from 58% tax declaration rate (DR) in 2015 according to audit results of (TRA, 2016c). Tax audit rate (AR) for large scaled taxpayers is 4.43% in 2012 and 15% in 2015 (Tax Audit Committee, 2016). The size of shadow economy in Turkey is 27.2% of the GDP (Schneider et al., 2015) which clearly shows pervasiveness of tax evasion as noted by Slemrod and Yitzhaki (2002).

Tax evasion and tax farming theory is based on expected utility theory in this study as in the core studies of Allingham and Sandmo (1972), Hindriks and Myles (2006) and Slemrod and Yitzhaki (2002). The CTP is uncertain whether the TRA will conduct a tax audit or not on the tax return of the corporation filed by the CTP as described by Fukofuka (2013) and TRA is also uncertain whether CTP is honest or a tax evader. How large must an audit rate or tax evasion rate be for CTP and TRA to force each other to a point of indifference? CTP will evade tax if expected return per lira on tax evasion is $1–p(1+f+i)>0$. This is the case when audit cost, evasion cost and stigma are not included in the analysis. Trump, a large scale businessman and the President of the United States who is celebrated by not paying tax, may have annihilated the stigma effect on tax evasion. Stigma effect is excluded from this study. If TRA satisfies $p>1/(1+f+i)$, then CTP declaration will approach to B as proportional to the greatness of p than point of indifference. On the other hand, if $p<1/(1+f+i)$, then CTP declaration will diverge from B as proportional to the smallness of p than point of indifference. This means that tax evasion rate gets larger as audit rate gets smaller. An audit rate of $p=0.01$ as exemplified by Dhami and al-Nowaihi (2006) means that expected return is 99%, which is not plausible. As a matter of fact, expected return will be high for all actual audit rates and fine rates. An observation from 2015 shows that $p=0.15$, $f=0.5$, 1, 2, 3 and $i=0.168$ gives CT annual expected returns of 75%, 67%, 52% and 37% respectively. Common fine rates between 1 and 3 yield audit rates between 0.25 and 0.50, which is not impossible even though high. Calculations becomes more difficult when audit cost and evasion cost are included in the analysis.

We consider a new draft tax procedure law (NDTPL) prepared by the Ministry of Finance has been debated since 2015. How much change can this make in corporate tax return? Istanbul Chamber of Certified Public Accountants, ICCPA, (2016) provides the content of amends and discusses them in an evaluation commission report. Highlights of the draft are given in Appendix A.

The main objective of this paper is to investigate corporate tax returns for underdeclaration case of tax evasion under NDTPL. In order for that we (1) generate a return function; (2) find audit rates of indifference (ARI) and declaration rates of indifference (DRI); (3) compare tax returns from evasion with those from honest declaration; and (4) find payment strategies.

Throughout this article only three unavoidable taxes for corporations are included: CT, advance corporate tax (ACT) and value added tax (VAT). CTP evasion cost and CTP audit cost are not included in the application due to lack of data. Audit costs are considered as administrative audit cost (AAC) and CTP audit cost (TAC).

AAC is measured by the audit cost over per ₺100 revenue collected. TAC is measured by the sum of possible bribery and extra accounting cost in case of an audit. In case of an audit and getting caught, CTP has to pay fines and interests as described in procedural tax law (TPL) and TRA has expenses in tax collection process. Cases corresponding to fine rates are: (a) voluntary submission of an e-tax return with remorse exemption (REM) for the base difference in which fine rate f=0; (b) voluntary submission of an e-tax return after statutory period (ASP) for the base difference: f=0.5; (c) underdeclaration and a base difference calculated from the books and records after an audit: f=1; (d) partial or no calculation of tax liability from the books or records by tax audit committee after an ex-officio audit: f=2; (e) an audit resulting with a tax fraud: f=3.

The remainder of the article is constructed as follows. In section 2, literature related to our study is provided. In section 3, the theory is given. In section 4, the data is provided. In section 5, an application specifically for corporate tax is provided. In section 6, possible outcomes of the NDTPL and the results of the application are discussed. In section 7, the article is concluded.

Literature Summary

Akbey (2014) showed that there was no relationship between budget tax revenue increase and the change in the number of tax auditors. He analyzed the effects of increasing quality of audits on tax revenue and tax load as the number of tax auditors increases. He concluded that due to economic crisis and tax amnesty, an increase in the number of tax auditors failed to reveal the desired results.

Allingham and Sandmo (1972) analyzed income tax evasion by theoretical analysis approach. They analyzed taxpayer's decision under uncertainity on evading tax in static and dynamic cases. In static case they found the conditions for maximizing taxpayer utility function. They also found that there exists an interior maximum solution. They concluded that an increase in audit rate and fine rate would always increase declared income, and an increase in tax rate would increase tax evasion.

Hindriks and Myles (2006) discussed the issues of tax evasion and its consequences in their comprehensive textbook in public economics. They (1) described two methods of measuring tax evasion including shadow economy; (2) analyzed expected utility model graphically and show how level of evasion is determined and how it is affected by the factors of the model; (3) determined the optimal levels of auditing and punishment; (4) used empirical and experimental evidence to assess predictions of the model; (5) used a game-theoretical approach to find an optimal solution in pure and mixed strategies; (6) related compliance to social interaction.

Fukofuka (2013) described contextual framework of corporate tax evasion and gave twelve idea to present the contextual framework of corporate income tax evasion. She constructed a basic two person game matrix and found expected returns under the cases of dependence and independence of the agents of the corporations. She also found Nash equilibriums for the two cases and provided three strategies to combat tax evasion such as rewarding of the agent of the government, increasing frequency of audit and increasing dependence of the agents.

Lipatov (2005) analyzed the role of accounting specialists who help corporations evade/avoid taxes in a game of incomplete information played by a tax

authority, CTPs, and an accounting specialist. They established that (i) marginal changes in enforcement were not effective when evasion/avoidance is pervasive; (ii) fines on firms as opposed to specialists were more effective; (iii) reducing auditing costs and increasing creative accounting costs were effective in curbing evasion when tax compliance is relatively high.

Slemrod and Yitzhaki (2002) emphasized audit cost in taxation models and interaction between tax policy and tax administration. They collected and critiqued the literature addressing the question to what extent optimal tax design should reflect the reality of evasion, the necessity of enforcement, and the costs of collection in a developed country. The paper introduced a general theory of optimal tax systems, in which tax rates and bases are chosen simultaneously with the administrative and enforcement regimes.

Theory

On one side government wants to generate more tax revenue for budget efficieny and on the other side corporations do not want to pay more tax to maximize their income. The agents of the corporation are the accountant, director, CEO and owner. The agents of corporation are considered as one person, which is defined as dependency by Fukofuka (2013). The agents of the government are tax auditors, tax administration, banks and tax revenue administration. The agents of government are also considered as one person.

CTP has two strategies: 1) underdeclare actual income of the corporation at probability q and 2) be honest and file true return at probability $1 - q$. Tax evasion in this article is considered as underdeclaration of income or no declaration of income. Tax evasion includes transfering money to a bank account overseas, not reporting sales, nylon billing and reporting donations which cannot be deducted from tax owed.

TRA has two strategies: 1) conduct tax audit at probability p whether actual tax is fully paid or underpaid; 2) do not audit no at probability $1 - p$ whether actual tax is paid fully or underpaid. If TRA decides that tax is not collected efficiently, they try to enforce high tax rates and fines through new tax laws. However, enforcing high tax rates and fines declines consumer spending and investment even though it generates additional tax revenue. On the other hand, if government does not enforce high tax rates, fines and audits, then what corporations pay will be limited which will also be insufficient.

We introduce a payoff function for different taxes and fines imposed. Using this function for a finite number $n \geq 1$ of taxes we generate subfunctions of four payment typesfor $1 \leq j \leq 4$ quarters. Each subfunction is based on evaded tax, penalty and interest. Tax payment function for audit and evasionin case of an audit is

$$G = T_n + ACT_j + I - R_n - C_1 \tag{1}$$

where $T_n=D_n+CVAT_n$, $D_n=\sum r_n X_n$ is the sum of paid taxes, $CVAT_n=\sum r_n(B–X)(1+f+i_n)$ is the sum of ARs from evaded CT and value added tax (VAT), fines and late interests, r_n tax rate, i_n late interest rate on base differencesof taxes, C_1 audit cost for TRA, $ACT_j=\sum r_{act}(B_j-X_j)(i_j+f)$ is the sum of fine and late interest on ACT for four quarters; j=1, 2, 3, 4, $R_n=\sum r_n(B-X)fd_n+\sum r_{act}(B_j-X_j)fd_{act}+Id_I$ is the sum of reductions in tax fines, r_{act} tax rate on ACT, $d_n$reduction rate in tax fine, d_{act} reduction rate in ACT fine, d_I reduction

rate in irregularity fine, i_j the late interest rate on ACT difference for at least one quarter of j=1, 2, 3 and 4, $I=Fd_F+F_kd_{Fk}$ is the sum of irregularity fines; k=1 or 2, I denotes irregularity fine, F special irregularity fine, F_1 the first degree irregularity fine, F_2 the second degree irregularity fine, n the number of taxes.

CTP decides on how much to declare under the risk of getting caught and TRA does not know about next DR. In response to this uncertainity TRA audits without knowing evasion rate and accordingly generates additional revenue (AR) from penalties and interest. Point of indifference is the point of decision making for CTP whether to evading or not to evading tax and also for TRA whether to auditing or not to auditing. TRA prefers to audit if

ER from evasion >ER from honest declaration (2)

and CTP prefers evading tax if

EP from audit < EP from no audit (3)

A payoff function is constructed to find a tax payment for each case. Using this function, subfunctions of tax payoffs are derived. These subfunctions are used to construct tax payoff matrices. We assume that CTP declares X, a proportion of B where $0 \leq X \leq B$ and B is actual income or base. In case of no audit, the tax owed is paid from a declared income as actual or evaded. In case of audit and getting caught, in addition to declared tax payment rX, evaded tax $r(B - X)$, tax fines f and interest i on evaded tax where r is tax rate are to be paid. ARI is derived from the equality of expected values and DRs are derived from the transformationof $t = X/B$ in this equality.

Tax Payment Schedule

Audit costs for TRA and for CTP and evasion cost for CTP are considered. CTP declares CT and ACT for every quarter of the fiscal year. In strategy 2 of CTP, C_1 is the audit cost for TRA, c_1 is the audit cost and k is evasion cost for CTP. In strategy 1 of CTP, CTP pays actual tax amount rB which costs C_0 for TA and c_0 for CTP. In this case there is no evasion and revenue of TRA becomes $rB - C_0$. This shows a loss of C_0 for TRA.

Even though all taxes are declared, a tax loss may be caused deliberately or indeliberately for at least one quarter of the fiscal year. Base difference often arises from underdeclaration, disallowable or overstated expenses recorded to books, an unrecorded invoice or undocumented sales.

Remorse Exemption

Replacing f, I and R_n with 0 in (1) gives

$$G_{rem} = T_n + ACT_j - C_1 \quad (4)$$

Tax payoffs from COR and REM declarations are given in Table 1. Here, the sum of actual tax amounts can be written as $\sum r_n B_n$.

Table 1: Tax payoffsfrom remorse exemption

		CTP			
		Honest		Underdeclaration	
TRA	Audit	B_n-C_0	B_n+c_0	G_{rem}	T_n+ACT_j+k+c_1
	No audit	B_n	B_n	D_n	D_n+k

$$(2) \Rightarrow pG_{rem} + (1-p)D_n > p(B_n - C_0) + (1-p)B_n \Rightarrow p > \frac{B_n - D_n}{CVAT_n + ACT_j + C_0 - C_1} \quad (5)$$

$$\Rightarrow t < 1 - \frac{p(C_1 - C_0 - ACT_j)}{\sum_n r_n B_n [p(1+f+i_n) - 1]} \quad \text{where } t=X_n/B_n \text{ and } p(1+f+i_n) - 1 \neq 0. \quad (6)$$

$$(3) \Rightarrow q(D_n + k) + (1-q)B_n < q(T_n + ACT_j + k + c_1) + (1-q)(B_n + c_0) \quad (7)$$

$$\Rightarrow q(CVAT_n + ACT_j + c_1 - c_0) + c_0 > 0 \Rightarrow t < 1 + \frac{c_0}{q[\sum_n r_n B_n (1+f+i_n) + ACT_j + c_1 - c_0]} \quad (8)$$

Tax Completion After Statutory Period

CTP may select COR together with ASP. In this case CTP will have to pay a fine for tax loss and late interest. Therefore, substituting 0 for I in (1) $\Rightarrow$

$$G_a = T_n + ACT_j - R_n - C_1 \quad (9)$$

Tax payoffs from underdeclaration for ASP are given in Table 2.

Table 2: Tax payoffs from underdeclaration for ASP

		Underdeclaration
Audit	G_a	T_n+ACT_j–R_n+k+c_1
No Audit	D_n	D_n+k

$$(2) \Rightarrow pG_a + (1-p)D_n > p(B_n - C_0) + (1-p)B_n \Rightarrow p > \frac{B_n - D_n}{CVAT_n + ACT_j - R_n + C_0 - C_1} \quad (10)$$

$$\Rightarrow t < 1 - \frac{p(C_1 - C_0 - ACT_j + R_n)}{\sum_n r_n B_n [p(1+f+i_n) - 1]} \quad (11)$$

$$(3) \Rightarrow q(D_n + k) + (1-q)B_n < q(T_n + ACT_j - R_n + k + c_1) + (1-q)(B_n + c_0) \quad (12)$$

$$\Rightarrow q(CVAT_n + ACT_j - R_n + c_1 - c_0) + c_0 > 0$$

$$\Rightarrow t < 1 + \frac{c_0}{q[\sum_n r_n B_n (1+f+i_n) + ACT_j - R_n + c_1 - c_0]} \quad (13)$$

Settlement

After an audit starts, settlement (SET) can be requested by CTP before or after tax is assessed. We consider the first. In this case, one of the fine rates of 1, 2 or 3 is imposed. In addition, special irregularity fine is imposed in cases including failure to issue documents in accordance with tax laws, failure to keep daily records in books, failure to comply with accounting standards and chart of accounts and to refrain from giving informationduring the tax inspection (TRA, 2016d). We consider that one of

these cases is committed. Due to NDTPL, there will be no reduction on actual tax owed even though a settlement is granted by TA. Hence late interest reductions does not apply either. Late interest reductions are applied in existing tax procedure law (TPL) due to reductions on actual tax owed. Therefore, F_k=0 in (1) $\Rightarrow$ SET payoff function is

$$G_s = T_n + ACT_j - R_n + F - C_1 \tag{14}$$

and tax payoff functionsfrom underdeclarationaregiven in Table 3.

Table 3: Tax payoffsfrom underdeclaration forSET

	Underdeclaration	
Audit	G_o+F	T_n+ACT_j–R_n+F+k+c_1
No Audit	D_n	D_n+k

$$(2) \Rightarrow pG_s + (1-p)D_n > p(B_n - C_0) + (1-p)B_n \Rightarrow p > \frac{B_n - D_n}{CVAT_n + ACT_j - R_n + F + C_0 - C_1} \tag{15}$$

$$\Rightarrow t < 1 - \frac{p(C_1 - C_0 - F - ACT_j + R_n)}{\sum_n r_n B_n [p(1 + f + i_n) - 1]} \tag{16}$$

$$(3) \Rightarrow q(D_n + k) + (1-q)B_n < q(T_n + ACT_j - R_n + F + k + c_1) + (1-q)(B_n + c_0) \tag{17}$$

$$\Rightarrow q(CVAT_n + ACT_j - R_n + F + c_1 - c_0) + c_0 > 0$$

$$\Rightarrow t < 1 + \frac{c_0}{q[\sum_n r_n B_n (1 + f + i_n) + ACT_j - R_n + F + c_1 - c_0]} \tag{18}$$

No settlement

In case settlement requirements are not met (no SET), CTP may file: (1) no lawsuit; (2) a lawsuit. This section includes the first only. In the first case CTP can request (a) no reduction (NR); (b) reduction (R). The reasons for not meeting settlement requirements include: (a) not joining to settlement meeting; (b) not signing settlement report although joining to meeting or wanting to sign the report with prejudice. In this case tax will be assessed by TA as proposed on inspection report (TRA, 2007).

If no reduction is requested, F_k=0 and R_n=0 in (1) $\Rightarrow$ payoff function is

$$G_{nr} = T_n + ACT_j + F - C_1 \tag{19}$$

and tax payoffs from underdeclaration for no reduction are given in Table 4.

Table 4: Tax payoffs from underdeclaration for no reduction

	Underdeclaration	
Audit	G_{nr}	T_n+ACT_j+F+k+c_1
No Audit	D_n	D_n+k

$$(2) \Rightarrow pG_{nr} + (1-p)D_n > p(B_n - C_0) + (1-p)B_n \Rightarrow p > \frac{B_n - D_n}{CVAT_n + ACT_j + F + C_0 - C_1} \tag{20}$$

$$\Rightarrow t < 1 - \frac{p(C_1 - C_0 - F - ACT_j)}{\sum_n r_n B_n [p(1 + f + i_n) - 1]} \tag{21}$$

$$(3) \Rightarrow q(D_n + k) + (1-q)B_n < q(T_n + ACT_j - R_n + F + k + c_1) + (1-q)(B_n + c_0) \tag{22}$$

$$\Rightarrow q(CVAT_n + ACT_j + F + c_1 - c_0) + c_0 > 0 \tag{23}$$

$$\Rightarrow t < 1 + \frac{c_0}{q[\sum_n r_n B_n(1 + f + i_n) + ACT_j + F + c_1 - c_0]} \quad (24)$$

If CTP does not file a lawsuit and requests a reduction, the payoff function is the same function as in (14) and tax payoffs from underdeclaration are the same as those in Table 3.

Data

Data is extracted from TRA Activity Reports and Tax Audit Committee (TACOM) Activity Reports. DRs are calculated for each tax by dividing the declared income by actual income. Tax rates are calculated by dividing requested tax amount to be levied by base difference, and fine rates are calculated by dividing tax fine by tax amount to be levied. Table 5 shows according to results of 2015 audits in Turkey that declared CT rate and declared ACT rate are approximately 58% and 28.5% respectively.

Table 5: 2015 tax audit results according to Turkish tax administration audits

Tax type	# of TP audited (000)	Declared income X (₺million)	Base difference B-X (₺million)	Tax difference (₺million)	Levied tax (₺million)	Declared rate *X/B*
Corporate	0.491	38.046	27.709	5.190	5.529	0.579
VAT	2.104	1229.173	464.869	41.539	57.313	0.726
Advance	1.066	32.711	81.930	8.874	9.069	0.285

Source: Constructed from (TRA, 2016c)

The 2015 active number of CTPs in Turkey is about 700 thousand (TRA, 2016a). Therefore, the mean annual corporate tax paid per taxpayer (TP) is ₺52.87 thousand in 2015. Table 6 shows that CT payoff rate after audit is 0.14.

Table 6: Tax audit results according to report evaluation commission

Tax Type	Base Difference Found (₺billion) (1)	Amount Of Tax To Be Levied (₺billion) (2)	Tax Fine (₺billion) (3)	Tax Rates (2)/(1)	Fine Rates (3)/(2)
CT	4.452993319	0.625009452	1.160898911	0.140	1.86
ACT	6.183449336	0.474823283	0.652303996	0.077	1.37
VAT	5.781288813	4.490696278	9.970059589	0.778	2.22

Source: TACOM 2015 Activity Report

Table 7: Inspection rates for large-scale TPs

Year	The number of large-scale TP (000)	The number of inspected large-scale TP (000)	Audit rate
2012	13.288	0.589	%4.43
2013	13.774	2.111	%15.33
2014	15.591	1.811	%11.62
2015	16.735	2.511	%15.00

Source: TACOM 2012-2015 activity reports

Table 7 shows that audit rate increased from 4.4% in 2012 to 15.33% in 2013 which is a 246% increase. In 2014 it decreased to 11.62% which is a 24% decrease and in 2015

again increased to 15% which is a 22.5% increase.Table 8 shows that TRA audit cost per ₺100 collected in 2015 is ₺0.53 after a 33% decrease over the last 10 years (TRA, 2016c).

Table 8: Administrative costs/gross revenue collected %.

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Audit Cost%	0.79	0.76	0.74	0.73	0.82	0.69	0.68	0.69	0.57	0.58	0.53

Source: TRA 2015 activity report (TRA, 2016c)

Table 9 shows the number of active tax auditors in 2015 based on the groups established with legislative decree No.646 (TACOM, 2016). These groups are classified as: (A) Small and middle sized TP auditors; (B) Large scaled TP auditors; (C) Organized tax evasion auditors; (Ç) Hidden capital, transfer pricing and overseas earnings auditors.

Table 9: Active Number of Auditors Breakdown With Respect To Groups

Title	Group A	Group B	Group C	Group Ç	Total
Tax inspector- general	0	155	15	20	190
Tax inspector	2485	232	41	37	2795
Assistant tax inspector	1022	44	0	0	1066
Total	3507	431	56	57	4051

Source: TACOM 2015 activity report

Table 10: Large Scaled TPs Inspection Results According To Report Evaluation Commission

Year	#of TPs audited (000) (1)	# of tax auditors* (2)	#of TPs per auditor (1)/(2)	Total #of audits** (000) (3)	# of audits per auditor (3)/(2)	Tax to be levied (₺million) (4)	Tax per inspection (₺000) (4)/(3)	Tax per auditor (₺million) (4)/(2)
2013	2.111	531	3.98	6.569	10.34	597	90.881	0.94
2014	1.811	441	4.11	10.254	23.25	634	61.830	1.44
2015	2.511	431	5.83	14.249	33	625	43.863	1.45

Source: Constructed from TACOM 2013-2015 activity reports.

*Not qualified auditors are not included. Numbers are obtained and extracted from TACOM 2013, 2014 and 2015 Activity Reports.

** If a TP is inspected for more than one period, every period is considered as a different inspection.

Table 10 shows that the number of large scaled TPs per auditor, the number of inspections per auditor, and tax amount collected (₺million) per auditor all have increased over the last three years. On the other hand, tax amount per inspection and the number of tax auditors have decreased over the last three years.

Application

Lacking institutional data on audit cost and evasion cost of corporations, we are not able to give an application on evasion rate of indifference. This section covers an application on AR with respect to *f* and DR with respect to *p* and *f*. We provide the outcomes for settlement payment type only.

Corporations are responsible for paying taxes depending on their business activities. All tax payoffs are calculated using CT revenues and payoffs with respect to

fines and interest imposed in Turkish tax system. Yavaslar (2015) described three different interest rates imposed in Turkish TPL: (1) default interest; (2) late interest; and (3) deferment interest. Default interest and late interest both are 16.80% annually, and deferment interest is 12% annually. Throughout this section the corporate income tax rate levied on business profits is 20%. Actual income is ₺431,000, declared income is ₺250,000 and CTP is audited on 16 December 2016. Therefore tax accrual date is 15 January 2017 which is 30 days after the notification date and also the last day to file a lawsuit in court. We consider that declared corporate annual income is X=₺250,000. Therefore, base difference is $B–X$=₺181,000 and declared tax amount is 250,000(0.20)=₺50,000. Evaded CT is ₺36,200. Actual income of the third quarter is B_3=₺84,382.28, declared AC income is X_3=₺24,048.95 and undeclared AC income is $B_3–X_3$=₺60,333.33 in the third quarter. Undeclared ACT in the third quarter is 0.20(60,333.33)=₺12,066.67. VAT evaded in the 3rd quarter is 0.18(60,333.33)= ₺10,860 and VAT on the base difference is 0.18(181,000)=₺32,580. Monthly late interest rate is 1.4%, CT rates are 19.5% for honest TP and 20% for tax evader according to NDTPL. CT declaration and payment due dates are April 25 and April 30, 2015 respectively. ACT declaration and payment due dates are the evening of the 14th and 17th day of the second month following every quarter, respectively. VAT declaration and payment due dates are 24th of the next month and 26th of the same month respectively. Tax payoffs, ARI and DR for tax payoffs are calculated using the functions and results are tabulated.

According to Law No. 6183 as explained in TPL article 112, late interest will be calculated for complete months only (Tax Inspectors Foundation, 2016). There are eight complete months from April 30, 2016 to January 15, 2017. Late interest rate on CT is 8(1.4%)=11.2% and late interest amount is 36,200(0.112)=₺4,054.40. For ACT there are thirteen complete months from November 17, 2015 to January 15, 2017. Late interest rate on ACT is 13(1.4%)=18.2% and late interest amount is 12,066.67(0.182)=₺2,196.13. We assume that third quarter base difference was caused in September 2015 after payment due date and the remaining base difference was caused in December 2015 after payment due date. Therefore, late interest on VAT is 10,860(0.196)+21,720(0.168)=₺5,777.52. Throughout this section, all amounts of interest besides C_0 are fixed, and tax liability is the sum of all taxes, fines and late interests. Tax payoffs are calculated for cases of REM and COR, ASP and COR, SET and NOSET. We assume that ACT is underdeclared only for the third quarter of the last fiscal year and hence CT is underdeclared. If CTP decides to be honest and TRA decides to audit, then CTP will pay 37.5% of ₺431,000which is ₺161,625 and TRA will collect ₺161,625minus the audit cost C_0=161,625(0,53)/100=₺856.61, which is approximately ₺160,768. If CTP decides to be honest and TRA decides not to audit, then TRA will collect the actual tax which is ₺161,625. If CTP decides to underdeclare and TRA decides not to audit, then TRA will collect what CTP declares which is 38% of ₺250,000. If CTP decides to underdeclare and TA decides to audit, then TRA will collect all fines and interests imposed on both underdeclared ACT and underdeclared CT. In remorse exemption a correction form for CT needs to be submitted because of

tax loss from ACT. Hence both REM and COR can be selected at the same time. In this case tax to be levied and fines to be imposed (TLFI) are calculated in ₺ as follows:

CT	36,200	C_1	931.78	TR	174,876.27
CT late interest	4,054.40	C_0	856.61	Tax pay	175,808.05+ k+c_1
VAT	32,580	ACT late interest	2,196.13	Tax due	80,808.05
VAT late interest	5,777.52				

Table 11: Tax payoffs (₺000) from remorse exemption

		CTP	
		$X=B$	$X<B$
TRA	Audit	160.768;161.625+c_0	174.876;175.808+k+c_1
	No Audit	161.625;161.625	95.000;95.000+k

Tax payoffs for remorse exemption are calculated and given in Table 11.

In case of tax completion after statutory period CTP voluntarily submits an e-declaration on January 15, 2017 before an audit is imposed or before referral commision receives the audit report. CTP selects both ASP and COR. Therefore tax returnis ₺215,128 from (9) and tax payoffs from underdeclaration are calculated in Table 12.

Table 12: Tax payoff (₺000) from underdeclaration for ASP

		Underdeclaration
Audit	215.128	216.181+k+c_1
No Audit	95.000	95.000+k

In settlement, tax payoff in accordance with both TPL and NDTPL are calculated. CTP requests a settlement within 30 days after receiving penalty notice. Assumptions for this payment type are that (1) settlement is requested before the assessment; (2) One third of the tax loss is reduced before the settlement; and (3) one of the cases of special irregularity fine is committed. TRA sets an appointment day both agents meet and they reach the agreement on tax fines. One third of the tax loss is reduced from the tax loss, and only 1/10 of the remaining is imposed, which is 1/15th of the tax loss overall. Since accrued ACT is not paid in the statutory period and it cannot be reduced from the tax calculated over annual return, it will be cancelled. However, late interest will be imposed from the official due date up to settlement date. Settlement includes regular, ex-officio and tax fraud audits. In regular audit, tax is calculated from the books and records in accordance with TPL 29. Tax payment from (14) is ₺190,180 and tax payments from underdeclaration are calculated in Table 13.

Table 13: Tax payoff (₺000) from underdeclaration for SET

		Underdeclaration
Audit	190.180	191.193+k+c_1
No audit	95.000	95.000+k

An ex-officio audit is imposed in accordance with TPL 30 and tax audit officer was not able to calculate tax from books and records but calculates the tax due from past activities and evidences available. In this case, tax payment from (14) is ₺203,083.

CTP is audited and caught for committing one of tax fraud activities given by Taxnet (2016). Tax return from (14) is ₺215,986. Table 14 shows according to NDTPL

that TDR increases faster in the beginning then levels off to stationary. AR is about the same as declared tax with a fine rate of 1. About 17% more tax can be generated compared to honest return. Table 15 shows according to existing tax law that DR has the same behavior as in the previous result. AR is about 89% of the declared tax with a fine rate of 1, which means that about 10% more revenue can be generated compared to honest tax payment. In addition, about 18% more revenue can be generated compared to honest tax payment with a fine rate of 2.

Table 14: Application results for settlement according to NDTPL

f	C_1 (₺000)	AR(1) (₺000)	ARI *p*	DRI *t*	R_n (2) (₺000)	AR/taxowed (1)/(1)+(2)	AR/ declared	Tax rev/ actual	Tax Pay Rate TPR
1	1.013	96.193	0.716	0.393	101.662	0.486	1.0126	1.1674	0.653
2	1.082	109.165	0.631	0.449	169.537	0.392	1.1491	1.2466	0.546
3	1.151	122.136	0.565	0.467	237.412	0.340	1.2856	1.3258	0.478
4	1.220	135.108	0.510	0.475	305.287	0.307	1.4222	1.4050	0.430
5	1.288	148.080	0.466	0.481	373.162	0.284	1.5587	1.4842	0.394

Table 15: Application results for settlement according to EL

f	C_1 (₺000)	AR (1) (₺000)	ARI *p*	R_n(₺000) (2)	DRI *t*	AR/tax liability (1) / (1)+(2)	AR/ declared	Tax rev/ actual	TPR
1	0.953	84.730	0.677	113.125	0.337	0.428	0.892	1.0974	0.614
2	1.021	97.701	0.588	181.000	0.356	0.351	1.028	1.1766	0.516
3	1.090	110.673	0.519	248.875	0.398	0.308	1.165	1.2558	0.453
4	1.159	123.645	0.465	316.750	0.419	0.281	1.302	1.3350	0.408
5	1.228	136.617	0.421	384.645	0.431	0.262	1.438	1.4142	0.376

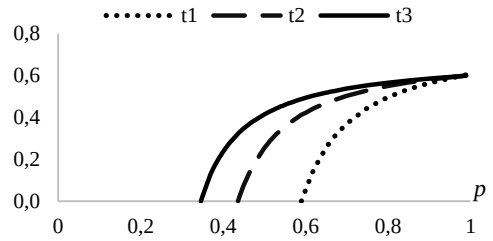

Figure 1: ARI vs DRI in case of settlement

Table 16: Corporate DRI in settlement according to NDTPL

f\p	0,15	0,2	0,25	0,3	0,4	0,5	0,6	0,7	0,8	0,9
1	na	na	na	na	na	na	0.054	0.370	0.500	0.564
2	na	na	na	na	na	0.254	0.423	0.503	0.550	0.581
3	na	na	na	na	0.236	0.414	0.493	0.538	0.566	0.586
5	na	na	na	0.267	0.435	0.503	0.540	0.563	0.579	0.591
6	na	na	na	0.354	0.470	0.521	0.550	0.569	0.582	0.592
10	0.090	0.337	0.430	0.479	0.529	0.555	0.570	0.581	0.588	0.594
15	0.358	0.454	0.499	0.525	0.554	0.570	0.580	0.586	0.591	0.595

Table 16 and Figure 1 both show that DR increases slower as fine rate and audit rate both increase. If audit rate is raised from 0.15 to 0.60 at fine rate of 15, then 58% corporate DR can be achieved. By taking *p* as a variable in settlement, declaration rates t1, t2 and t3 increase as audit rate increases relative to fine rates of 1, 2 and 3 respectively.

In no settlement case tax payoffs are found for each type of audit. Reduction is granted for the second or more time for the the case of reduction. We consider regular, ex-officio and fraud audits. In regular audit for the case of no lawsuit filed, first we assume that no reduction is requested within 30 days after receiving the notification. Even though unlikely to happen this possibility is not ignored in our application. Tax payoff is ₺279,300 from (19), ARI is 0.349 and DRI is 0.58 from (20) and (21) respectively. Second, we consider that reduction is requested and granted. Tax payoff from (14) is ₺252,494. Therefore, ARI is 0.434 and DRI is 0.74 from (15) and (16) respectively. Tax payoffs from underdeclaration for reduction are calculated in Table 17.

Table 17: Tax payoffs (₺000) from underdeclaration for reduction

No SET		***X* <*B***
Audit	252.494	253.839+k+ c_1
No Audit	95.000	95.000+k

After ex-officio audit, if no reduction is requested, TLFI (₺) are calculated in accordance with TPL 30. Therefore, tax return payoff from (19) is ₺371,721. ARI is 0.248 and DRI is 0.579 from (20) and (21) respectively. If reduction is requested, then tax return is ₺306,106which implies that ARI and DRI are 0.325 and 0.567 from (15) and (16) respectively. After tax fraud audit if no reduction is granted, then tax return is ₺452,139. Therefore, ARI and DRI are 0.192 and 0.582 from (20) and (21) respectively. If reduction is requested, then tax payoff is ₺359,718. Therefore, ARI and DRI are 0.259 and 0.578 from (15) and (16) respectively.

Table 18: Audit rates and declaration rates of indifference

Fine Rate	**ARI SET**	**ARI reduction**	**ARI no reduction**	**DRI SET**	**DRI no SET**
1	0.716	0.434	0.349	0.393	0.58
2	0.631	0.325	0.248	0.449	0.58
3	0.565	0.259	0.192	0.467	0.58
4	0.510	0.215	0.157	0.475	0.58
5	0.466	0.184	0.133	0.481	0.58
10	0.324	0.107	0.075	0.491	0.58
15	0.249	0.076	0.052	0.494	0.58
20	0.202	0.058	0.040	0.496	0.58
25	0.170	0.048	0.032	0.497	0.58

Table 18 shows that an audit rate of 16% is achieved in no SET with a fine rate of 6 and 1/3 reduction included. On the other hand, an audit rate of 17% is achieved in SET with a fine rate of 25 with all reductions included.

A payment schedule map of CTP based on TRA's randomization is given in Figure 2.

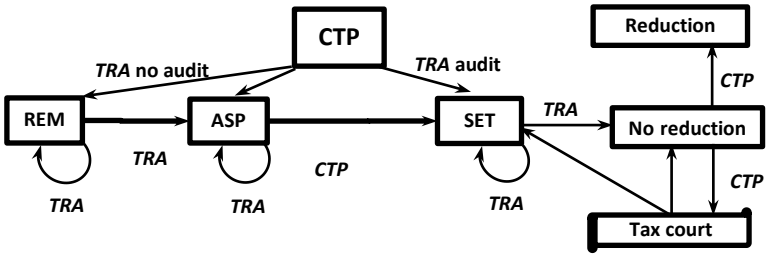

Figure 2: Payment schedule map

Discussion and Conclusion

In this article we analyzed tax returns under the TPL and NDTPL. We focused on four corporate tax returnfunctions with four different tax payment schedules, namely G_{rem} (remorse exemption), G_a (tax completion after statutory period), G_s (settlement) and G_r (reduction).

Doubling tax fines and granting no reduction in actual tax liability will undoubtly increase tax burden of the CTP with the NDTPL. This will make the CTP pay 2*n* times the amount of fine. Even though it is uncertain how the CTP will respond to the change in general, it may turn out to be a marginal change after their adoption to NDTPL. Lipatov (2005) established that marginal changes in enforcement were not effective when evasion/avoidance was pervasive. Slemrod and Yitzhaki (2002) reported that when the tax structure was changed, people might call and give new instructions to their accountant, change their reports and the timing of transactions. One of the unclear issues in the NDTPL is how to determine honest CTPs. According to the Ministry of Finance the CTP must comply with all tax laws and regulations completely for three years in a row to become honest. Then the question is whether the same CTPs will be audited for three years in a row or just be assumed to be honest. Another unclear issue is that to what extent tax reductions will be eliminated. In other words, whether tax inspection committee will grant a reduction in tax fine and late interest in case CTP settlement request is accepted by TRA. In TPL, tax fine and late interest are being reduced because of a reduction on actual tax, which is encouraging CTP to evade tax. In addition to tax evasion, another way of minimizing tax payoff is tax amnesty which is common in Turkish political system. Waiting for tax amnesty may be the best deal for the CTP given that there will be no imprisonment. Latest tax amnesty enacted in August 2016 gives the CTP an opportunity to pay underdeclared tax liability with all fines and late interest dropped. According to Akbey (2014) an increase in the number of tax auditors failed to reveal the desired results because of economic crisis and tax amnesty.

We have found that TPR declined as audit rate declined in settlement tax payoffs. This result is consistent with the analysis of Hindriks and Myles (2006). In addition, TPR declined as fine rate increased. Alm et al. (1992) had the same result that tax revenue increased with greater enforcement efforts, but payoff declined as the probability of audit increased. We have shown that DR approached to 0.60 as *p* approached to 1 and increased as both fine rate and audit rate increased which is

consistent with the conclusion of Allingham and Sandmo (1972). One interesting result was that tax payoff from an ASP base difference with a fine rate of 0.5 was greater than that of a SET base difference with a fine rate of 1 in the settlement tax payoffs. Therefore, TRA may add a preventive measure in NDTPL. Otherwise, CTP will request SET when ASP is assessed instead of REM. When SET request is accepted, SET tax return is about 12% less than ASP tax payment. When REM is accepted, REM tax payment is about 11% less than SET tax payment. Nevertheless granting settlement in case of tax fraud will encourage CTPs to evade tax and therefore it should be dropped from the NDTPL. As long as all tax declaration forms were submitted in the statutory period, we have found that tax return would be about 11% more than actual tax payoff under TPL and this rate would go up 7% with NDTPL. Of that payment 0.53% would be audit cost to TRA and therefore about 17% more revenue after audit cost would be generated compared to actual tax payment.

In voluntary disclosure of unlawful activity, CTP will choose REM first, and in case of an audit CTP requests SET first. Therefore, payment strategies in order are REM, SET, ASP and reduction. Overall, SET is the best strategy considering low audit rates even though REM shows a lower payoff. By implementing the NDTPL, TRA can generate substantially more revenue compared to TPL. This change overall may be effective in achieving the goal to maximize tax revenue, but may not be efficient in tax collection process. Our calculation in both NDTPL and TPL indicates that a tax penalty rate is imposed not only to the main tax but also to all taxes involved in the business activity. Therefore, CTP who is imposed high tax fines and also caged by tax laws tries to skirt loopholes in tax law. Thus, enhancing tax compliance is hardly possible. Our calculation also indicates high audit rates of indifference to paying or to evading tax. To tackle this problem, TRA should increase tax audits because administrative audit cost per ₺100 collected has a tendency to decline over time.

As a result, for more efficient tax collection process TRA should impose tax penalty on the main tax only, raise audit rates, provide tax amnesty less frequently, and overall, make a new modern tax reform plan.

Appendix A. Highlights of the NDTPL

Highlights of the NDTPL: (a) There will be no delay in fines due to tax fraud; (b) There will be no reduction on actual tax liability; (c) Tax rate will be decreased by 5 percent for honest CTPs paying their taxes regularly. Honest CTPs will pay 19.5% instead of statutory 20%; (d) Honest CTPs will be allowed to establish an e-business office on Twitter; (e) Incentives will be provided to CTPs based on the degree of compliance to TPL; (f) Those who violate tax privacy shall be imprisoned up to 3 years and adjudged to criminal fines for no less than 150 days.

References

Akbey, F. (2014). An inquisition on tax audits and revenues in Turkey. Dokuz Eylul University Journal of Economic and Administrative Sciences; 29(1): 63-103

Allingham, M.G. & Sandmo, A. (1972). Income tax evasion: A theoretical analysis, Journal of Public Economics; 1: 323-338

Alm, J., McClelland, G.H. & Schulze, W.D. (1992). Why do people pay taxes? Journal of Public Economics; 48(1): 21-38

Altundis, M. (2007). Tax crimes and penalties imposed in TPL and the effects of new Turkish criminal law on these crimes. Journal of Ankara Bar Association; 65(1):168-179

Fukofuka, P. (2013). The contextual framework of corporate income tax evasion. Journal of Accounting and Taxation; 5(2): 27-37

Hindriks, J. & Myles, G.D. (2006). Intermediate Public Economics, (2nd Ed.), The MIT Press, Massachusetts.

Schneider, F., Raczkowski, K. & Mröz, B. (2015). Shadow economy and tax evasion in the EU. Journal of Money Laundering Control; 18(1): 34-51

Slemrod, J. & Yitzhaki, S. (2002). Tax avoidance, evasion and administration. Handbook of Public Economics, Volume 3, North Holland, Amsterdam

Dhami, S. and al-Nowaihi, A. (2006). Why do people pay taxes? Prospect theory versus expected utility theory. https://www2.le.ac.uk, Access date: 18.08.2017

Istanbul Chamber of Certified Public Accountants (2016). The Draft TPL Evaluation Commission Report. http://archive.ismmmo.org.tr/Mansetler/MEVZUAT/Duyuru/VUK_TasariTaslakKomisyonRapor.pdf_431.pdf, Access date: 21.08.2016

Lipatov, V. (2005). Corporate tax evasion: The case for specialists. Munich Personal RePEc Archive, Paper No. 33998, https://mpra.ub.uni-muenchen.de/33998/, Access date: 19 August 2016

Tax Audit Committee (2016). 2012-2015 Activity Reports. http://www.vdk.gov.tr/default.aspx?nsw=dciSsil8zCRLPP9XnV0K5Q==-H7deC+LxBI8=&nm=1048, Access date: 10 August 2016

Tax Net (2016). Tax fraud crimes and penalties. http://www.verginet.net/dtt/2/359Kacakciliksuclarivecezalari_3197.aspx, Access date: 28 August 2016

Tax Inspectors Foundation (2016). An example for a limited company audited. http://www.vmv.org.tr/Yay%C4%B1n/10, Access date: 28.05.2016

Turkish Revenue Administration (2016a). The number of active corporate taxpayers. http://www.gib.gov.tr/fileadmin/user_upload/VI/20151.htm, Access date: 01 August 2016

Turkish Revenue Administration (2016b). Central government budget revenues. http://www.gib.gov.tr/fileadmin/user_upload/VI/GBG/Tablo_22.xls.htm, Access date: 08.08.2016

Turkish Revenue Administration (2007). Settlement in resolving tax disputes with the tax administration. www.gib.gov.tr/fileadmin/user_upload/yayinlar/uzlasma.pdf, Access date: 28.06.2016

Turkish Revenue Administration (2016c). Strategy Development Department 2011-2015 Activity Reports. http://www.gib.gov.tr/kurumsal/stratejik-yonetim/faaliyet-raporlari, Access date: 10.05.2016

Turkish Revenue Administration (2016d). Special irregularity fine. http://www.gib.gov.tr/node/83111, Access date: 28.08.2016

Yavaslar, F.B. (2015). Surcharges and penalties in tax law. Turkey's national report. www.eatlp.org/uploads/public/2015/National%20report%20Turkey.pdf, Access date: 04.05.2016