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PAPAVA INDEXES OF TAX CORRUPTION

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Corruption as a social phenomenon has existed for a long time. The fight against corruption takes on a special importance, however, when the scale of corruptive practices approaches the point where we face an actual "globalization of corruption" (Elliot (ed.), 1997). It is indeed telling when the complexity and hazardous nature of this threat prompts the President of the World Bank to lable it a "cancer of corruption" (Mauro, 1997 (B), pp. 1, 3).

The Collins Dictionary of Sociology defines corruption as the refusal on the part of governmental officials to accept expected standards of behavior because of their personal wellbeing (Jerry, Jerry, 1999, p. 322).

In relevant economic literature one can find discussions on the nature, factors, origin and effects of corruption (Mauro, 1997 (A), 1997 (B); Rose-Ackerman, 1997; Tanzi, 1995; Levin, Tsirik, 1998 (A), pp. 40-47), and applicable mathematical models (Levin, Tsirik, 1998 (A), 1998 (B); Polterovich, 1998).

One of the most prevalent forms of corruption is the tax offence – when a tax officer accepts a bribe to overlook certain things in taxable operations to permit total or partial tax evasion (Svensson, 1987; Kottke, 1998, pp. 535-621). The problem of corruption in tax administrations (Chander, Wilde, 1992; Levin, Tsirik, 1998 (B), pp. 34-39), by very its nature, is one of the cornerstones of the proverbial "shadow economy" (Bogomolov, 1998, p. 104; Makarov, 1998, p.38) and has been the subject of analyses, assessments and measurement in countless investigations(Adams, Fitchett (ed.), 1992; Bhattacharrya, 1999; Feinstein, 1999; Giles, 1999; Tanzi; 1999; Thomas, 1999; Makarov, 1998). The problem of the "shadow economy" is especially damaging in those countries where post-communist transformations are underway,

where there is a dire need for institutional adjustments (Papava, Khaduri, 1997, 1998; kes, 1994).

To assess of the extent of corruption, various indexes have been used. The objective of this paper is to determine indicators for that most important element of the "shadow economy" - corruption in tax administrations.

As is known, the index is a relative indicator which characterizes the changes (i.e. dynamics) in occurrence over time, or the effects of comparing these occurrences in space (Baklanov, 1972, p. 5).

On the basis of general principles of the theory of indexes (see for example Allen, 1975; Baklanov, 1972; K ves, 1983; Kovalevski, 1989), the Minister of the Economy of Georgia, Professor Vladimer Papava developed *Tax Corruption Indexes,* which permit quite accurate assessments of the corruption in the tax administration (Papava, 2000).

To determine the "Papava Indexes of Tax Corruption", first, one has to reckon potential tax revenues estimated according to the economy at the present stage of development. One must then compare this potential amount with the actual taxes collected, and *before* proceeding with any calculations all amendments to the tax law should be excluded.

The GDP is the crucial parameter on the basis of which the above-mentioned indexes should be calculated nationwide; with respect to individual sectors of the economy or individual regions, the value added produced in the given sector or region must be used as such a parameter. It is worth noting that given the object of establishing such indexes, the GDP, in turn, requires certain adjustments. This is because different tax regimes are used with respect to different elements of that parameter.

First of all, external trade should be excluded from the GDP.

As is known, imports in addition to all other taxes imposed in the country, are subject to import duty. At the same time, tax revenues from imports can be substantially affected by fluctuations in the exchange rate. With respect to imports, the level of tax corruption should be assessed separately.

Exports should be excluded from the GDP. The reason is that according to relevant international practices only profit tax and personal income tax on exported goods are payable to the State budget. Exports are not subject to VAT, excise duties, and export tariffs. This reduces the amount of actual tax revenues. Also, with respect to exports, the degree of tax corruption should be reckoned separately.

It is recommended the all those sectors and regions (e.g. regions in which a free economic zone is established) to which different tax regimes are applicable be excluded from inclusion in the GDP. Agriculture is a good example of this type of sectors. In the Georgian context, for example, there is just actually only one type of tax - land tax - which is applicable to agriculture. With respect to each of such sectors and regions, the rate of tax corruption should be assessed separately. The method, which should be applied in these cases, should be identical to the one applied to exports. For the sake of simplicity in calculation, let us assume that there is no free economic zone in the country.

For the purpose of formalization of indexes, let us introduce the following symbols:

Q_0 is the nominal GDP for the base year;

$\tilde{Q}_0$ −   the adjusted nominal GDP (subject to the above assumptions[1]) for the base year;

Q_1 −   the nominal GDP for the relative year;

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[1] Specifically, adjustments should be effected by excluding foreign trade and the value added produced in agriculture and consumed inside the country.

$\tilde{Q}_1$ – the adjusted nominal GDP (subject to the above assumptions) for the relative year;

M_0 – total imports for the base year (in US $);

M_1 – total imports for the relative year (in US $);

α_0 – the exchange rate of the national currency for the base year;

α_1 – the exchange rate of the national currency for the relative year;

X_0 – total exports for the base year;

X_1 – total exports for the relative year;

A_0 – the value added produced in agriculture and consumed domestically for the base year;

A_1 – the value added produced in agriculture and consumed domestically for the relative year;

T_0^T – tax revenues for the base year collected by the tax service;

T_1^T – tax revenues for the relative year collected by the tax service;

$\tilde{T}_0^T$ – adjusted tax revenues (subject to the above assumptions[2]) for the base year collected by the tax service;

$\tilde{T}_1^T$ – adjusted tax revenues (subject to the above assumptions) for the relative year collected by the tax service;

T_0^M – tax revenues collected from imports for the base year;

T_1^M – tax revenues collected from imports for the relative year;

T_0^X – tax revenues collected from exports for the base year;

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[2] Specifically, adjustments should be effected by excluding all tax revenues collected from foreign trade and agriculture.

$T_1^X -$ tax revenues collected from exports for the relative year;

$T_0^A -$ tax revenues from agriculture for the base year;

$T_1^A -$ tax revenues from agriculture for the relative year.

According to the above symbols:

$$\tilde{Q}_0 = Q_0 + \alpha_0 \cdot M_o - X_0 - A_0,$$

$$\tilde{Q}_1 = Q_1 + \alpha_1 \cdot M_1 - X_1 - A_1,$$

$$\tilde{T}_0^T = T_0^T - T_0^M - T_0^X - T_0^A,$$

$$\tilde{T}_1^T = T_1^T - T_1^M - T_1^X - T_1^A.$$

Given the above symbols, let us determine the parameters of tax revenues to be raised for the State budget:

$t_0 = \dfrac{\tilde{T}_0^T}{\tilde{Q}_0}$ indicates the share of adjusted tax revenues, collected by the tax

service, in the adjusted GDP for the base year;

$t_1 = \dfrac{\tilde{T}_1^T}{\tilde{Q}_1}$ _ the share of adjusted tax revenues, collected by the tax service, in the

adjusted GDP for the relative year.

As was noted above, the "Papava Index of Tax Corruption " represents the correlation of actual tax revenues with potential revenues. The latter should be calculated by multiplying all tax revenues ratio to GDP for the base year by the adjusted GDP for the relative year: $T_1^{TP} = t_0 \cdot \tilde{Q}_1$. This formula will show us all

potential tax revenues which could be collected by the government only on the basis of changes in economic activites, while tax legislation and administration remain unchanged.

By subtracting the actual from potential tax revenues, we can get an increase (or decrease) in tax revenues: $T_1^{TP} - \tilde{T}_1^T$. This could result from improvement of tax administration and changes in the tax legislation. By deriving percentage of such an increase (or decrease) from the above-mentioned potential tax revenues we can get a value which shows an increase (or decrease) in additional tax revenue per unit of potential tax revenue, resulting from an improved tax administration and amendments to the tax legislation. If we reflect in our calculations amendments to the tax legislation (in particular, actual tax revenues for the base year should be adjusted on the basis of tax legislation applicable in the relative year), then this ratio will represent the "Papava Index of Tax Corruption in Tax Service Excluding Agriculture and Exports"[3]:

$$ I_{TC}^T = \frac{T_1^{TP} - \tilde{T}_1^T}{T_1^{TP}} = \frac{t_0 \tilde{Q}_1 - t_1 \tilde{Q}_1}{t_0 \tilde{Q}_1} = \frac{t_0 - t_1}{t_0}. $$

If $I_{TC}^T > 0$ (or $I_{TC}^T < 0$), then we have an increase (or decrease) in the level of corruption[4].

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[3] This and all subsequent formulas are developed directly by Vladimer Papava.

[4] Theoretically one can not exclude the probability that when $I_{TC}^T > 0$, such a situation may result from recruiting less qualified staff in tax offices, or general slackness of employees, or lack of motivation, which situation, ultimately, will encourage some employees, if not all of them, to take advantage of this general negligence and get involved in corrupted practices. This remark can be applicable to all indexes below.

As was noted above, agriculture should be calculated separatly because it is subject to a different tax regime. With regard to agriculture, the following parameters should first be determined:

$$t_0^A = \frac{T_0^A}{A_0} \qquad \text{and} \qquad t_1^A = \frac{T_1^A}{A_1},$$

where t_0^A and t_1^A represent tax revenues per unit of value added derived from

agriculture in the base and relative year respectively.

Given these parameters, it is easy to calculate the potential tax revenues that can be derived from agriculture $T_1^{AP} = t_0^A A_1$ and, accordingly, the "Papava Index of Tax Corruption in Agriculture":

$$I_{TC}^A = \frac{T_1^{AP} - T_1^A}{T_1^{AP}} = \frac{t_0^A A_1 - t_1^A A_1}{t_0^A A_1} = \frac{t_0^A - t_1^A}{t_o^A}.$$

Here we must note once again that if in the given country, any sector (or region) other than agriculture is subject to a different tax regime than that applied to the rest of the country, then all relevant indexes should be calculated for that sector (or region) separately.

As was mentioned above, exports should also be subject to a separate study. According to the above symbols:

$$t_0^X = \frac{T_0^X}{X_0} \qquad \text{and} \qquad t_1^X = \frac{T_1^X}{X_1},$$

where t_0^X and t_1^X represent tax revenues per unit of export for the base and relative year respectively.

On the basis of such parameters, we can calculate a potential quantity of tax revenues from exports $T_1^{XP} = t_0^X X_1$ and, accordingly, the "Papava Index of Tax Corruption for Exports":

$$I_{TC}^X = \frac{T_1^{XP} - T_1^X}{T_1^{XP}} = \frac{t_0^X X_1 - t_1^X X_1}{t_0^X X_1} = \frac{t_0^X - t_1^X}{t_o^X}.$$

Given the above indexes, it is easy to calculate what the loss or benefit to the State Budget would be as a result of an increase or decrease in the level of corruption at tax offices. If we compare this quantity ($I_{TC}^T T_1^{TP} + I_{TC}^A T_1^{AP} + I_{TC}^X T_1^{XP}$) to all potential tax revenues facilitated by economic development ($T_1^{TP} + T_1^{AP} + T_1^{XP}$) and assume that $I_{TC}^T T_1^{TP} = T_1^{TP} - \tilde{T}_1^T$, $I_{TC}^A T_1^{AP} = T_1^{AP} - T_1^A$ and $I_{TC}^X T_1^{XP} = T_1^{XP} - T_1^X$, then we can get the "Papava Integrated Index of Tax Corruption in Tax Service":

$$I_{TC}^1 = \frac{T_1^{TP} - \tilde{T}_1^T + T_1^{AP} - T_1^A + T_1^{XP} - T_1^X}{T_1^{TP} + T_1^{AP} + T_1^{XP}} = 1 - \frac{T_1^f}{T_1^P},$$

where: T_1^f represents actual tax collections made by the tax service in the relative

year ($T_1^f = \tilde{T}_1^T + T_1^A + T_1^X$);

T_1^P − all potential domestic tax revenues for the relative year   resulting from

economic development ($T_1^P = T_1^{TP} + T_1^{AP} + T_1^{XP}$).

If $I_{TC}^1 > 0$ (or $I_{TC}^1 < 0$), then we have an increase (or decrease) in the level of corruption at tax offices.

When we perform similar calculations with respect to customs, we must replace the value added by the value of imports, calculated at the current exchange rate of national currency, and determine the following parameters:

$C_0 = \dfrac{T_0^M}{\alpha_0 M_0}$ represents the ratio of customs revenues to imports for the base year;

$C_1 = \dfrac{T_1^M}{\alpha_1 M_1}$ − the ratio of customs revenues to imports for the relative year.

Potential customs revenues should be calculated by multiplying the ratio of tax revenues in customs for the base year by the average exchange rate for the same year and total imports for the relative year: $T_{1c}^{MP} = C_0 \alpha_0 M_1$.

By analogy with the above indexes, the "Papava Index of Tax Corruption in Customs" will be:

$$I_{Tc}^M = \frac{T_1^{MP} - T_1^c}{T_1^{MP}} = \frac{C_0 \alpha_0 M_1 - C_1 \alpha_1 M_1}{C_0 \alpha_0 M_1} = \frac{C_0 \alpha_0 - C_1 \alpha_1}{C_0 \alpha_0} = \frac{C_0 - C_1 \beta}{C_1},$$

where $\beta = \dfrac{\alpha_1}{\alpha_0}$ is the ratio of increase (or decrease) of the national currency exchange

rate .

If $I_{TC}^M > 0$ (or $I_{TC}^M < 0$), then we have an increase (or decrease) in the level of corruption at customs offices.

If we combine the corruption rates at tax and customs offices with each other, then we will get the overall national parameter of that phenomenon or, in other words, we will get the "Papava Integrated Index of National Tax Corruption":

$$I_{TC}^2 = \frac{T_1^P - \tilde{T}_1 + T_1^{AP} - T_1^A + T_1^{XP} - T_1^X + T_1^{MP} - T_1^M}{T_1^{TP} + T_1^{AP} + T_1^{XP} + T_T^{MP}} = 1 - \frac{T_1^f + T_1^M}{T_1^P + T_1^{MP}}.$$

If $I_{TC}^2 > 0$ (or $I_{TC}^2 < 0$), then we have an overall increase (or decrease) in the degree of tax corruption at the national level.

In addition to the above indices, one can calculate the "Papava Index of Payroll Tax Corruption" for non-budgetary (health and employment) funds.

If we assume that the amount mobilized by the non-budgetary funds for the base and relative year respectively is P_0 and P_1, and the wages are W_0 and W_1, we can calculate the relevant rates of revenues generation by the above funds:

$$t_0^P = \frac{P_0}{W_0} \qquad \text{and} \qquad t_1^P = \frac{P_1}{W_1}.$$

For the relative year the potential size of revenues from nonbudgetary funds will amount to $P_1^p = t_0^P W_1$, and the "Papava Index of Payroll Tax Corruption" will be:

$$I_{Pc} = \frac{P_1^p - P_1}{P_1^p} = \frac{t_o^P W_1 - t_1 W_1}{t_0^P W_1} = \frac{t_0^P - t_1^P}{t_0^P}.$$

If $I_{PC} > 0$ (or $I_{PC} < 0$), then we have an increase (or decrease) in the level of corruption for non-budgetary funds.

Given all the above calculations, we can get the "Papava Integrated Index of National Tax and Payment Corruption":

$$I^3_{TPC} = \frac{T_1 - \tilde{T}_1 + T_1^{AP} - T_1^A + T_1^{XP} - T_1^X + T_1^{MP} - T_1^M + P_1^P - P_1}{T_1^{MP} + T_!^{AP} + T_1^{XP} + T_1^{MP} + P_1^P} = 1 - \frac{T_1^f + T_1^M + P_1}{T_1^P + T_1^{MP} + P_1^P}.$$

All above indჳbes were calculated in the Georgia context for the Year 1999. The results were very interesting, enabling us to identify existing reserves in the area of taxes. In particular, in 1999 the "Papava Integrated Index of Tax Corruption in Tax Service" amounted to –4.3 per cent. This means that at the cost of improving the administration of tax offices, and thereby reducing corruptive practices, the State Budget gained an additional 4.3 tetri per lari in potential tax revenue.

Unfortunately, the situation at customs offices relfects the oposite - the "Papava Index of Tax Corruption" amounts to 25.2 per cent. In other words, due to a deterioration in administration and expanding corruption, the State Budget lost 25.2 tetri per lari of potential tax revenues.

The "Papava Indexes of Tax Corruption" were also calculated by sectors and regions. For these particular purposes, the GDP was replaced by the value added produced in each sector and region. It was found out that with respect to regions the "Papava Indexes of Tax Corruption" ranged from +11 per cent to –15 per cent, while with respect to sectors from +24 per cent (energy sector and trade) to –30 per cent (healthcare).

In agriculture the "Papava Index of Tax Corruption" makes up 3 per cent; in other words, in the sector of agriculture, due to the deterioration of administration and growth of corruptive practices, the State Budget lost 3 tetri per lari in potential tax revenues.

On the basis of all the above calculations, the "Papava Integrated Index of National Tax Corruption" was fixed at 6.6 per cent, which means that in 1999, the

State Budget lost 6.6 tetri per lari in potential tax revenues which resulted from the growth of domestic economic activities.

The "Papava Index of Payroll Tax Payment Corruption" for 1999 was calculated at 12.9 per cent. In other words, per lari of potential revenues, the loss of non-budgetary funds amounted to 12.9 tetri.

The "Papava Integrated Index of National Tax and Payment Corruption" for 1999 was fixed at 7.9 per cent, which indicates that the shortfall in the State Budget and non-budgetary funds per lari of potential revenues was 7.9 tetri.

In conclusion, it must be emphasized once again that the "Papava Indexes of Tax Corruption" give a quite detailed picture of the deterioration (or improvement) in the level of corruption in any given sector, region or area. It thereby enabled the government to set forth specific measures in its fight against corruption.

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