TAXATION IN AGRICULTURAL MARKETS ANTALYA GREENHOUSE PRODUCTION[1]

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Abstract: Taxation of agriculture has long been discussed with reference to response of production to the charges. As agriculture can only respond price factors with periodic delays, analyses focusing on the impact of taxation system are important. Due to the recent changes in taxation system of agriculture in Turkey, researchers conducted a field survey in 2016 among greenhouse and glasshouse producers of Antalya. With this study, it is aimed to portray the feedbacks received from 281 green/glasshouse producers in the centre, west and east ends of the city. The assessment of the producers with regards to the current taxation system and expectations awaited for higher productivity and efficiency of the sector were received in addition to calculation of farm level inefficiencies. The assessment of the farmers were demonstrated in relation with the profitability structures of the green/glasshouses. Due to the findings, 79 % of the farmers considered income tax level as higher than acceptable level, while this negative perception rose to 83 % for VAT. In conformity with these results, the overall tax levels were considered as high by 85 %. Finally, the linear relationship between inefficiency and perceptions on taxation for tax sensitive farmers was mostly negative as expected.

Keywords: greenhouse, taxation, producer, socio-demographic, profitability, Antalya

JEL Code: Q 11, Q14 - Q17

1. INTRODUCTION

Taxation is one of the most important income resources of national budgets in our economic era. Tax collection is both a sustainable and predictable resource, on which future investment decisions could be made by planning and implementation authorities (Neumark, 1948). Taxes are non-refundable contributions of a country's nationals to the economy so as nobody has a direct right to wait personal return on taxes. However, taxes do also constitute a national fund that is used to finance in or out of border public-interest activities. This is the social function of taxes. Taxes are also utilised as tools to correct income level with differing impositions across different layers of the society.

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Agriculture, being the oldest economic activity of humanity, constitutes a tax source for finance of national economies. Of course taxation of agriculture differs between countries due to the weight of agriculture in the overall economy. With this perspective, it is correct to notify that agricultural income is an important tax source in Turkey, considering the sector's weight in the economy. However, like elsewhere nature-dependent structure of agriculture, as well as weak record-keeping characteristics, results in periodic variations of agricultural tax collected (Hayran, 2013: 70).

Departing from this evaluation, this study intends to portray the sector's valuation on agricultural taxation with respect to the data collected from greenhouse producers of Antalya, Turkey in 2016. The aim of the study is to cross compare the qualitative evaluations of 281 plastic greenhouse and glasshouse producers from Antalya with their measured profit inefficiency using linear relationship measurement tools and to make inferences accordingly.

2. TAXATION OF AGRICULTURE IN TURKEY

Taxation of agriculture in Turkey is classified under direct and indirect taxation. Direct taxation is related with the agricultural income and inputs utilised for production. Main titles are income tax, corporate tax, and property tax and motor vehicle tax. Indirect taxes however include value added tax (VAT) and private consumption tax for fuel used in production.

Income tax is either calculated with stoppage implementation or the farmers are directly taxed with respect to their real income declarations. In stoppage based system, the farmers do not bear responsibilities on book keeping or financial declarations, while they are obliged to keep and save producer's bill for their economic activities (Yildiz, 2015:126; Anonymous, 1960:3355). This posterior tax calculation and payment system can be used by producers or entrepreneurs that make production below some limits. The limitations are based on amount of lands utilised for field crops, on number of trees for horticultural crops and on number of animals owned for animal breeding. In addition to these main activities, there are limitations as well for fisheries, bee keeping or silk production. Besides, there are also limitations on ownership of farm equipment (Anonymous, 1960:3408-28). So, it is possible to indicate that stoppage based taxation is mostly implied on farmers that operate under medium to small scale.

Real income taxation referring to large scale producers classified due to ownership of land, animals, equipment as above mentioned. The tax base for large scale producers is calculated either based on business account book or balance sheet. Business account book based taxation refers to tax calculation with respect to the difference between agricultural income and input related expenses or debts of a financial period. However, balance sheet based taxation is calculated based on the differential between period ending and period beginning capital stock (Yildiz, 2015: 126, 196; Anonymous, 1960: 3408-27). The income tax rates implemented are demonstrated in Table 1.

Table 1: Income Tax Classification - 2016[2]

Income	Rate
Below 4.167,47 USD	% 15
Below 9.922,54 USD – 625,12 USD for 4.167,47 USD – for the rest	% 20
Below 22.821,84 USD – 1.776,13 USD for 9.922,54 USD – for the rest	% 27
Above 22.821,84USD – 5.258,95 USD for 22.821,84 USD – for the rest	% 35

Resource: Anonymous, 2015 (General Notification on Income Tax 2016)

Agricultural producers are taxed through corporate taxation when there appears a corporate structure, and when their income is calculated either based on business account book or balance sheet. The non-agricultural income of agricultural firms and profit shares as well as rent and leasing incomes are taxed by 15 % due to Corporate Tax Law (Anonymous, 2006: 9885).

Property tax is also implied for agricultural producers, buildings used agricultural production purposes like storage of crops or equipment do not lead accruing of taxes. In other words, property related with agricultural activities is exempted from property taxes. This exemption includes common holdings of the village or agricultural cooperatives (Anonymous, 1970: 4688). The building taxes are implied with 0,1 % for buildings used for accommodation and with 0,2 % for other buildings (Anonymous, 1970). Yet, agricultural lands are taxed, when they reside on metropolitan areas, for their values above 250 million Turkish Liras due to Property Tax Law dated back 1970. The rates below this level is exempted from property tax as well (Ceylan et al., 2014: 148; Gun and Eraktan, 2005: 1205; Anonymous, 1970: 4693). Besides, periodic temporary exemptions are provided for specific situations. Lands utilised for forest generation are excluded for 50 years, lands gained 'suitable for agricultural production' status by human efforts are excluded for 10 years and lands devoted for production of horticultural products by human efforts again are excluded from property tax between 2 and 15 years (Hayran, 2013: 71; Gun and Eraktan, 2005: 1205; Anonymous, 1970: 4693).

Motor vehicle taxes implied only for planes used for irrigation or pesticide implementation in the agricultural lands by only 25 % of the real tax amount calculated. Otherwise, recorded and declared land vehicles used for agricultural purposes are exempted from motor vehicle taxes and private consumption taxes (Anonymous, 1963: 3716).

Indirect taxes however include Value Added Tax (VAT) and Private Consumption Tax (PCT). VAT for agricultural production includes delivery of goods and services in the scope of commercial, agricultural, industrial production activities and activities of public corporations. VAT is calculated with regards to three methodologies. Summation of wages, interest accrued, rent and profits gives value added for summation method. Deduction method refers to subtraction of value of goods and services purchased from the value of goods and services sold. So the remaining part is called as the value added. The final methodology, tax reduction, include calculation of VAT from the accrued VAT to be paid, and paid VAT in response to purchases. In addition there are three varieties of VAT. Gross product based VAT, income based VAT and consumption based VAT. The calculation of value added differs again for these varieties.

[2] Based on average USD/TL rate for 2016, retrieved from Turkish Central Bank (**1 USD= 3,02342 TL**), the rate has been used hereafter

There are exemptions for VAT implementation for exports, for researches conducted to find petrol oil, for transportation of goods to the legal centre of operation, if it is out of Turkish boundaries and for social works. Finally, it is important to notify the rates implemented to fields related with agriculture. While the standard rate is 18 %, the rate for agricultural products in 1 % while it is 8 % for food products.

The final tax type, which is PCT is not directly attributable to agricultural production. The tax was set forward in 2002 in the scope of the EU accession process and aimed to produce income for public. It affects producers through the vehicles they use mainly, if they are not utilised for agricultural purposes (Anonymous, 2002: 8306-2; Eraktan, 2008).

Additionally, there are Banking and Insurance Implementations Tax, Customs Tax, Stamp Tax. These taxes barely apply to agriculture sector. Specifically, customs tax accrues to consumers rather than producers.

3. MATERIAL AND METHODOLOGY

3.1 Data

The study was conducted in Centre, Serik and Kumluca towns of Antalya with green (plastic) or glasshouse producers. The sample was calculated with Neyman method (Yamane, 2001). A face to face survey was conducted with 281 producers, more than 275 calculated for 95 % confidence interval, respecting accessibility. Number of producers surveyed from the Central town was 43, from Kumluca was 183 and from Serik was 55.

3.2. Methodology

Our survey study aimed analysis of impacts of farmer specific factors related with tax payment situation as well as socio-demographic factors on the profit inefficiency of the plastic/glasshouse farms in the targeted region. Stochastic profit frontier approach was used in analysing afore mentioned impacts. Stochastic profit frontier approach depends on estimating gross profit of the farms with respect to direct and indirect production inputs including stoppage of plastic/glasshouse equipment in logarithmic form. Gross profit is calculated by deduction of variable costs from the farm income by setting fixed costs as instalment aside. The farm equipment costs inferred as the stoppage of the equipment within this variable cost calculation. The final form of the equation implied for this analysis was as following:

$$\ln P_i = ß_1*A_i + ß_2*G_i + ß_3*F_i + ß_4*K_i + ß_5*D_i + (u_i+v_i)$$

The explained gross profit per acre was estimated against land amount utilised in the green/glasshouse (A), fertiliser cost (G: TL/acre), seedling cost (F: TL/acre), agricultural medication cost (K: TL/acre) and stoppage for tools utilised (TL).

The error terms retrieved from this profit estimation is acknowledged as sum of profit inefficiency index of the farm and the unobserved coincidental error (Batesse and Cora, 1977; Batesse and Coelli 1995, Kolawole, 2006: 6) as demonstrated below.

$$ó^2 = ó_u^2 + ó_v^2$$

The variation composed of the error variance and inefficiency index is used to decompose the inefficiency, or the profit inefficiency index, through taking inverse log of error terms.

$$PII_i = (1-e(-u_i))$$

The inefficiency index was estimated against some pre-determined socio-demographic factors through utilisation of the following equation.

$KEI_i = f(A_i, T_i, H_i, VAT_i, V\_A_i, V\_I_i, C_i, S_i)$

Where;

Dependent variable is KEI_i= Profit inefficiency index of the i^{th} farm. Independent variables are: A_i= Age of the farmer of the i^{th} farm; T_i= Education level of the farmer of the i^{th} farm; H_i,= Household size of the i^{th} farm; S_i= Whether i^{th} farm pays taxes stoppage based (Yes: 1, No:0); V_A_i = The level of property tax that i^{th} farm bears; V_VAT_i= The level of VAT that i^{th} farm bears; V_I_i = The level of income tax that i^{th} farm bears; C_i = Dummy variable indicating whether the i^{th} farm has more glass than greenhouse instalment (Yes: 1, No: 0)

Following this decomposition, it is intended to demonstrate the impacts of surveyed farmers' main assessment on taxation of agriculture on the inefficiencies of the farms as well as provision of this qualitative assessment. This evaluation is made with a cross comparison of the data obtained and assessment of a linear relationship between the inefficiency level and evaluation of respondents' tax system based on Likert Scale with 5 points. Likert Scale indicated the starting point from 'Completely Disagreed' to 'Completely Agreed'. The evaluation is made by calculation of Pearson's correlation coefficient indicating the direction and magnitude of potential linear relationship.

4. DEMONSTRATION AND ASSESSMENT OF THE FINDINGS

4.1. Socio-Demographic Assessment

Prior to providing information on profit levels calculated and costs incurred, it is considered as beneficial to briefly demonstrate the socio-demographic situation of the farmers surveyed.

Firstly, average age of 281 farmers surveyed was 42,68, while 63 % of the farmers age ranged between 30 and 50. When the education level is considered, 58 % of the farmers indicated that they are primary school graduates (completed 5 years of education). While 12 farmers indicated no education information, 14 farmers had indicated that they are college or university graduates. The helpers in farm business for the surveyed farmers are mostly their spouses and children. 268 farmers out of 281 farms receive their wives' contribution and the average age of the working ladies is 41. Education level of working spouses is similar with the surveyed male farmers with 20 uneducated and 178 primary school graduates.

The farmers operate in the farm activities with an average number of 260 days. 6 farmers indicated that they also work for non-production activities in their own farms and 36 farmers do work out of their farms with average 3.000 TL (992,25 USD)[1] income per month. Besides, 6 of the working spouses also do have occupations out of farm and earn an average of 1.900 TL (628,43 USD)[1] per month.

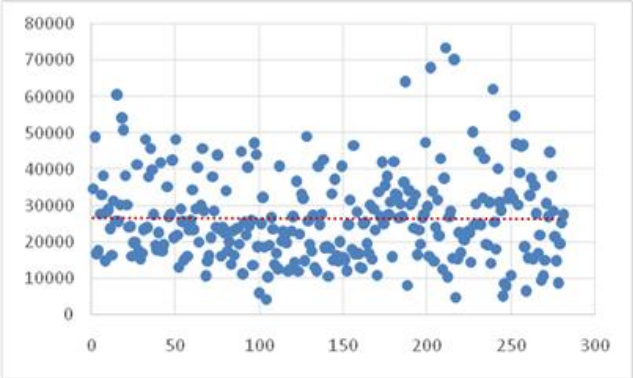
4.2. Profit and Cost Structure of the Farms

Firstly, the farmers surveyed indicated that 75 of the farms constitute of glasshouses, while 244 are plastic houses. 137 farms do constitute of more than one plastic/glass house and average land size is 4,5 acres. 227 of 281 plastic/glasshouses (81 %) are properties of the farmers. 101 of the second plastic/glasshouse that take place in

the existing enterprise out of 125 again belong to the farmer himself. Therefore, it is possible to notify that most of the farmers do operate in their own farmland and with their own plastic/glasshouse equipment.

Following this general overview, it is essential to consider income, profit and cost structure of the farms. Most of the farmers indicated that they produce crops in conformity with climatic expectations of the region as tomato, green – red pepper, aubergine, cucumber and pumpkin. As no specific discrimination was made depending of the crop differences, average production amount was calculated with respect to the total production of the green/glass house. Yet, it is also important to note that all producers surveyed were only focused on production of one single crop. However, the differentiation was applied for calculation of the total income and profit levels. Average production amount for 281 farmers appeared to be 35 tonnes per production period for afore mentioned product set. Yet, the income distribution is demonstrated in Figure 1.

Figure 1: Total income of plastic/glasshouses (TL)



Total average income level for enterprises was 54.472,95 TL (18.017 USD). Distribution of this income level across towns indicate the central farmers have the highest return with 57.899,33 TL (19.150,28 USD), while Kumluca producers earn 47.892,11 TL (15.840,38 USD) for their farming activities which is almost 21 % lower than the central farmers. However, this aggregate figure needs to be converted into per m^2. Therefore, the average income per m^2 appeared as 14,43 TL (4,77 USD).

On the other hand, while average farm income appeared as 18.000 USD, average variable costs of the farms appeared as 9.922,54 USD. It is here important to note that in the central town where glasshouses occupy most of the farms and where most of the production has commercial purposes, the variable cost average is also higher like the farm income, when compared with the remaining two towns. However, total variable cost per m^2 was 7,24 TL (2,40 USD), which meant the farmers almost operate with 50 % profitability when variable costs are considered solely. Departing from these figures, the gross profit differentials for target towns is demonstrated in Table 2, again referring to higher profitability of commercial plastic/glasshouses of Central town.

Table 2: Average Gross Profit Levels in Towns (USD)

	GROSS PROFIT
CENTRE	10.259,9
KUMLUCA	7.128,02
SERİK	7.545,76
TOTAL	**9.176,03**

This gross profit figure is estimated against variable costs (pesticide costs, fertilizer costs, seedling costs) and stoppage of plastic/glasshouse equipment of the farms and the inefficiency level of the farms were decomposed. From this decomposition, it was understood that average profit inefficiency of the farms was 57 % and the score varied between 7 % and 87 % for 281 greenhouse farms. These figures reveal the possibility to increase technical efficiency per farm simultaneously.

In the second part of the analysis, the reasoning behind the inefficiency, related with tax payment situation, was estimated for policy proposal purposes. The impacts of socio-demographic factors as the age and education level of the producer, the width of the farm family were estimated in addition to VAT level, property tax level for land and dummy variables. Firstly, the farms were differentiated regarding plastic and glasshouse ownership and tax payment situation is measured regarding whether the farmer makes stoppage based payment.

Table 3: Findings of the Inefficiency Model

	Coefficients	**t**	**P(t)**
Constant	4.04	10,78	0,00***
V_A_i	0,04	1,13	0,25
H_i	-0,12	3,19	0,00***
S_i	-0,14	1,20	0,23
C_i	0,02	2,11	0,03**
VAT_i	0,38	9,97	0,00***
A_i	0,001	0,01	0,9
V_I_i	0,38	1,5	0,13
T_i	0,07	1,51	0,13

*** significant with % 1, ** significant with % 5

The findings demonstrated in Table 3 indicated that stoppage based taxation leads to reduction of profit inefficiency for the concerned agricultural operators. Besides, rise in VAT and property tax payments appeared to be factors increasing profit inefficiency. This means that the rise in direct and indirect tax load leads to less technical inefficiency in agricultural production and the finding is in conformity with previous studies. Finally, the age, or the rising expertise of the farmer, leads to more profitability as well as consideration of the farm business as a family business. And again referring to financial expectations, glasshouses that require more maintenance has a negative but almost negligible impact on the measured profitability.

Following demonstration of these findings, it is intended to consider qualitative valuation of surveyed 281 farmers on taxation of agriculture.

4.3. Farmers' Evaluation of the Taxation System

Prior to indicating the relationship between the measured inefficiencies of greenhouse farms, a portrait of the farmers' evaluation is contributory to the overall evaluation. The farmers indicated their ideas on taxation of agriculture and existing rules applying to them through a 5-Likert scale. The scale was categorised from 'completely agreed – partially agreed – no idea – partially disagreed – completely disagreed'.

The farmers were asked whether their farm income is adequate for paying taxes completely or not. The results indicated that 61 % of farmers referring to 170 out of 281 farmers either completely or partially disagreed with this proposition. 57 % of farmers (160) thought that the existing taxation system does not provide financial justice. While 42 % of farmers (117) considered that the state authorities do not use collected taxes properly, 46 % (130) indicated vice versa. Besides, when the target audience was asked to evaluate their own position within the system, 37 % (104) indicated that taxpayers completely fulfil their legal duties, while 49 % (137) claimed just the opposite. Therefore, farmers do not consider themselves as complete contributors to the tax system.

Interestingly, the farmers were asked to indicate whether they feel themselves bad when they are paying taxes. 135 farmers representing 48 % indicated that they disagree with 'bad feeling' case, while 126 farmers representing 45 % indicated that they feel 'bad'. They were also asked whether they know taxpayers involve in tax evasion activities. 30 % of the farmers (84) indicated that they do not know any tax evasion activity conducted. However, 44 % (124) are aware of tax evading taxpayers. The remaining 26 % surprisingly indicated that 'they have no idea' on tax evasion. This level is also worth to consider in the scope of tax evasion. However, 68 % of farmers consider tax evasion as an important guilt against the state and 61 % claimed that they would directly report any guilt related with tax evasion.

Besides, the surveyed farmers indicated that concerns related with the future of the business can be considered as a valid reason for tax evasion by 46 %, while the opposite thinkers constituted 40 % of the audience. The audience however, claimed that lowering tax rates and easing the process would be contributory for new investment opportunities. Also 76 % of farmers (211) indicated that they make tax payments on a timely manner. 65 % of producers declared that they are confident with the services they receive from tax administration offices and 78 % emphasized that tax payment is an important civil obligation, which should be monitored properly.

When the existing tax levels faced with are considered among surveyed farmers, the real valuation becomes more apparent. 79 % of the farmers (223) indicated that they find income tax or relevant stoppage level is higher than the acceptable level, when only 14 % approves the existing level. In addition 234 farmers representing 83 % of the audience considered VAT they pay for inputs as higher than the acceptable level. Here the approving farmers' ratio reduces to 10 %. In addition, 85 % of farmers (239) declared that the existing tax levels in Turkey are far higher than acceptable levels in general. These final findings reveal that even if they consider tax payment as an important duty and they mostly prefer to make their payments upon the requirements, they still consider the financial injustice of the system from their extent.

4.4. Relationship between Profit Inefficiency and Evaluation of the Taxation System

After provision the overall assessment, it is also important to cross compare the profit inefficiency levels of the farms with the farmers' qualitative evaluations of the system. It is intended to understand whether there is a linear relationship between qualitative considerations of the farmers on the system and their profit inefficiency. Accordingly, the correlation between the profit inefficiency index and selected indicators are calculated.

For the assessment, the responses retrieved for qualitative assessment questions classified with 5-Likert scale is summarized with summation of number of completely – partially agreeing farmers and completely-partially disagreeing farmers with a 0-1 scale. The correlation of agreeing and disagreeing farmers' responses with the relevant farmers' profit inefficiency level can be summarised as following in two phases.

Table 3: Correlation of the Profit Inefficiency of Greenhouse Farms with Qualitative Assessment of Farmers – 1

	Disagreeing Farmers	**Agreeing Farmers**
Income Level Adequacy	0,075	-0,075
Fulfilment of Tax Obligations	-0,077	0,117
Timely Payment of Taxes	-0,078	0,060
Tax Payment is a Duty	0,092	-0,063
Tax Evasion is a Guilt	-0,047	0,066

The assumed linear correlation between having 'adequate income' and the inefficiency revealed that rising inefficiency and inadequacy assessment is related to each other with 7,5 %. However, farmers that considered their income as adequate for tax payment have lower inefficiency scores. Farmers that do not think all taxpayers fulfil their obligations demonstrated existence of a negative relationship with 7,7 %, meaning reduction of the inefficiency. However, the opposite thinkers and the inefficiency has a positive linear relationship with 11,7 %. The relationship has the same directional effect for farmers that prefer timely payment of taxes born with 7,8 % and 6 % for non-payers and payers. People that do not fully consider tax payment as a duty or obligation showed rising tendency for the inefficiency with 9,2 %, while agreeing farmers showed a negative trend with 6,3 %. People that do not consider tax evasion as a guilt however showed a 4,7 % negative relationship and agreeing farmers showed a negative relationship with 6,6 %.

Table 4: Correlation of the Profit Inefficiency of Greenhouse Farms with Qualitative Assessment of Farmers - 2

	Disagreeing Farmers	**Agreeing Farmers**
Inappropriate Spending	0,12	-0,03
High Income Tax/Stoppage	0,11	-0,11
High VAT	-0,04	0,00

In addition, considerations regarding the tax levels are evaluated in terms of their linear relationship with the inefficiency level as well. Farmers that do not think there is an inappropriate public spending tendency of the tax revenues, also indicate a positive impact with inefficiency with 12 %. This means, the inefficiency level of farms do rise for approvers of financial implementations. However, the relationship between approving inappropriate public spending with the inefficiency is negative with 3 %. The same tendency can be seen in farmers that do not consider existing income tax or stoppage based taxation levels high demonstrated 11 % rising effect with the inefficiency, while the opposite thinkers just showed a declining inefficiency trend. However, the situation is almost negligible for VAT levels. Farmers that do not perceive VAT levels as higher than the acceptable level demonstrated a 4 % declining impact on the inefficiency, meaning an appreciation in the efficiency level. But there is no relationship between thinking VAT levels as high and changing inefficiency.

This is a basic interpretation of the potential relationships between the qualitative assessment of the farmers and their profit inefficiency status. Yet, it can be considered as contributory for policy making.

5. RESULTS

With this study, the previously retrieved outcomes of a field survey aiming measurement of profitability of greenhouse farmers in Antalya, Turkey and the impacting factors of the measures profit inefficiency levels are demonstrated. 281farmers were surveyed and the production characteristics of the farms as well as demographic characteristics of the farmers and farmer families are compatible with the expectations. However, the estimated profit inefficiencies of the greenhouse farms referred to a 57 % of average inefficiency and very few farms demonstrated relatively efficient structures.

In addition to measurement of the inefficiency level, the surveyed farmers were asked to indicate their opinions on taxation system of Turkey, specifically concerning agriculture. The most significant notes retrieved are related with assessment of direct and indirect taxes imposed. 79 % of the farmers find income tax level as higher than acceptable level, while this negative perception rises to 83 % for VAT. In conformity with these results, the overall tax levels are considered as high by 85 % of the farmers.

Finally, the linear relationship between inefficiency levels of the farms and farmers' assessment of the taxation system through calculation of correlations. For the assumed linear relationship levels, it is also possible to note that the linear relationship for tax sensitive farmers is mostly negative as expected. This negative relationship refers to declination of profit inefficiency levels, meaning appreciation with regards to technical efficiency, as profit efficient farms have higher gross profit/input costs ratio. This evaluation leads us to expect more detailed quantitative analyses of the inefficiency levels.

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