



# Investigation on Corporate Tax Evasion Based on Random Selection Method—Taking Kabul City as an Example

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## Abstract

The random selection method is revolutionary for investigating sensitive issues, and its application to tax evasion in Afghanistan is still blank. Based on the random selection method of Greenberg's improved model, this paper investigates the tax evasion rate and tax evasion characteristics of enterprises in Kabul City and conducts statistical analysis and statistical tests on 1591 questionnaires recovered. The results show that the subjective tax evasion ratio of enterprises in Kabul city is lower than the expected ratio of intuitive feeling, but it is still quite serious; the tax evasion phenomenon and related institutional characteristics of enterprises in Kabul city are statistically significant. According to the conclusions of the investigation and research, the government should gradually reduce the tax burden of enterprises, further simplify the tax system, encourage the development of the tax agency industry, increase the intensity of tax inspection, and create a tax environment for honest taxpayers.

## Subject Areas

Economic

## Keywords

Random Selection Method, Warner Model, Green Berg Model, Tax Evasion, Kabul City

## 1. Introduction

Tax evasion is a serious problem in Afghanistan. However, most of the exist-

ing studies have estimated the scale and impact of the overall tax evasion amount from the macro level, and there are few credible investigations on the specific taxpayers or tax evasion issues from the micro level in Afghanistan. Tax evasion violates the tax law and the criminal law if the amount of tax evasion is huge. Since tax evasion is illegal and involves the sensitive privacy of taxpayers, it is not suitable to conduct investigations by directly asking taxpayers.

Tax research shows that tax collection has been a part of the government's revenue throughout history. For example, the prominent and well-known emperors of Afghanistan (Samanid, Ghaznavi, and Durrani) collected taxes between 819 and 1826, but despite that, there was no regular tax collection system until 2001, and taxes were collected irregularly. Since 2001, there has been extensive reformation in tax collection and related institutions [1].

The long-term growth and development of Afghanistan's economy are dependent on taxes [2]. According to another study in this area, tax evasion decreases government revenues and slows economic growth [3]. Tax evasion reduces government tax revenue that supports infrastructure and social programs [4]. SIGAR reported in 2013 that Afghan taxes consistently fall below expectations because of tax evasion and widespread corruption. Moreover, tax evasion is negatively affected by a society's general economic and non-economic policies [5] [6]. Random audits reveal widespread tax evasion among the self-employed in all organizations, which lowers government revenue [7].

In response to the phenomenon that respondents are afraid to answer truthfully in the survey of similar sensitive questions because they are worried about privacy leakage, American scholar Warner (1965) first proposed a revolutionary survey-random selection method. Compared with the direct question and answer method, the random selection method can protect the privacy of the respondents from being leaked, thereby eliminating the respondents' concerns and improving the response rate and authenticity of the respondents in such sensitive question surveys [8]. Therefore, the random selection method has been widely used to investigate many sensitive issues (such as fraud, drug use, etc.). To this end, we conducted this survey on corporate tax evasion in Kabul City using the random answer method, aiming to achieve two goals: first, to break through the limitation that the traditional direct question and answer method cannot investigate tax evasion issues, and estimate that there is corporate income tax in Kabul City. The overall proportion of enterprises with tax evasion behaviors generally infers the severity of tax evasion in the country and the severity of corporate tax evasion; the second is to test the possible relationship between corporate tax evasion and related factors, and explore the reasons according to the test conclusions: problems and defects in the field of taxation, and provide policy suggestions for the reform and improvement of Afghanistan's tax system.

## 2. The Basic Principles and Application of Random Selection Method

### 2.1. Basic Model and Technical Principle

The random selection method is based on the ideological design of “the more the privacy of the respondents can be protected, the more cooperation they can get”: by the investigators.

#### 2.1.1. Warner Base Model

In response to the sensitive questions to be investigated, Warner expressed the questions in two ways, positive and negative, and asked the respondents to choose one of the answers through a random procedure. According to the ideas of the Warner model, the tax evasion investigation must design the following two opposite questions for the respondents to answer one of them:

Question A - Do you have tax evasion behavior?

Question B - Have you not evaded tax?

Respondents decide which questions they answer through random procedures, such as rolling dice. For example, answer question A if the dice roll is 1, 2, 3 or 4; if the dice roll is 5 or 6, answer question B. Respondents can only answer “yes” or “no” to questions A and B. If the respondents answered truthfully, according to the full probability formula, the probability of answering “yes” is:

$$P(\text{answer "yes"}) = P(\text{answer question A and answer "yes"}) + P(\text{answer question B and answer "yes"}) = P(\text{answer question A}) P(\text{answer "yes" | answer question A}) + P(\text{Answer Question B}) P(\text{Answer "Yes" | Answer Question B}) \quad (1)$$

Let  $\lambda$  be the proportion of people who answered “yes”;  $\pi_A$  be the proportion of people who answered “yes” to question A (equal to The proportion of people who answered “No” in B);  $p$  is the probability of answering question A;  $n$  is the sample size. (1) can be expressed as:

$$\lambda = p\pi_A + (1-p)(1-\pi_A) \quad (2)$$

When  $p \neq 0.5$ , the estimated value of  $\pi_A$  can be obtained from Equation (2)

$$\hat{\pi}_A = \frac{\hat{\lambda} + p - 1}{2p - 1} \quad (3)$$

As long as the respondents answer honestly, it can be proved that  $\hat{\pi}_A$  is an unbiased estimate with a variance of

$$D(\hat{\pi}_A) = \frac{\pi_A(1-\pi_A)}{n} + \frac{p(1-p)}{n(2p-1)^2} \quad (4)$$

It can be seen from Equation (4) that  $D(\hat{\pi}_A)$  consists of two parts: one is to conduct a direct question-and-answer survey and assume that the variance of  $\hat{\pi}_A$  under the condition that the respondents can answer the truth (that is, the situation when  $p = 1$  or  $p = 0$ ), and the second is the variance brought about by the random program. Compared with the direct question and answer method, although the random answer method may reduce the bias of responses and non-responses in sensitive question surveys at the same time, the introduction of

random procedures will also increase the variance of the estimator. Therefore, the random selection method can show its comparative advantage only when investigating sensitive issues. At this time, the estimator is less biased, and the mean square error is smaller, thus offsetting the effect of the increase in variance to a certain extent.

The random selection method is used in the survey. When the respondents answer “yes” or “no”, they do not know whether they are answering questions A or B, which can largely eliminate the respondents’ concerns about protecting privacy of the respondents effectively. However, using mathematical statistics, investigators can obtain  $\hat{\pi}_A$  and  $D(\hat{\pi}_A)$ . In the Warner model, the value of  $p$  has a certain limit, that is,  $p \neq 0.5$ . Although  $p = 0.5$  can best alleviate the respondents’ concerns, the respondents cannot get a reasonable estimate of  $\pi_A$ ; and when  $p$  is close to 0 or 1, although  $D(\hat{\pi}_A)$  will become smaller, it greatly reduces the number of respondents due to personal information protection. Therefore, when using the Warner model, it is generally appropriate to set the  $p$ -value between 0.7 and 0.8.

### 2.1.2. Horvitz Improvement Model

Even though the Warner model is better than the direct question-and-answer method in investigating sensitive questions, the two questions designed are sensitive, and the respondents will still have great concerns. Therefore, the Warner model was improved by Horvitz introducing a non-sensitive question is completely unrelated to the sensitive question (hereinafter referred to as a non-sensitive question) to eliminate the concerns of the respondents further, thereby improving the survey results attitude of cooperation [9]. According to the idea of Horvitz’s improved model, the investigation of tax evasion can design the following two questions:

Question A: Do you have tax evasion?

Question B: Is the phone you use an Apple brand?

Of course, the introduction of non-sensitive question B can significantly reduce the sensitivity of the survey, which is beneficial to reduce the answer bias further and improve the estimation accuracy. However, this method estimates the proportion of people who answered “yes” to sensitive question A and those who answered “yes” to non-sensitive question B, thus requiring two independent samples with different probabilities. Therefore, Horvitz’s improved model is called “insensitive problem design with unknown distribution” [10].

Let  $\pi_A$  be the proportion of people who answered “yes” to sensitive question A;  $\lambda_1$  and  $\lambda_2$  are the proportion of people who answered “yes” in sample 1 and sample 2, respectively;  $p_1$  and  $p_2$  are the proportion of people in sample 1 and sample 2, respectively. The probability of answering sensitive questions A ( $p_1 \neq p_2$ );  $n_1$  and  $n_2$  are the sample sizes of sample 1 and sample 2, respectively. In the Horvitz improved model, the estimated value of  $\pi_A$  and its variance are:

$$\hat{\pi}_A = \frac{\hat{\lambda}_1(1-p_2) - \lambda_2(1-p_1)}{p_1 - p_2} \quad (5)$$

$$D(\hat{\pi}_A) = \frac{1}{p_1 - p_2} \left[ \frac{\lambda_1(1-\lambda_1)(1-p_2)^2}{n_1} + \frac{\lambda_2(1-\lambda_2)(1-p_1)^2}{n_2} \right] \quad (6)$$

### 2.1.3. Greenberg Improved Model

In Horvitz's improved model, since the distribution of insensitive problems is unknown, it will still greatly affect the estimation accuracy of  $\pi_A$ . Greenberg *et al.* (1969) further improved the Horvitz improved model. Based on maintaining the general consistency with Horvitz's improved model, Greenberg *et al.* changed the original insensitive problem of unknown distribution to the insensitive problem of known distribution [11]. Therefore, Greenberg's improved model is called "insensitive problem design with known distribution". According to the idea of Greenberg's improved model, the investigation of tax evasion can design the following two questions:

Question A - Do you have tax evasion?

Question B - Is the month of your birthday an even number?

The probability of answering "yes" to question B can be considered to be  $\pi_B = 0.5$ , as long as it is a random sample survey and the number of respondents is large enough. Greenberg's improved model reduces the number of parameters to be estimated, and the number of samples required for the survey to one and significantly improves the accuracy of estimated values for sensitive issues.

Let  $\pi_A$  be the proportion of people who answered "yes" to sensitive question A;  $\pi_B$  be the proportion of people who answered "yes" to non-sensitive question B (known);  $n$  be the proportion of people who answered "yes";  $p$  is the probability of answering sensitive question A;  $n$  is the sample size. In the Greenberg-improved model, the estimated value of  $\pi_A$  and its variance are specifically a special case of the Horvitz improved model.

$$\hat{\pi}_A = \frac{\lambda - (1-p)\pi_B}{p} \quad (7)$$

$$D(\hat{\pi}_A) = \frac{\lambda(1-\lambda)}{np^2} \quad (8)$$

Although there are other improved models based on the Warner model, the Greenberg improved model has proved to be the most successful random selection method so far and thus has become the mainstream method for investigating sensitive issues.

## 2.2. Application of Tax Evasion Investigation

Although the random selection method has been invented for 50 years, the method itself has become increasingly mature and has been widely used in the investigation of many sensitive issues, but few studies apply this method to the investigation of tax evasion. However, existing studies have shown that the random selection method has greater advantages and value than other methods in

the investigating tax evasion.

Scholars from the United States mainly carry out overseas studies, and Australia used the random answer method and the lockbox method to investigate the tax evasion of American taxpayers. The results showed that those surveyed by the random-choice method were more likely to admit to tax evasion than those surveyed by the lockbox method [12] [13]. Furthermore, the random selection method has potentially important value in the study of tax evasion [13]. The professional ethics of tax practitioners in Australia using the random answer method and direct question and answer method strongly advocated using the random answer method in the study of tax evasion [14]. Greenberg's improved model used the random answer method and direct question and answer method to conduct a questionnaire survey of Australian taxpayers and used the random answer method to examine the relationship between tax evasion and six demographic characteristics relation [15].

In Afghanistan, the application of random sampling method in investigating tax evasion has not yet been used and this is the first time that I have used random sampling method to estimate several main types of personal tax evasion in Afghanistan. I hope that this method will be a suitable and useful way to investigate tax evasion in Afghanistan in the future.

### **3. Questionnaire Design and Survey Implementation**

In Afghanistan's current tax system, the legal taxpayers of many taxes are enterprises, and enterprises mainly pay Afghanistan's tax revenue. Judging from the tax evasion cases investigated and dealt with by Kabul in recent years, almost all of them involve enterprises. Therefore, we have chosen to investigate the issue of corporate tax evasion in Kabul City.

#### **3.1. Problem Design**

We conducted this survey using a random selection method of Greenberg's modified model (*i.e.*, "insensitive question design with known distributions"). In order to investigate the proportion of tax evasion enterprises in Kabul City, we designed two questions in the questionnaire as follows:

Question 1: Does your business have tax evasion?

Question 2: Is the mantissa of your mobile number an even number?

If the respondent's birth month is between January and September, answer question 1; if the respondent's birth month is between October and December, answer question 2. We designed the above problem for the following reasons:

Firstly, on the design of insensitive problems and their probabilities through field investigations and expert interviews in the early stage, we estimated that the number of companies with tax evasion in Kabul City accounted for about 50% to 60%. Therefore, we design the non-sensitive question as to whether the mantissa of the respondent's mobile phone number is even so that the distribution obeyed by the non-sensitive question is close to the distribution obeyed by the sensitive

question, thereby improving the estimation accuracy of the sensitive question. At the same time, this non-sensitive question conforms to the principle of randomness and is simple, clear and easy to meet the investigation requirements.

Secondly, about the setting of the random program, we determined the random procedure as the birth month of the respondents, which not only conforms to the principle of randomness, but also sets the probability  $p$  of answering sensitive questions according to the needs of the survey. The most critical reason is that the random procedure for the birth month can be directly integrated into the questionnaire, making the survey process more convenient and feasible. Because the random procedure of the birth month may reduce the protection of the respondents' privacy, it is compensated by the subjective protection of anonymous filling of the questionnaire.

Finally, the setting of the  $p$ -value.  $p$  is the probability of the respondent answering the sensitive question, which has a decisive influence on the variance of the estimated value of the sensitive question. The smaller the  $p$ -value, the stronger the privacy protection of the respondents, and the more likely they are to cooperate with the investigation, but at the same time, the larger the variance of the estimator, the lower the estimation accuracy. It is generally believed that a  $p$ -value between 0.7 and 0.85 is more appropriate. In this case, the survey not only provides sufficient protection for the respondents' privacy, but also enables the respondents to obtain high estimation accuracy. Therefore, we set the  $p$ -value to 0.75 by the respondent's birth month.

In addition, in order to make the survey feasible, we integrated the random selection method into the questionnaire, and conducted the survey by distributing the questionnaire on site that was a self-made questionnaire based to insensitive question design with known distributions was designed in Persian and here I briefly add the main point of our questionnaire as follow: In the first step, we have written our two main questions; Question 1: Does your business have tax evasion? Question 2: Is the mantissa of your mobile number even? Furthermore, we have written the two known distribution questions: 1: If your birth month is between January and September, answer question 1: If your birth month is between October and December, answer question 2, and finally, add all the hypothesis. We designed the questionnaire to be the size (large, medium, and small) of the enterprises in the same industry in Kabul City.

In this way, all the respondents will not only be objectively protected by the random selection method, but also be subjectively protected by the anonymous filling of the questionnaire to eliminate the respondents' concerns as much as possible and make the survey a success.

### 3.2. Hypothesis Build

According to existing research and our field investigation in Kabul City, there may be a certain relationship between corporate tax evasion and socio-economic factors. Therefore, we establish the following 8 hypotheses (**Figure 1**) and inte-

grate them into the questionnaire. Whether these 8 hypotheses are valid will be statistically tested according to the final survey results:

**Hypothesis 1:** *Private enterprises have a higher tendency to evade tax than state-owned enterprises. In the questionnaire design, we classify all state-owned enterprises as state-owned enterprises, and other types of enterprises (foreign-funded enterprises) are classified as private enterprises as long as they have no state-owned capital.*

**Hypothesis 2:** *Domestic enterprises have a higher tendency to evade tax than foreign enterprises. In the questionnaire design, we classified enterprises established by state-owned, collective, and domestic personal assets (including five categories of state-owned enterprises, collective enterprises, private enterprises, joint ventures, and joint-stock enterprises).*

**Hypothesis 3:** *Small firms have a higher tendency to evade tax than large firms. Although the National Bureau of Statistics has specific documents on the classification of large, medium, small and micro enterprises in statistics, the classification standard is designed at the national level and varies from industry to industry. If this classification standard is used to investigate enterprises in Kabul City, not only is the questionnaire difficult to design but a sufficient sample of large enterprises cannot be obtained. In order to make the survey feasible, we designed the questionnaire to be the size (large, medium, and small) of the enterprises in the same industry in Kabul City.*

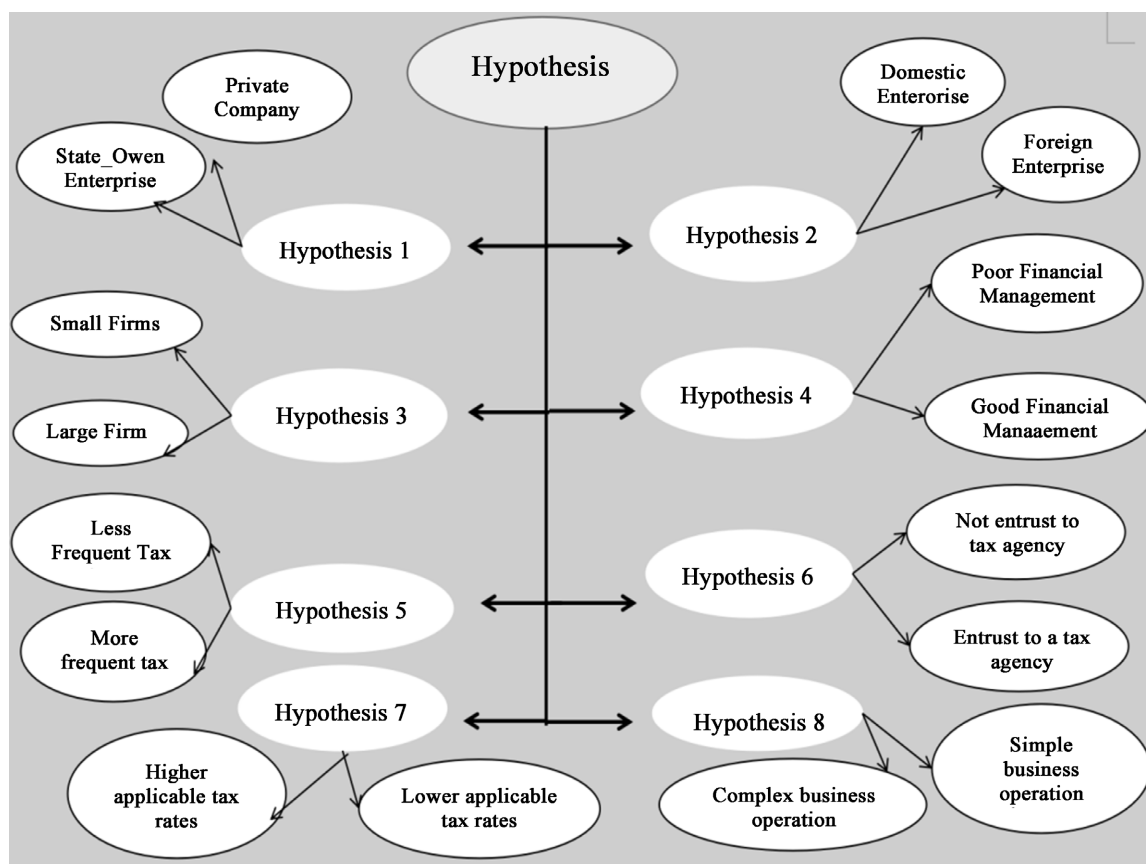
**Hypothesis 4:** *Firms with poor financial management are more prone to tax evasion than firms with good financial management. In the design of the questionnaire, according to the actual situation of enterprise financial management in Kabul City, the classification standard is whether the enterprise has a financial department with more than 3 people or whether the director of the enterprise financial department has worked for more than 10 years. Anything that exceeds the above standards is classified as a financial management standard; otherwise, it is classified as irregular financial management.*

**Hypothesis 5:** *Firms subject to less frequent tax inspections tend to evade tax more frequently than those subject to more frequent tax inspections. In the design of the questionnaire, according to the actual situation of tax collection and management in Kabul City, we classify enterprises that are inspected by the tax department less than once (including once) each year as low-frequency inspection enterprises and will be inspected by the tax department more than twice (including two times) each year. The inspected enterprises are classified as high-frequency inspection enterprises.*

**Hypothesis 6:** *Companies that do not entrust a tax agency to file their tax returns have a higher tendency to evade tax than those that entrust a tax agency to file their tax returns.*

**Hypothesis 7:** *Firms with higher applicable tax rates tend to evade tax more than those with lower applicable tax rates. Since value-added tax, business tax and corporate income tax are the main taxes paid by enterprises, in the questionnaire design, we set the applicable tax rate of value-added tax to 17%, the*





**Figure 1.** A conceptual framework diagram of 8 hypotheses.

*applicable tax rate of business tax to be more than 5% (including 5%), or the applicable tax rate of enterprise income tax to be 25% of the enterprises are classified as high tax rate enterprises, and other tax rate enterprises are classified as low tax rate enterprises.*

**Hypothesis 8:** *Companies with complex business operations are more prone to tax evasion than those with simple business operations. In the questionnaire design, we asked the respondents to answer whether the tax-related policies of their companies' business operations are simple or complex.*

### 3.3. Investigation and Implementation

Because the financial personnel of the enterprise have the best understanding of whether the enterprise has evaded tax and are most suitable to be the respondents of this investigation, we use the various districts of Kabul and the Kabul City Local Taxation Bureau to organize successively in 2019 and 2020. Only one survey is conducted in all corporate taxation counseling training conferences, and only one survey questionnaire is issued for an enterprise with more than one person attending the conference.

In order to eliminate the concerns of the financial personnel of the surveyed enterprises, we first indicated the academic identity of the investigators at the same time, expressed the desire to understand the severity of the corporate tax

burden through this survey to provide a reference for Afghanistan's tax system reform. To this end, we also set up questions about the severity of corporate tax burden and the direction of tax reform in the questionnaire. Then, we explained the random selection method and relevant matters in the questionnaire so that the financial personnel of the surveyed enterprises could fully understand the objective protection of their privacy by the random selection method. Most corporate financial personnel on the scene cooperated because they were concerned about the corporate tax burden and tax system reform we mentioned. Some corporate financial personnel even became interested in applying the random selection method. Through the on-site questionnaire survey of a total of 14 corporate taxation counseling training conferences held by 9 district bureaus (including directly affiliated branches) of Kabul Province Taxation Bureau and 5 district bureaus (including directly affiliated branches and foreign-related branches) of Kabul districts, We finally collected a total of 1591 valid questionnaires.

## **4. Results Analysis and Policy Recommendations**

### **4.1. Analysis of Results**

After sorting out the data collected from the questionnaires, we use the Social Science Statistical Package (SPSS) to analyze the survey data, mainly estimating the proportion of tax evasion enterprises in Kabul City and 8 hypotheses reliability analysis.

According to the collected questionnaire data, we used the basic formula of random selection method to estimate that the number of tax evasion enterprises in Kabul City accounted for 25%. This proportion is much lower than our estimate of 50% to 60%. The reasons may be as follows: First, the psychological amplification effect caused by media reports, academic research and professional characteristics may make the public overestimate the severity of corporate tax evasion; Second, corporate financial personnel generally interpret tax evasion as a subjective and intentional act in a narrow sense, rather than objectively underpaying tax due to negligence in work or misunderstanding of tax policies as tax evasion; There are concerns that the answer may not be true.

The assumptions we established earlier have been divided into two types of enterprises to compare the tax evasion propensity, and the tax evasion of enterprises can also be regarded as a categorical variable. Therefore, base on calculating the tax evasion proportion of various enterprises, the final result is that hypotheses 1, 6, 7, and 8 are basically valid; hypotheses 2, 3, 4, and 5 are basically invalid.

Assumption 1 is basically established, and it can be shown that there are differences in the risks and benefits of tax evasion between private enterprises and state-owned enterprises. For state-owned enterprises, tax evasion brings limited benefits to enterprise managers, and sometimes the high tax amount will become one of the political achievements of enterprise managers, and tax evasion is in-

investigated and punished, bringing high occupational risks to enterprise managers. For private enterprises, tax evasion can directly bring benefits to business owners, and tax evasion usually only brings economic risks. Hypothesis 6 basically established can show that: Afghanistan's tax agency structure and its professionals have played a certain positive role in reducing corporate tax evasion. Assumption 7 is basically established, it can be shown that: when the taxation department has limited tax collection and management capacity, and the inspection rate and penalty rate are both low, raising the tax rate will only increase the tax evasion motivation of enterprises. Assumption 8 is basically established, it can be shown that the more complicated the tax-related business operations of an enterprise, the greater the loopholes in the tax law and the greater the space for tax evasion.

Reasonable explanations for hypotheses 2, 3 and 4 are basically untenable: the enterprise aims to make profits, and the tax environment of the whole society and the tax compliance of enterprises in the same industry have a greater impact on whether an enterprise pays taxes according to law. It is generally believed that increasing the frequency of tax inspections will increase the probability of tax evasion detection, thereby reducing tax evasion. Reasonable explanations for the basic failure of Hypothesis 5 are as follows: first, the frequency of inspections in the questionnaire design is not significantly different; second, the daily inspections by tax personnel are sometimes not in-depth; third, companies with a high frequency of tax inspections sometimes have more serious tax evasion enterprises.

## **4.2. Policy Suggestions**

This paper's investigation of corporate tax evasion in Kabul City shows that corporate tax evasion may not be as common and serious as intuitive perception. Of course, to further reduce enterprises' subjective tax evasion, policymakers should consider the following policy suggestions. The first is to reduce the corporate tax burden gradually. Goods and services tax and corporate income tax rates should be reduced. The second is to simplify the tax system further. The tax system's complexity should be gradually reduced, and by strengthening tax publicity and tax services, corporate financial personnel should be guided to understand and master tax laws accurately. The third is to encourage the development of tax agency industry. The generalization of tax agency is conducive to standardizing enterprises' taxation behavior and greatly reducing enterprises' tax evasion behavior. The fourth is to increase tax inspection efforts, strengthen the tax-related monitoring of the daily business behavior of enterprises, increase the frequency of tax inspections, and increase the inspection and punishment of tax evasion by enterprises. The fifth is to create a tax environment for paying taxes in good faith. The tax credit system and tax service classification management should be improved, and at the same time, a tax co-governance pattern of "government leadership, departmental coordination, and social participation" should

be accelerated.

## Conflicts of Interest

The authors declare no conflicts of interest.

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