

# Does More Progressive Tax Make Tax Discipline Weaker?

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## Abstract

This paper investigates the relationship between the disparity in tax base and tax collection. I address the tax collection problem with traditional industrial organization approach. Thus, I model the "tax minimization" industry where the supplier helps taxpayers to avoid their tax liability. I find that lower income inequality as well as a less progressive tax code may result in a smaller number of tax payers committing to their tax duties. Finally, I question the reduction in the highest tax rate as a policy directed at the improvement of tax discipline.

*JEL Classification:* H21; H23; H26

*Key words:* Endogenous prices, tax collection, inequality, tax progressivity.

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# 1 Introduction

The aim of this paper is to investigate the relation between the distribution of tax duties and tax collection. In contrast with the traditional tax minimization literature, my model allows for endogenous price setting. In this framework the price for tax minimization services varies with the level of disparity in the distribution of tax duties and affects the proportion of tax units avoiding their tax duties.

The main findings are that the greater progressivity of the tax system improves tax collection and so does higher inequality.

Tax avoidance and evasion is a problem of great importance for many countries. According to Slemrod and Yitzhaki (2000), the US government spends about 10% of the total tax revenue on tax enforcement. Furthermore, the US Internal Revenue Service estimates that about 17% of due income taxes are not paid, a figure which is probably even higher for most other countries. Tax avoidance and evasion practices force governments to increase the tax burdens on non-avoiding tax payers. Feldstein (1999) estimates the deadweight loss from income tax in the US to be more than twelve times larger than it would be without tax avoidance. The government's inability to collect sufficient tax revenue may result in financial crises, as in Russia in 1998 and Argentina in 2002. In these cases, since rich individuals usually use avoidance practices, the government levies heavier taxes on the less well-off and this further slows down the development of small businesses and economic growth. Moreover, tax minimization behavior may cause shifts in the real economy, thereby affecting occupational choice, human capital investment and labor supply<sup>1</sup>. To reduce the costs associated with tax collection, we must understand the economic foundations of the tax

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<sup>1</sup>For a detailed overview of the main problems related to tax avoidance, see Andreoni, Erard and Feinstein (1998).

minimization industry<sup>2</sup>.

The existing literature on tax minimization generally assumes that the costs associated with tax minimization only depend on the private characteristics of a particular tax unit. It usually neglects the pecuniary externalities generated by aggregate demand. In Cross and Shaw (1992), for example, the cost of a tax avoidance activity depends on the size of the income that is avoiding tax. Atkinson and Stiglitz (1980) include the government's effort to enforce tax collection as a factor affecting these costs. Slemrod (2001) proposes that initially richer individuals pay a lower price for the same amount of income saved from taxation.

Besides the assumption about the cost function for tax avoidance or evasion, the organization of this industry has been subject to little study, which could provide the background for the assumptions about costs. There are only two market structures where price is not affected by changes in aggregate demand. The first assumes perfect competition, while the second is characterized by monopoly power and perfect price discrimination. The last structure is modeled in Hindriks, Keen and Muthoo (1999), where a corrupt tax inspector audits the true individual's income, but can be bribed into misreporting the audit result to the government. I will consider the case of imperfect competition (Cournot competition in quantity) and the restricted ability to discriminate in price (only third degree of price discrimination will be allowed).

The rest of the paper is organized as follows. Section 2 presents a general model and discusses the optimal strategy of the tax minimization provider. Section 3 investigates the relationship between inequality and tax collection.

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<sup>2</sup>To be clear, I use the term "tax minimization" to avoid any discussion on the legal distinction between tax avoidance and evasion. This distinction might be very difficult to define since in many cases, it is subject to court verdict. Consistent with my definition, the "tax minimization industry" includes services either helping to hide incomes subject to taxation or to avoid tax duties.

Section 4 discusses the links between tax progressiveness and tax discipline and presents the main results. Section 5 concludes.

## 2 The model

There are three types of economic agents: tax units, the government and the agency providing tax optimization services. Each tax unit exogenously obtains a positive endowment,  $x$ , which could denote any tax base including income, profit or bequest. In the rest of the text, I will refer to  $x$  as income in order to simplify my presentation. The cumulative distribution function of income,  $F(x)$ , is common knowledge, while the income earned by a particular household is private information.

The government determines the tax code,  $\tau(x)$ , which I take to be exogenous and a non-decreasing function relating the level of tax duties to income.

The agency helps tax units avoid their tax duties by providing tax shelter for a fixed proportion of tax duties,  $\alpha\tau(x)$ ,  $\alpha \in (0, 1)$ . The service is indivisible; the agency either helps to hide the proportion of the entire tax duties, or it does not. I assume that the agency could observe some parameters which correlate with income. However, I restrict the agency's direct monitoring abilities due to high monitoring cost. For example, the agency could observe client's business category, the size of his firm or its geographical location and use third degree of price discrimination. The agency can set different prices for different categories but it charges the same price within a category. In other words, the agency divides its consumers into separate markets and sets price,  $T_i$ , which maximize its profit in market  $i$ . Furthermore, I assume that the agency knows the income distribution,  $F_i(x)$ , within each category. Thus, the agency solves the same problem for each market  $i$ . This allows me to abandon the index  $i$ , and to simplify the presentation.

It is reasonable to assume costly monitoring. As an illustration, consider a corrupt official authorized to provide firms with tax grants and exemptions. It is extremely hard to estimate the profit generated by tax grants. Consider three examples of tax exemptions which cost the Russian federal budget more than 7% of GDP<sup>3</sup>: the tax grant to the natural gas monopoly company Gazprom at the end of 1993 (2% of GDP); the secured tax exemptions for the metallurgical industry (2% of GDP) and the National Sports Fund's right to import alcohol and tobacco free of tax (3% of GDP). All those grants were provided by the Russian Prime Minister whose market power was certainly very strong. However, his ability to price discriminate was rather limited, since he made these tax exemption arrangements ex-ante, with only imperfect knowledge as to the value which the tax exemptions could generate. Thus, ex ante, it might have been difficult to predict the profit of the National Sports Fund, which became the leading importer of alcohol and tobacco products into Russia after having secured the right to import these goods tax-free.

In general, the value of the bribes paid to obtain tax exemption is significantly lower than the associated cost to the federal budget. A good illustration of this would might be the Landfill tax scandal in the UK, when “a government appointed regulator which polices the probity of £280m in tax credits given to thousands of UK environmental bodies paid its directors over £100,000 in fees for two years without authorization”, according to *The Guardian*. Similarly, in New York, according to the *Gotham Gazette* (2002), “Some 18 current and former city tax assessors accepted millions of dollars in bribes to improperly reduce the tax rates on at least 500 properties. The corruption costs the city as much as \$1 billion”. The differences between the value of bribes and the amount of taxes not paid as a result is so huge that it is impossible to assume any sign of bargaining or first degree of price discrimination.

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<sup>3</sup>Åslund (1999).

## 2.1 Monopoly

First, we consider an agency with monopolistic market power. This model may describe the behavior of a corrupt law maker who provides tax grants and exemptions for particular firms. It could also represent a corrupt tax inspector facing zero probability of being caught, similar to that described in Shleifer and Vishny (1993).

Knowing the tax code and income distribution, the agency selects a price for the tax optimization service,  $T$ , which maximizes the agency's profit. For the purpose of simplification, I assume tax minimization to have zero costs. Consider the agency's revenue as a function of the chosen price,  $T$ . Let  $\hat{x}$  denote the solution of the following equation:

$$\hat{x} = \inf_x \{ \alpha \tau(x) = T \}. \quad (1)$$

The taxpayers whose incomes are larger than  $\hat{x}$  will use the agency's service, while the others will prefer to declare their income and pay tax  $\tau(x)$  to the government. Further, I will refer to  $\hat{x}$  as the income threshold. The agency's profit is then calculated by the formula (2):

$$m \stackrel{d}{=} \alpha T (1 - F(\hat{x})) = \alpha \tau(\hat{x})(1 - F(\hat{x})), \quad (2)$$

where  $(1 - F(\hat{x}))$  measures the proportion of tax payers whose income is greater than  $\hat{x}$ . To maximize its profit,  $m$ , the Agency should find the income threshold solving problem (3):

$$\hat{x} = \arg \max \{ \tau(x)(1 - F(x)) \}; \quad (3)$$

and set the price  $T = \alpha \tau(\hat{x})$ .

Generally, the solution of problem (3) is not unique. However, I shall assume the agency to be government-friendly, which means that, in case of indifference, the agency chooses the income threshold that is the best for the

government:

$$\hat{x} = \max(\arg \max \{\tau(x)(1 - F(x))\}).$$

## 2.2 Cournot Competition

It may be more reasonable to assume that the tax avoidance industry has oligopoly structure. Certainly, in many advanced economies the market seems to be dominated by a relatively small number of large players. For instance, in the UK there is the ‘Big Four accountancy firms’ (KPMG, Ernst and Young, PricewaterhouseCoopers and Deloitte). These firms often face criticism for the provision of tax shelters for wealthy individuals and business corporations (see for example Financial Times 2004, May 10). And there is currently a gathering political momentum to address what is seen as a growing problem (as Gordon Brown, the current UK Finance Minister has indicated on a number of occasions recently).

Consider Cournot oligopoly with  $n$  competitive firms providing tax advice for clients. Each of the firms face residual demand

$$D(T) = (1 - F(\hat{x}) - Q_{n-1}),$$

where  $Q_{n-1}$  is the proportion of clients serviced by the rest of the industry,  $T$  is the price for tax avoidance and  $\hat{x}$  is an income threshold defined in (1). Each firm maximizes its profit given residual demand

$$\max T(1 - F(\hat{x}) - Q_{n-1}) = \max_{\hat{x}} \alpha \tau(\hat{x})(1 - F(\hat{x}) - Q_{n-1}).$$

The first order condition for this problem is

$$FOC : \quad \tau'(\hat{x})(1 - F(\hat{x}) - Q_{n-1}) - \tau(\hat{x})F'(\hat{x}) = 0. \quad (4)$$

We shall consider a symmetric equilibrium where all the firms serve the same share of clients  $Q = (1 - F(\hat{x}))/n$ , which implies that  $Q_{n-1} = (1 - F(\hat{x}))(n - 1)$ . This assumption allows us to rewrite (4) as (5)

$$\tau'(\hat{x})\frac{(1 - F(\hat{x}))}{n} - \tau(\hat{x})F'(\hat{x}) = 0. \quad (5)$$

The same first order condition (5) is obtained when we consider following maximization problem

$$\max_{\hat{x}} \tau(\hat{x})(1 - F(\hat{x}))^n,$$

which helps us to prove proposition 1.

**Proposition 1** *A threshold income for the Cournot oligopoly game is a solution of (6)*

$$\hat{x} = \arg \max \tau(\hat{x})(1 - F(\hat{x}))^n \quad (6)$$

Proposition has an intuitive interpretation, as  $(1 - F(\hat{x}))^n$  equals to probability that all  $n$  firms have a client while they are acting independently.

In the rest of the paper, I will investigate the property of the income threshold and its relation to changes in the tax code and income distribution. For this purpose, I need the following lemma

**Lemma 1** *Let  $g$  be any function and let  $x_g = \max(\arg \max g)$ ;*

*let  $f$  be a positive function strictly decreasing on  $[x_g, +\infty)$ ;*

*let  $x_{fg} \in \arg \max [f(x)g(x)]$ ;*

*then  $x_{fg} < x_g$ .*

**Proof.** See appendix ■

**Corollary 1** *We can similarly prove that if  $f()$  is a positive function non-increasing on  $[x_g, +\infty)$  then  $x_{fg} \leq x_g$ .*

The following proposition 2 will demonstrate that competition in tax avoidance industry reduces the number of tax units paying their taxes and results in lower tax revenue.

**Proposition 2** *Let  $\widehat{x}_m$  and  $\widehat{x}_n$  be the threshold incomes solving (6) for Cournot games with  $m$  and  $n$  firms, where  $m < n$ . Then  $\widehat{x}_m > \widehat{x}_n$*

**Proof.** Since  $n > m$  and  $(1 - F(\widehat{x}))^{n-m}$  is a positive and decreasing function, we can use lemma 1 and prove the statement.

$$\begin{aligned} \widehat{x}_n &= \arg \max \tau(\widehat{x})(1 - F(\widehat{x}))^n = \\ &= \arg \max [\tau(\widehat{x})(1 - F(\widehat{x}))^m * (1 - F(\widehat{x}))^{n-m}] < \\ &< \arg \max \tau(\widehat{x})(1 - F(\widehat{x}))^m = \widehat{x}_m. \end{aligned}$$

■

Proposition 2 shows that government should reduce the degree of competition in the tax minimization industry. For example, the right to issue tax grants and tax exemptions should be given only to one authority. Our prescriptions are the opposite to those in Shleifer and Vishny (1993). This is because Shleifer and Vishny's paper addresses the situation where bureaucrats are bribed to provide some socially valuable goods, whilst we are investigating the production of tax avoidance, which is a "social bad".

### 3 Inequality and tax collection

The following sections shows that more equal income distribution may result in a smaller number of tax payers. To get a better intuition, consider an extreme case of a very egalitarian society, where all individuals have the same income and, therefore, the same tax duties,  $\tau$ . Maximizing its profit, the tax avoidance agency can charge epsilon below the common tax liability resulting in complete tax avoidance. A dispersion of tax liabilities due to an uneven income distribution can results in a charge which is too high for some tax payers. For example, in an economy with uniform income distribution and a proportional tax code, the monopolistic profit maximizing agency would

charge the price equal to median tax duties. In this case, the richest half of the population will avoid taxes, but government will still be able to collect tax duties from the less well-off half of the population.

The rest of this section analyzes how general is this relation between inequality and tax collection. First, we consider the most general class of functions reducing inequality. Then, we find the additional restrictions for this class which guarantee a reduction in the number of tax payers.

### 3.1 Ordering inequality

The most popular ordering of inequality is Lorenz dominance introduced in Atkinson (1970). Atkinson demonstrated that if the Lorenz curve (which shows the proportion of total income received by the poorest  $t\%$  of the population) for one distribution of income lies below the Lorenz curve associated with another, then inequality in the first case is higher for a wide class of inequality measures. One way of reducing inequality is to regressively transform income. When the rate of increase in income is smaller for a richer than for a poorer person, the new Lorenz curve will lie above the old one and the two Lorenz curves do not intersect.

However, it is somewhat cumbersome to construct the Lorenz curve every time we need to compare the inequality resulting from different income transformations. In some circumstances, for example when a new tax code is designed, we may not even know the true income distribution. In such a situation we need to know when one income transformation leads to higher inequality than another for any initial income distribution. The Lorenz Dominance criterion helps us to answer this question. In particular, it states that for two non-decreasing strictly positive income transformations the necessary and sufficient condition for Lorenz dominance is that the ratio of two transformations is a monotonic function.

**Lemma 2** *Let  $L$  be a Lorenz curve for initial income distribution  $F(x)$ . Let  $g(x)$  be positive non-decreasing functions transforming income  $x$  to  $g(x)$ . Let  $L_g$  and be the Lorenz curve for transformed income distribution.*

*Then,  $L_g$  lies below (above)  $L$  for all initial income distributions  $F(x)$  iff  $\frac{g(x)}{x}$  is an increasing (decreasing) function.*

**Proof.** *This lemma was proved in Kakwani (1977) and Jakobsson (1976) for a continuous domain and differentiable income transformation, and in Keen, Papapanagos and Shorrocks (2000) for discrete income distribution. For proof in a more general set-up, see Le Breton, Moyes and Trannoy (1996) or Damjanovic (2004) which provides a simpler proof. ■*

Lemma 2 shows that increasing average functions represent the largest subclass of increasing function which makes any income distribution more unequal in terms of Lorenz order.

### 3.2 Increasing inequality and tax discipline

Now, we will investigate the effect of a change in inequality on tax collection. For further references, we need the following definition.

**Definition 1** *Increasing income transformation  $g(x)$  equalizes tax burdens with respect to tax code  $\tau(x)$  on interval  $[a, b]$  if  $\frac{\tau(g(x))}{\tau(x)}$  is a decreasing function on  $(a, b)$*

From the definition, any income transformation, which equalizes tax burdens makes tax duties more equal in Lorenz order. The following proposition states that income transformation which is equalizing with respect to tax code would result in the reduction of the share of tax units paying their tax duties.

**Proposition 3** *Let  $\hat{x}$  be the income threshold for the initial agency problem corresponding to tax code  $\tau(x)$  and cumulative income distribution function*

$F(x)$ . Let  $g(x)$  be the income transformation equalizing the tax burden with respect to the existing tax code  $\tau(x)$  on the interval  $[\hat{x}, b]$ , where  $b$  is the upper bound of the initial income. Denote the new income cumulative distribution function as  $F_g$ . Furthermore, let  $\hat{x}_g$  be a solution to the new problem  $(\tau, F_g)$ . Then we have that,  $\hat{x}_g < g(\hat{x})$ .

**Proof.** The relation between the old and new income distributions would be as follows:  $F_g(x) = F(g^{-1}(x))$ , where  $g^{-1}$  is an inverted function of  $(x)$ .

$\hat{x}_g$  is a solution to the equation

$$\hat{x}_g = \arg \max \tau(x) (1 - F(g^{-1}(x)))^n.$$

Substituting  $y = g^{-1}(x)$ , we obtain

$$\begin{aligned} \hat{y} &= \arg \max \tau(g(y)) (1 - F(y))^n \\ &= \arg \max \tau(y) \frac{\tau(g(y))}{\tau(y)} (1 - F(y))^n, \end{aligned}$$

where  $\hat{x}_g = g(\hat{y})$ . The function  $\frac{\tau(g(y))}{\tau(y)}$  is a positive and non-increasing since  $g$  is equalizing with respect to  $\tau$ . Therefore, we can apply lemma 1 and conclude that  $\hat{y}$  is smaller than  $\hat{x} = \arg \max \tau(x) (1 - F(x))^n$ . This means that  $\hat{x}_g = g(\hat{y}) \leq g(\hat{x})$  and less people would pay their tax duties after income transformation occurs. ■

Proposition 3 proves that equalizing tax burdens with respect to tax income transformation reduces the number of tax payers. In the following subsection, we apply this proposition to the progressive linear tax code.

### 3.3 Decreasing inequality reduces the number of tax payers for the linear tax code

The tax codes applied to the highest income group in almost all countries have a progressive linear form,  $\tau(x) = tx - C$ . Here,  $t$  is the highest marginal tax rate and  $C = O - tx_{ban}$ , where  $x_{ban}$  is the bottom of the highest

income bracket and  $O$  is the tax obligation for an individual earning  $x_{ban}$ . The following proposition shows that any increasing income transformation, which reduces inequality and increases income, leads to a smaller number of tax units paying taxes.

**Proposition 4** *let  $\tau(x) = tx - C$  be a tax code, where  $C$  and  $t$  are positive numbers.*

*Let  $g(x)$  be the income transformation function such that*

*i)  $\frac{g(x)}{x}$  is a decreasing function,*

*ii)  $g(x)$  is an increasing function*

*iii)  $g(x) > x$*

*then  $g(x)$  is equalizing with respect to  $\tau$  on  $(\frac{C}{t}, +\infty]$ ,*

**Proof.** Let  $C/t = A$ . we need to show that  $\frac{g(x)-A}{x-A}$  is a decreasing function on  $[A, +\infty)$ . Consider  $x, y$ , such that  $y > x > A$ . Then

$$\begin{aligned} & \frac{g(y) - A}{y - A} - \frac{g(x) - A}{x - A} = \\ & \frac{[g(y)x - g(x)y] + A[(y - x) - (g(y) - g(x))]}{(y - A)(x - A)} = \\ & \frac{[1 - a][g(y)x - g(x)y] + a[x - g(x)](y - x)}{(y - A)(x - A)} \leq 0; \end{aligned}$$

Where  $a = \frac{A}{x} < 1$ . ■

We use proposition 4 and proposition 3 to conclude that any income transformation which results in higher income and reduces inequality results in a decreasing proportion of taxpayers paying their duties.

In general, the smaller number of tax payers will not necessary lead to a lower tax collection rate, which is equal to the ratio of government revenue  $\int_0^{\hat{x}} \tau(x)dF$ , to statutory tax,  $\int_0^{\infty} \tau(x)dF$ . It is also equal to the value of the Lorenz curve associated with the distribution of tax duties at point  $t =$

$F(\hat{x})$ . The tax collection rate after tax equalizing income transformation will correspond to the value of the Lorenz function which lies above the initial one but taken at a point which is smaller. Therefore both increases and decreases of the tax collection rate could follow a reduction in inequality. Indeed, consider the monopoly model with uniform income distribution on  $[0,1]$  and proportional tax code. An income increment of 0.1 to all individuals will result in lower inequality, a smaller number of tax payers but a larger tax collection rate. However, a larger increment, let us say 0.4 for the sake of argument, would result in a lower tax collection rate. Similarly, we cannot say anything about the profit of the agency since the sign will depend on the forms of initial and transformed income distributions.

## 4 Tax Progressiveness and Tax Collection

In this subsection, we will show that a less progressive tax may result in a smaller number of tax payers.

**Definition 2** *We will say that the tax code  $\tau_1(x)$  results in more equal tax duties than  $\tau(x)$  if  $\frac{\tau_1(x)}{\tau(x)}$  is a non-increasing function.*

Definition 2 is consistent with Lorenz dominance criterium proved in Le Breton, Moyes and Trannoy (1996). The following proposition shows the proportion of tax payers committing to their tax duties are lower when the tax code results in more equally distributed tax burdens.

**Proposition 5** *Let  $\hat{x}$  be the income threshold of the initial agency problem  $(\tau, F)$ , where  $\tau(x)$  is an increasing tax code and  $F(x)$  is any cumulative income distribution function. Let the new tax code,  $\tau_1$ , be such that  $\frac{\tau_1(x)}{\tau(x)}$  is a non-increasing function. Let  $\hat{x}_1$  be the income threshold of the agency problem  $(\tau_1, F)$ , then:  $\hat{x}_1 \leq \hat{x}$ .*

**Proof.**  $\hat{x}$  is the solution of equation

$$\begin{aligned}\hat{x}_1 &= \arg \max \tau_1(x) (1 - F(x))^n = \\ &= \arg \max \left[ \tau(x) (1 - F(x))^n \frac{\tau_1(x)}{\tau(x)} \right],\end{aligned}$$

where  $\frac{\tau_1(x)}{\tau(x)}$  is positive and non-increasing. Therefore, from 1,  $\hat{x}_1$  is smaller than or equal than  $\hat{x} = \arg \max [\tau_1(x) (1 - F(x))^n]$ . ■

Proposition 5 has n important policy implication which we discuss in following subsection.

#### 4.1 Reduction of marginal tax rate for the highest tax bracket

Proposition 5 has an important application. Consider a tax reform where the government reduces the highest marginal tax rate without reforming the tax code on lower income brackets. For high income individuals, the tax code would be transformed from  $\tau_1(x) = t_1x - C_1$  to  $\tau(x) = tx - C$ , where the parameters satisfy conditions (7)

$$\begin{aligned}\frac{C}{t} &\leq \frac{C_1}{t_1}; \\ t &< t_1.\end{aligned}\tag{7}$$

The inequality holds if the tax rate for the second highest income brackets is positive. Calculation (8) proves that  $\frac{\tau(x)}{\tau_1(x)}$  is a positive decreasing function;

$$\frac{\tau(x)}{\tau_1(x)} = \frac{tx - C}{t_1x - C_1} = \frac{t}{t_1} + t \frac{\frac{C_1}{t_1} - \frac{C}{t}}{t_1x - C_1}.\tag{8}$$

By applying proposition 5 one can prove that such a reform will reduce the income threshold. Thus, the reduction in the marginal tax rate for the highest tax bracket may lead to lower tax revenue and less people paying taxes.

A reduction in the marginal tax rate for the highest tax bracket is often recommended as a means of reducing incentives for tax avoidance and evasion (see, for example, Tanzi and Zee, 2000). However, the present model

illustrates that this policy may result in completely the opposite outcome. The key to understanding this result is to recall that the prices for tax minimization services are set endogenously in response to the change in demand.

Indeed, just such a reduction in the tax base was reported in Russia in 2002. Starting from 2001, the Russian government cut the profit tax rate from 35 to 25 percent and broadened the tax base by revoking the investment preferences, which made the tax duties more equally distributed. By implementing this measure, the Russian government intended to reduce the incentives for tax avoidance and tax evasion. However, the ratio of taxable profit to total profit fell from 60 to 30 percent in one year, as reported in Gurvitch (2002). To my knowledge, neither of the existing tax minimization models are able to explain this phenomenon. This paper provides a possible explanation.

## **5 Concluding remarks**

In this paper, I have modeled the tax optimization industry which adjusts prices in response to changes in demand. Within this model, I have investigated the relationship between the changes in tax base distribution and the proportion of tax units committing to their tax duties. I have argued that a reduction in inequality or a decrease in tax progressiveness may result in a fall of this share. Further, I have provided arguments against the reduction of the highest marginal tax rate as a policy directed at the improvement of tax discipline. Some real-world tax changes appear to fit with the implications of the current model.

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## 6 Appendix

Prof of lemma 1.

**Proof.** Proof by contradiction.

Let assume that

$$x_{fg} > x_g. \quad (9)$$

By definition  $x_g = \arg \max g(x)$  and  $x_{fg} = \arg \max g(x)f(x)$

$$g(x_g) = \max g = \max [(g * f)/f] \geq (g * f)(x_{fg})/f(x_{fg}). \quad (10)$$

$$(g * f)(x_{fg}) = \max(g * f) \geq (g * f)(x_g) \quad (11)$$

Inequality  $f(x_{fg}) < f(x_g)$  holds because  $f$  is nonincreasing and  $x_g > x_{fg}$  by assumption (9). This implies inequality

$$g(x_{fg}) = (g * f)(x_{fg})/f(x_{fg}) > (g * f)(x_g)/f(x_g) = g(x_g).$$

The last inequality  $g(x_{fg}) > g(x_g)$  is in a contradiction with formula (10) which implies that assumption (9) is incorrect, and  $x_{fg} < x_g$ . ■