Value-Added Tax Evasion through Reduced Tax Rate: A Field Study from an Emerging Economy

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Abstract

As vast majority of countries use standard and reduced value-added tax (VAT) rates, a taxpayer may be motivated to misuse the reduced rate – to calculate it when standard rate should be applied. Therefore, the main objective of the paper is to examine the extent to which VAT is evaded in this way and to study the most important determinants of it. The field research on bakeries in the emerging economy of Serbia showed that nearly a quarter of them misuse reduced VAT rate. Logistic regression showed that bakeries registered in VAT system for a shorter time and those located in smaller municipalities are more probable to misuse the reduced VAT rate. I argue that national tax authorities should not only have a role in punishing taxpayers, but also to educate them. They should also reconsider the scope of general and reduced VAT rates, reconsider punishing system and develop an electronic register of VAT regulation to make it easier accessible.

Keywords: *value-added tax, reduced tax rate, tax evasion, bakeries, logistic model, emerging economies*

JEL Classification: H25, H26

DOI: https://doi.org/10.31577/ekoncas.2026.01-02.03

Article History: *Received*: January 2025 *Accepted*: February 2026

Introduction

Newspapers in emerging countries often report on tax evasion conducted by retail stores, with many of them focusing on bakeries. The majority of the taxes in bakeries are evaded through unreported sales – sales without invoice issued (Matthews and Lloyd-Williams, 2001; Battiston and Gamba, 2016). In this way,

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a significant portion of value-added tax (VAT) in baking industry has been evaded. However, bakers also employ many other tactics to evade tax that are not studied enough in the scientific literature and media.

Bearing in mind that VAT is self-assessed system (a company that buys inputs deducts VAT that is calculated by a company that sells outputs), proponents of the VAT claim it would increase much-needed public revenue and improve tax administration and compliance (Keen and Lockwood, 2010; Brockmeyer et al., 2024). VAT is particularly important for emerging countries, as they usually rely more on consumption taxes and impose little tax burden on corporate income in order to attract foreign investments (Besley and Persson, 2014). Some microeconomic effects are also evident, particularly in emerging countries, since the implementation of the VAT may increase investment efficiency and liquidity of the companies (Bai and Wu, 2022).

However, as any another tax, VAT is prone to many weaknesses since companies developed many tactics to legally avoid and illegally evade it (Arltova et al., 2020). Some tactics are employed at the cross-national level (for instance carrousel fraud), while others are employed at the national level (for instance misuse of the reduced VAT rate). Since bakery industry in emerging countries is dominated by a large number of small bakeries, they are more likely to employ VAT evasion tactics at the national level.

The subject of the paper is misuse of the reduced VAT rate in Serbia. VAT system in Serbia prescribes two rates: standard of 20% and reduced of 10%. Since tax morale in Serbia, like in many other emerging, transition and post-transition countries, is relatively low (Daude et al., 2013), the misuse of the reduced VAT rate may be an attractive strategy to evade tax. Misuse of the reduced VAT rate refers to the situation in which a company chooses to calculate reduced VAT rate, although standard VAT rate should be calculated.

I have chosen to study bakery industry due to various reasons. First, bakeries, fast-foods and restaurants are often emphasized in the tax evasion context (Matthews and Lloyd-Williams, 2001). Second, bakeries are often tax-audited in Serbia with significant tax fraud detected in such audits. Third, bakery industry offers wide variety of products that are taxed with different (standard or reduced) VAT rates.

In addition, three main objectives of the paper may be identified. The first objective is to estimate a share of bakeries that misuse the reduced VAT rate in Serbia. The second objective is to examine the impact of firm-specific and demographic characteristics on the misuse of the VAT rate. The third objective is to make some recommendations in order to achieve higher level of tax compliance in Serbia.

I use logistic regression to analyze the misuse of the reduced VAT rate in the bakery industry as industry in which a portion of products are taxed at the standard

VAT rate, while the rest are taxed at the reduced VAT rate. This research is based on the primary field data as I have visited fifty bakeries and studied the VAT rate they calculated on the sale of pizza slice – a product that should be taxed with 20% VAT rate. In general, I found that nearly a quarter of bakeries misuse the reduced VAT rate. In addition, I found that bakeries that are registered in VAT system for a shorter time and those located in smaller municipalities are more probable to misuse the reduced VAT rate.

The author believes that the research may be of interest to many interest groups, in particular to the national tax authorities and to the owners and management of bakeries. Research aims to make recommendations to national tax authorities in order to enhance VAT compliance in the bakery industry. Furtherly, research results may clarify the taxation of the bakery products, helping bakeries to avoid problems during the tax audit.

This study complements the prior studies in several ways. First, I add to the existing research on the VAT evasion. Although important, VAT is often neglected in the research, primarily due to the fact that some of the most developed countries (such as USA) do not implement VAT (Zhang et al., 2021). Focus of the tax research is primarily on the corporate income tax avoidance and evasion (for instance Bona-Sanchez et al., 2020; Garcia-Blandon et al., 2021; Gill et al., 2022; Pavel et al., 2024), even in the emerging countries, although corporate income tax rates in these countries are usually lower.

Second, majority of the research on VAT evasion and misuse of the reduced VAT rate is conducted in developed countries (Matthews and Lloyd-Williams, 2001; Battiston and Gamba, 2016; Hopland and Ullmann, 2020), while such research in emerging countries is highly scarce (Yusof et al., 2014). Third, although both VAT evasion in bakeries (Battiston and Gamba, 2016) and misuse of the reduced VAT rate (Hopland and Ullmann, 2020) were subject of some empirical research, to the best author's knowledge, this is the first empirical research to study the misuse of the reduced VAT rate in the bakery industry. Fourth, I add to the highly scarce scope of the field studies on tax evasion (Mascagni, 2018), as prior research primarily use secondary data from questionnaires or from tax returns (Batra et al., 2003; Alm and McClellan, 2012; Beck et al., 2014; Abdixhiku et al., 2017; Hopland and Ullmann, 2020; Payne and Saunoris, 2020).

Except for the introduction and conclusion, the paper consists of four parts. In the Section 1, the literature review is presented and the research hypotheses are developed. Section 2 presents institutional background, overviewing VAT in Serbia and VAT on bakery products. Research methodology is given in the third section, while research results and discussion of the results are given in the fourth section of the paper.

1. Literature Review

1.1. Reduced Rates in the VAT System

Almost each European country (Bosnia and Herzegovina and Denmark are rare exceptions) implements VAT system with multiple (usually two) rates. Besides standard VAT rate, a reduced VAT rate is implemented, aiming to relax the tax burden on basic human needs and/or encourage the consumption of certain goods and services. Usually, reduced VAT rates are implemented on the consumption of some basic foodstuffs, public transport, daily newspaper etc. (Boeters et al., 2010). Given the well-known regressivity of the VAT (Thomas, 2022), reduced VAT rate aims to mitigate it and to furtherly reduce income inequality, though these effects are questioned in the literature (Boeters et al., 2010).

Many authors (Keen and Smith, 2006; Borselli et al., 2012; De La Feria and Schoeman, 2019) point out at the tax evasion through the misuse of the reduced VAT rate. In other words, a seller of the article may calculate reduced VAT rate although tax regulation prescribes that the consumption of this article should be taxed with the standard VAT rate. Arltova et al. (2020) suggest that misuse of the reduced VAT rate is one of the least sophisticated methods for tax evasion, though national tax authorities are still not fully able to mitigate and eliminate it.

VAT regulation is often perceived as relatively complex and hard to comply with (Schoonjans et al., 2011). Richardson (2006) stresses that tax regulation complexity and tax evasion may be positively correlated. In this regard, given a wide variety of product across the world, it is not easy for the tax regulation to clearly prescribe which products should be taxed with reduced rate. Therefore, misuse of the reduced VAT rate may be a result of the intentional (conscious) tax evasion motives, but also of the unintentional (unconscious) mistakes during the preparation of the tax return (Hopland and Ullmann, 2020).

Monitoring the appropriate implementation of the reduced VAT rate may be a challenging task for national tax authorities, since tax auditors have to know a wide variety of products that are taxed with the reduced VAT rate. In this regard, Kasper and Alm (2022) argue that fraudulent taxpayers may become even more tax fraudulent if they are tax audited and auditors do not detect any fraud. On the other hand, some authors call for the careful tax audit and punishment of newly established taxpayers that evade VAT, since a significant portion of them dissolves their business after the tax audit (Belnap et al., 2022).

Studies that deal with the misuse of the reduced VAT rate are particularly evident in the food industry (Cnossen, 2018; Hopland and Ullmann, 2020) as some nearly similar food products may be taxed with different VAT rates. Studying restaurants in Germany, Hopland and Ullmann (2020) find that many restaurants tend

to overreport take-away consumption and underreport on-site consumption as take-away is taxed with a lower VAT rate than the on-site consumption. Furtherly, Matthews and Lloyd-Williams (2001) also argue that restaurant and take-away industry are critical from the VAT aspect as they may tend to underreport sales and overreport VAT paid on inputs. This may partly be a result of the fact that some products are taxed with the standard VAT rate, although major inputs of it are taxed with the reduced VAT rate.

1.2. Determinants of VAT Evasion

Many studies on the tax evasion and its determinants have been conducted, both in developed (for instance Engstrom and Holmlund, 2009; Schoonjans et al., 2011; Hopland and Ullmann, 2020) and emerging countries (for instance Yusof et al., 2014; Mawejje and Okumu, 2016; Mohamad et al., 2016; Abdixhiku et al., 2017; Payne and Saunoris, 2020). Wide variety of potential determinants is studied, though the consensus about their impact is yet to be reached, primarily due to cross-national differences in tax regulation and tax morale (Richardson, 2006).

Vast majority of the research on tax evasion and its determinants is based on the data from international surveys – mostly The World Bank Enterprise Surveys – WBES (Batra et al., 2003; Tedds, 2010; Beck et al., 2014) and Business Environment and Enterprise Performance Survey – BEEPS (Alm and McClellan, 2012; Abdixhiku et al., 2017; Payne and Saunoris, 2020). Significantly lower number of studies are based on other data sources, such as data from field studies (Battiston and Gamba, 2016) or national tax authorities (Hopland and Ullmann, 2020).

Most studies that used data from international surveys find the negative impact of company size on the tax evasion, both in developed (Batra et al., 2003; Tedds, 2010; Beck et al., 2014) and emerging (Abdixhiku et al., 2017; Payne and Saunoris, 2020) countries. More precisely, Batra et al. (2003) find that companies that produce for the domestic market are more probable to evade consumption tax, while Tedds (2010) notes that smaller companies report less sales, thus evading more consumption tax. Alm and McClellan (2012) explain that smaller companies may find it easier to avoid the attention of tax authorities as tax authorities at some point face diminishing returns in pursuing smaller businesses.

Yusof et al. (2014) conclude that larger companies in emerging countries evade taxes to a lesser extent as they have enough resources to finance legal tax planning and enough political power to influence tax regulation and, in this way, legally avoid tax liabilities. On the example of corporate income tax, Gill et al. (2022) argue that large companies from emerging countries, with multinational presence, avoid taxes through profit shifting to low-tax jurisdictions and tax havens.

Besides intentional tax evasion, smaller companies may also be more prone to the tax compliance problems. Since VAT compliance is one of the main components of companies' tax compliance costs (Eichfelder and Vaillancourt, 2014), Schoonjans et al. (2011) argue that such costs are relatively higher for smaller companies. In this regard, smaller companies are more likely to have obstacles in order to become compliant with tax regulation. In line with the results of prior research, I have formulated the first research hypothesis as follows:

H1: Smaller bakeries are more probable to evade VAT through reduced rate than larger bakeries.

Longer involvement in the VAT system may enable companies to gain further tax education, thus making less mistakes in the VAT calculation. Park and Hyun (2003) point out at the tax education as one of the effective tools to achieve tax compliance. In this regard, experimental study by Hageman (2010) finds that less-experienced tax preparers may have lower levels of confidence or, on the other hand, may be overconfident when preparing tax returns, which may lead to mistakes and unintentional tax evasion. Beck et al. (2014) also confirm that younger companies evade a higher share of taxes.

On the other hand, some other studies offer different findings. Some studies (Batra et al., 2003; Tedds, 2010) find that age of the company does not have the impact on unreported sales, while Mawejje and Okomu (2016) find that older companies possibly engage more in tax evasion, as more experienced managers may establish better relationships with the tax administration. In line with the results of prior research, I have formulated the second research hypothesis as follows:

H2: Bakeries registered in VAT for shorter time are more probable to evade VAT through reduced rate than bakeries registered in VAT for longer time.

Bergner and Heckemeyer (2017) argue that owners often choose the organizational form of their businesses that minimizes tax complexity and costs of tax compliance. In particular, small taxpayers (particularly individual entrepreneurs) perceive VAT as complex and often seek to avoid registration in the VAT system. When they reach the VAT exemption threshold and have to register in the VAT, they may cope with many tax compliance problems. Data from the WBES survey also show that individual entrepreneurs are among least compliant economic agents (Tedds, 2010).

Harju et al. (2019) argue that many individual entrepreneurs prefer to stay below VAT exemption threshold due to large compliance costs (understanding the VAT system, filing of VAT returns etc) and, as a result, evade sales taxes to a larger extent than companies. In fact, taxes evaded by individual entrepreneurs are one of the biggest concerns for national tax authorities, even in developed countries,

such as USA (Slemrod, 2007) or European Union (EU) members (Engstrom and Holmlund, 2009).

On the other hand, companies may also look to avoid registration in the VAT. Onji (2009) shows that some companies tend to masquerade as many small companies in order to avoid threshold for VAT registration. In addition, Batra et al. (2003) show that mode of ownership does not have the impact on underreporting of revenue and VAT evasion. In line with the results of prior research, I have formulated the third research hypothesis as follows:

H3: Individual bakery entrepreneurs are more probable to evade VAT through reduced rate than bakery companies.

Majority of the prior research find that taxpayers located in smaller municipalities are more probable to evade taxes. In this regard, Vo et al. (2020) stress that the strength of tax regulation in smaller cities of emerging countries may be reduced, as it can be difficult for tax auditors to visit companies in these cities on frequent basis. In other words, physical isolation of the companies from the economic center of the country may facilitate their tax evasion. Beck et al. (2014) confirm that firms located in smaller towns evade a higher share of taxes.

Regarding emerging countries, Mohamad et al. (2016) find that tax evasion is the greatest among small and medium-sized companies located in suburban areas of Malaysia, though Ross and McGee (2011) find non-linear relation for Malaysian companies between size of the city and tax evasion. On the other hand, Batra et al. (2003) find that companies located in large cities tend to engage more in unofficial activity, thus evading taxes. In line with the results of prior research, I have formulated the fourth research hypothesis as follows:

H4: Bakeries in smaller municipalities are more probable to evade VAT through reduced rate than bakeries in larger municipalities.

2. Institutional Background

2.1. VAT in Serbia

VAT system in Serbia is implemented in 2005, making Serbia one of the latest countries in Europe to implement it. When implemented, standard rate was 18% and reduced rate was 8%. From October 2012, the standard rate is set at the current 20%, while from January 2014, the reduced rate is set at the current 10%.

VAT regulation in Serbia is mostly adjusted with the EU regulation, as Serbia is recognized candidate for the EU membership. Therefore, the credit VAT system is implemented in Serbia, in which companies calculate VAT on sales and deduct VAT on inputs purchased. Companies are required to pay the difference between

calculated and deducted VAT no later than 15 days after the tax period. VAT regulation prescribes that tax period may be one month or three months. In this regard, companies that recorded sales more than 50 million Serbian dinars in the past twelve months have to be monthly taxpayers.

VAT threshold in Serbia is eight million Serbian dinars, meaning that companies that in the twelve-months period recorded a higher amount of sales revenue have to register in the VAT system. Companies with lower sales revenue may opt to register in the VAT system.

Like most of the European countries, Serbia implements reduced VAT rate to reduce regressivity of the consumption taxes and foster the consumption of certain goods and services. In this regard, reduced VAT rate is applied on some basic foodstuffs (like bread and other bakery products, milk and dairy products, salt, flour, sugar, oil), daily newspapers and publications, medicines, public transportation services etc. Arsić and Altiparmakov (2013) stress that 40% of the trade in Serbia belongs to the goods and services taxed at the reduced VAT rate.

Although been designed in line with the EU regulation, the VAT system in Serbia has a significant room for improvement. First, Serbian Ministry of Finance issued many opinions on the implementation of the VAT system, but the electronic database with these opinions is yet to be developed, thus making it difficult to the companies to access them. These opinions are primarily related to the VAT rate that should be applied on certain product or the right of the company to deduct VAT on certain purchase. Second, the classification of products on those taxed at standard and those taxed at reduced rate is currently highly critical. For instance, some non-essential products (like chocolate milk or fruit yogurt) are taxed at the reduced rate (as they are considered as dairy products), while some products that seem to be more essential (as bottled water) are taxed at the standard rate.

Third, due to abundant regulation, the VAT system was treated as a highly complex, though some improvements have been made. For instance, from the 1 July 2021, Serbia implemented the Rulebook on the Value Added Tax that integrated 27 bylaws that were in force. Fourth, there are some specific features of the VAT calculation in certain industries. For instance, in construction and secondary raw materials sector, the VAT is calculated on the basis of reverse-charge mechanism. In addition, VAT regulation prescribes a special VAT rate of 8% on the purchase of agricultural products from the agricultural entrepreneurs and agricultural holdings.

2.2. VAT on Bakery Products

Despite its almost two-decade implementation, the VAT system produces many questions regarding the classification of goods and services on those taxed at the standard and those taxed at the reduced rate, particularly in the food industry.

In Serbia, the distinction between standard and reduced VAT rate in bakeries is prescribed by various types of regulation. The Law on the Value Added Tax (The Official Gazette of the RS, 138/2022) stands at the top of regulation hierarchy, prescribing that the trade of bread and other bakery products is taxed at the reduced VAT rate.

However, this law does not furtherly explain the goods that belong to the "bakery products". The second level of the regulation hierarchy, the Rulebook on the Value Added Tax (The Official Gazette of the RS, 59/2022) prescribes that bakery products refer only to the traditional bakery products like pies, rolls, pastries, croissants, donuts etc. In addition, some drinks like milk and yoghurt are taxed at the reduced VAT rate.

The third level of the regulation hierarchy are opinions of the Ministry of Finance as it published several opinions regarding the taxation of bakery products. These opinions are mainly published in the monthly Bulletin of the Ministry of Finance, though there are many opinions that are privately issued and may not be publicly accessed. In this regard, Ministry of Finance issued on the 19 October 2005 the opinion on the tax treatment of the trade and import of the pie crusts and pizza. In this opinion, the Ministry stated that the trade and import of the pizza should be taxed at the standard VAT rate, as pizza should not be considered as bakery product. This opinion is publicly accessible at the official website of the Ministry of Finance.

Furtherly, the Ministry of Finance issued on the 27 January 2006 the opinion on the VAT rate that should be applied on the trade of sandwiches and pizza. The Ministry confirmed previous opinion as it stated that both sandwiches and pizza should not be considered as bakery products and thus should be taxed at the standard VAT rate.

However, this opinion is not publicly accessible and I have been given this opinion on the own request to the Tax Administration of Serbia.

To furtherly confirm that pizza slice should be taxed at the standard VAT rate, I have sent the e-mail request to the contact center of the Tax Administration of Serbia. The contact center answered that trade of the pizza slice should be taxed at the 20% VAT rate and also presented us previously mentioned opinions of the Ministry of Finance.

It is obvious that Serbian law-makers and national tax authorities consider pizza as fast-food product, not as a bakery product. Such opinion is also in line with some scientific work as Kaynak et al. (1996) argue that sandwiches, hamburgers and pizza belong to the fast-food. Taxing pizza at the higher VAT rate is also in line with arguments that fast-food should be heavily taxed (Steenhuis et al., 2011) due to its negative implications on human health.

3. Research Methodology

3.1. Design of the Field Research

Since the data about tax evasion is hard to be extracted from the financial statements, many authors use online available surveys such as WBES (Batra et al., 2003; Beck et al., 2014) or BEEPS (Alm and McClellan, 2012; Abdixhiku et al., 2017; Payne and Saunoris, 2020). However, Kundt et al. (2017) argue that self-assessments by respondents in surveys may suffer from the reluctance of the respondents to reveal their own illicit behavior. Gerxhani (2007) adds that respondents in such surveys may be reluctant to admit tax evasion, with this problem being particularly emphasized in emerging and transition countries.

Therefore, I have opted to use primary data from own field study. Field studies in the taxation area gained significant attention in previous years (Mascagni, 2018). In addition, taxation of the bakery industry has been subject of some field research. For instance, Battiston and Gamba (2016) make a field study on Italian bakeries to check whether they issue fiscal invoices. To investigate whether bakeries in Serbia apply standard or reduced VAT rate on the trade of pizza slice, I have visited 50 randomly selected bakeries (located in 15 municipalities) that are registered in the VAT system (calculate VAT on sales and deduct VAT on inputs purchased) and bought a pizza slice.

To secure the homogeneity of the sample, I have sampled only pizza slice in the conical shape (a quarter, a sixth or an eight from the circled pizza). In this regard, I have not sampled small circled pizza as I argue it cannot be considered as a pizza *slice*. Furtherly, I have sampled only basic type of pizza (so-called *capricciosa*), opting not to sample other pizza types. If necessary, I have asked for the fiscal invoice as I did not intend to check the issuance of the invoice, but to study its content. Some larger bakery companies have multiple sales objects, but I sampled only one sales object per company as I argue that the unified software is applied at the company-level, so it is rational to assume that the applied VAT rate is the same in each sales object. Structure of the sample is presented in Table 1.

Bakery sector in Serbia is highly segmented as it is dominated by a large number of small bakeries. Most of them are not registered in the VAT system, reducing significantly the sample. In fact, the Covid-19 pandemic heavily influenced the bakery industry. Many bakeries dissolve their business – some only formally remained active in the Serbian Business Registers Agency, while others are officially liquidated. In addition, many bakeries went out of the VAT system as they reduced the sales revenue below the threshold for the VAT registration. Some bakery companies (and some of them among the largest bakeries in the country) closed the retail sales objects and remained active only in the wholesale sector.

T a b l e 1

Structure of the Sample

Municipality population	**Number of sales objects**
0 – 50.000	14
50.001 – 100.000	8
100.001 – 150.000	19
150.001 – 200.000	9
Form of organization	**Number of sales objects**
Individual entrepreneur	33
Limited liability company	16
Joint-stock company	1
VAT period	**Number of sales objects**
One month	36
Three months	14

Source: Author.

I have also opted not to sample fast-food shops as they (almost) fully offer only products that are taxed at the standard VAT rate. On the other hand, it is not easy to distinguish bakeries and fast-food shops, but I treated the sales object as a bakery if it offers many products taxed at the reduced VAT rate. In addition, I have not sampled bakeries that are not registered in the VAT system as they trade all products with the 0% VAT rate and do not face the dilemma regarding the appropriate VAT rate.

3.2. Statistical Methodology

Since the usual linear regression may not be the appropriate method when dependent variable is binary (takes value null or one), I have opted to use logistic regression. This method has been widely used in the tax research when dependent variable is binary (Lanis and Richardson, 2011). In line with logistic regression theory, binary model (with binary dependent variable y and vector of independent variables x_i) is often motivated as a latent variables specification. Suppose that there is an unobserved latent variable y_i^* that is linearly related to x, with u_i being a random disturbance:

$$y_i^* = x_i^{'}\beta + u_i \tag{1}$$

Then the observed dependent variable is determined by whether y_i^* exceeds a threshold value of zero:

$$y_i = \begin{cases} 1 \; if \;\; y_i^* > 0 \\ \quad V \\ 0 \; if \;\; y_i^* \le 0 \end{cases} \tag{2}$$

Under such specification, based upon the cumulative distribution function for the logistic distribution, the probability of observing a value of one and null is as follows:

$$\Pr\left(y_i = 1|x_i, \beta\right) = 1 - \frac{e^{-x_i'\beta}}{1+e^{-x_i'\beta}} = \frac{e^{x_i'\beta}}{1+e^{x_i'\beta}} \tag{3}$$

$$\Pr\left(y_i = 0|x_i, \beta\right) = \frac{e^{-x_i'\beta}}{1+e^{-x_i'\beta}} \tag{4}$$

In the Table 2 are presented variables employed in the research. I designed the research model with binary dependent variable *FRAUD* that takes value 1 if a bakery is fraudulent – misuses reduced VAT rate and sells pizza slice with 10% VAT and value 0 otherwise. Regarding independent variables, I measure size of a bakery with number of employees (*SIZE*) instead of usual financial statement indicators, such as total assets or equity (Chen et al., 2010; Panda and Nanda, 2020). As financial statements in emerging countries may be unreliable (Li et al., 2014), particularly if they are not audited, it is worth noting that most of the sampled bakeries do not audit their financial statements. In addition, most of the sampled bakeries are individual entrepreneurs, for which it is hard to distinguish between theirs private and business assets. Since underreporting of sales is significant problem in Serbia (Kundt et al., 2017), revenue reported in income statement might also be unreliable.

In previous tax research in emerging countries (Chen et al., 2010; Tedds, 2010; Panda and Nanda, 2020), age of the firm is often used as an independent variable. However, I have opted to measure experience of a bakery in the VAT system (*TIME*) rather than its age, since I am interested only in bakeries that are registered in the VAT system. In addition, I have included binary independent variable *LEGAL* to distinguish between individual bakery entrepreneurs and bakery companies. I have measured the size of the municipality with the number of inhabitants (*POPUL*).

T a b l e 2

Variables Definition

Variable	Definition
FRAUD	0 if a fiscal invoice contains true VAT rate (20%); 1 if a fiscal invoice contains wrong VAT rate (10%)
SIZE	Number of employees in a sampled organization (according to the Serbian Business Registers Agency, <apr.gov.rs>)
TIME	Natural logarithm of the time in the VAT system in years: date of fiscal invoice issuance minus date of entering the VAT system (according to the Serbian Tax Administration, <purs.gov.rs>)
LEGAL	0 for individual entrepreneur; 1 for companies (limited liability and joint-stock companies)
POPUL	Natural logarithm of the estimated number of inhabitants in the sampled municipality on 30 June 2021 (according to the Serbian Statistical Office, <stat.gov.rs>)

Source: Author.

4. Results and Discussion

4.1. Descriptive Statistics

Results of the descriptive statistics are presented in the Table 3. In general, twelve out of the sampled fifty bakeries misuse reduced VAT rate as they sell pizza slice with the 10% VAT rate, implying that as much as 24% of bakeries misuse reduced VAT rate.

It is worth noting that in some small municipalities, there was only one bakery or only two bakeries that are registered in the VAT. In some of such municipalities, each bakery was fraudulent, implying 100% of bakeries that misuse reduced VAT rate. High percentages of the fraudulent behavior were also noted in some larger municipalities. For instance, in one larger municipality (with more than 100,000 inhabitants), 40% of the sampled bakeries were fraudulent. On the other hand, in the largest observed municipality none of the nine sampled bakeries were fraudulent.

T a b l e 3

Descriptive Statistics

	Mean	Median	Minimum	Maximum	Standard deviation
FRAUD	0 for 38 observations; 1 for 12 observations				
SIZE	90.520	16.000	2.000	1,799.000	285.343
TIME	2.176	2.490	0.207	2.896	0.760
LEGAL	0 for 33 observations; 1 for 17 observations				
POPUL	11.323	11.624	9.157	12.097	0.716

Source: Author.

Regarding some independent variables, most sampled bakeries are relatively small. Fourteen bakeries have ten or less employees, while twenty-nine bakeries have twenty or less employees. The average sampled bakery is registered in the VAT system for nearly eleven years. In addition, in the sample are many bakeries that are registered in the VAT system for a short time (thirteen bakeries are registered for less than five years), but also many that are registered for a long time (twelve bakeries are registered for more than fifteen years).

During the sampling process, there were noted some interesting situations. First, in a small municipality, the worker printed the fiscal invoice, then immediately crumpled it up and threw in the bin. Upon my request, the worker issued the fiscal invoice, after recording the sale again in the cash register. In this way, the worker doubled the sale in the cash register.

Second, new fiscalization started in May 2022 and produced several problems for sales objects. In this regard, one sales object issued fiscal invoice without the name of the company, but with the Tax Identification Number and address. Third,

only 12 out of 50 sampled sales objects allowed the payment with debit card, while one sales object allows such payment only for payments higher than two hundred Serbian dinars.

4.2. Regression Estimates and Discussion

Before the regression estimation, I have conducted the univariate analysis to check for the presence of multicollinearity in the designed model. In this regard, the correlation matrix with Pearson's correlation coefficients is presented in the Table 4. As there are not the variables that are strongly correlated, the multicollinearity problems are not expected. The strongest correlation among independent variables appears between size of the bakery and its form of organization, though this correlation is only moderate.

T a b l e 4

Pearson's Correlation Matrix

	FRAUD	SIZE	TIME	LEGAL	POPUL
FRAUD	1.000				
SIZE	–0.152	1.000			
TIME	–0.368***	0.168	1.000		
LEGAL	–0.206	0.341**	0.249*	1.000	
POPUL	–0.490***	0.124	0.156	0.252*	1.000

Note: *, **, and *** denote statistically significance at the 10%, 5% and 1% level, respectively.

Source: Author.

Logistic regression estimates are presented in the Table 5. Besides multiple regression model (with four independent and one dependent variable), there are also presented four separate regression models, with one independent and one dependent variable. These models show that bakeries with less experience in the VAT system are significantly more probable to misuse the reduced VAT rate and to sell pizza slice with the 10% VAT. In addition, bakeries located in smaller municipalities (with less inhabitants) are significantly more probable to commit such fraud. Size of the bakery and its form of organization do not appear to significantly influence the fraudulent behavior of the bakeries.

Size of the bakery (measured by the number of employees) does not appear to significantly influence probability of misuse of the reduced VAT rate, implying that national tax authorities should pay equal attention to the smaller and larger bakeries. In fact, 25 smallest sampled bakeries has a higher rate of the misuse of the reduced VAT rate (8 out of the 25 or 32%) than the 25 largest sampled bakeries (4 out of the 25 or 16%), but this difference does not appear to be significant in the regression analysis.

T a b l e 5

Logistic Regression Estimations

	Dependent: FRAUD				
Constant	21.563*** (2.590)	–0.259 (–0.442)	1.0231 (1.104)	–0.833** (–2.199)	17.692*** (2.702)
SIZE	–0.011 (–0.456)	–0.041 (–1.301)			
TIME	–1.090* (–1.938)		–1.066** (–2.414)		
LEGAL	0.325 (0.313)			–1.182 (–1.403)	
POPUL	–1.824** (–2.509)				–1.686*** (–2.866)
McFadden R^2 LR Statistic Observations	0.336 18.544*** 50	0.114 6.271** 50	0.114 6.282** 50	0.042 2.308 50	0.209 11.515*** 50

Note: beta coefficients in front of parentheses, z-statistics in parentheses; *, **, and *** denote statistically significance at the 10%, 5% and 1% level, respectively.

Source: Author.

Although smaller bakeries have fewer funds and other resources to fully comply with the tax regulation, they often outsource their bookkeeping and taxation activities to the professional accountants (bookkeeping agencies) that have expertise, *inter alia*, in the VAT. In addition, smaller bakeries are often more afraid of the tax audit since they usually have only one (or very small number of) sales objects. Unlike large bakeries (that have many sales objects), temporary closing of this object due to tax evasion would make a bigger harm to the small baker. These facts may explain the absence of the influence of bakery size on the probability of the misuse of the reduced VAT rate.

Bakeries that are for shorter time registered in the VAT system appear to be significantly more probable to misuse reduced VAT rate. This implies that national tax authorities should pay particular attention to the tax behavior of bakeries that are newly established. In fact, the rate of bakeries that sell pizza slice at illegal VAT rate is extremely high for bakeries with less than 3 years of experience in the VAT system (4 out of 6 bakeries or about 67%). This rate falls for bakeries with less than 5 years of experience (6 out of 12 bakeries or 50%) and even more for bakeries with less than 10 years of experience (7 out of 18 bakeries or about 39%).

Previous finding indicates that less experienced bakeries (that are for shorter time registered in the VAT system) have less knowledge about the VAT regulation and implementation and, in particular, different VAT rates. Probably, they also have less experience with tax audits and national tax authorities. In addition, particular problem arises when less experienced bakeries hire (employ or outsource) bookkeepers that are not familiar to the taxation of bakery industry.

In the first years after their founding, bakeries may be occupied with many issues regarding their growth and development, facing many business and financing dilemmas. As a result, tax issues of their business were neglected as they do not pay significant attention to the correct choice between standard and reduced VAT rate. On the other hand, it is possible that some bakeries suffer from the lack of resources in the first years of business and seek to partially mitigate such problem through tax evasion and the choice of reduced instead of standard VAT rate.

Individual entrepreneurs appear to more frequently (10 out of 33 entrepreneurs or about 30%) misuse the reduced VAT rate than the limited liability and joint-stock companies (2 out of 17 companies or about 12%). However, this difference is not statistically significant, according to the logistic regression estimates. In this regard, it appears that national tax authorities should pay similar attention to both individual bakery entrepreneurs and bakery companies.

Many reasons may explain the absence of statistically significant difference between individual entrepreneurs and companies. First, in most limited liability companies in Serbia, the ownership and management are not separated. These companies are usually owned by one owner that has key management role, so these companies *de facto* operate as individual entrepreneurs. Second, many individual entrepreneurs grow and develop their business in the long period, opting to remain registered as entrepreneurs and not to establish a company. As a result, many individual entrepreneurs have larger business than many limited liability companies, so the difference between individual entrepreneurs and companies in Serbia is not obvious like in some developed countries.

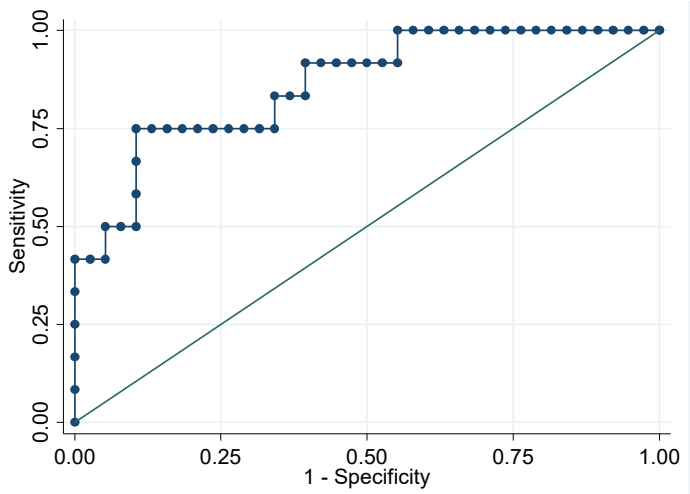
A share of fraudulent bakeries is significantly higher in smaller municipalities (with less than 100,000 inhabitants – 9 out of 22 bakeries or about 41%) than in larger municipalities (with more than 100,000 inhabitants – 3 out of 28 bakeries or about 11%). Such results imply that national tax authorities should pay a particular attention to the bakery sales objects located in smaller municipalities.

More fraudulent behavior of bakeries in smaller municipalities may be explained by the fact that tax authorities in smaller municipalities often have fewer resources (in terms of monetary, labor and information technologies resources) to track tax evasion than their colleagues in larger municipalities. In addition, the probability of family relationships, friendships and acquaintances between bakery representatives (owners and managers) and tax auditors is higher in smaller municipalities, leading to the potential empathy and subjectivity of the auditor during the tax audit. As a result, national tax authorities of Serbia have decided to rotate tax auditors and to send tax auditors from one municipality in the audits in other municipalities, though such practice is yet to be fully implemented.

I have also run Hosmer-Lemeshow test to measure goodness of fit of the model. Relatively low chi-square statistic of the test (8.692) and relatively high p-value (0.369) indicates that overall, the model fits the data well. Figure 1 presents Receiving Operating Characteristic (ROC) curve for the designed research model. Area under curve of 0.862 confirms the good predictive ability of the designed model.

F i g u r e 1

ROC Curve



Source: Author.

Forecast analysis, presented in the Table 6, confirms that the model is acceptable as the overall rate of correct classifications is 82%. In particular, the model correctly classifies bakeries which do not misuse the reduced VAT rate.

T a b l e 6

Forecast Values

Observed		Forecast		
		A bakery misuses reduced VAT rate		*Percentage correct*
		No	Yes	
A bakery misuses reduced VAT rate	No	35	3	92.1
	Yes	6	6	50.0
Overall percentage				82.0

Source: Author.

I have also employed probit regression estimations, as an alternative to the logistic regression. In general, probit estimations confirm the estimates from the logistic regression. Due to the reasons of space, probit estimations are given in the Appendix (Table A1).

4.3. Robustness Checks

To check the robustness of the obtained results, I have made several modifications of the original research model. First, I have changed the measurement of the size of the bakery. Instead of using the number of employees, I have classified bakeries as micro, small, medium and large and coded them from 1 to 4, respectively (SIZE2). The classification is based on the data from the Serbian Business Registers Agency. Second, I have changed the measurement of the TIME. Instead of the date of the fiscal invoice issuance, I have used the balance date (31 December 2021) as I have used in the research some data that is disclosed on this day (number of employees, size classification of the company etc).

Third, instead of the form of organization, I have introduced variable PERIOD, that is coded 0 if a bakery is monthly VAT taxpayer and 1 if a bakery is a quarterly taxpayer. Fourth, instead of using the number of inhabitants, I have used the average salary (SALARY) in the municipality for the 2021 (according to the Serbian Statistical Office), to check the impact not only of the geographical size, but also of the economic power of the municipality.

T a b l e 7

Logit Regression Estimations for Modified Research Model

	Dependent: FRAUD				
Constant	195.729** (2.054)	–0.907 (–2.499)	0.593 (0.770)	–0.916 (–1.549)	221.086 (2.636)
SIZE2	0.514 (0.689)	–0.818 (–1.213)			
TIME2	–1.175* (–1.859)		–0.913** (–2.405)		
PERIOD	–1.479 (–1.241)			–0.336 (–0.471)	
SALARY	–17.733** (–2.028)				–20.331*** (–2.645)
McFadden R^2 LR Statistic Observations	0.274 15.091*** 50	0.038 2.108 50	0.113 6.213** 50	0.004 0.216 50	0.198 10.935*** 50

Note: beta coefficients in front of parentheses, *z*-statistics in parentheses; *, **, and *** denote statistically significance at the 10%, 5% and 1% level, respectively.

Source: Author.

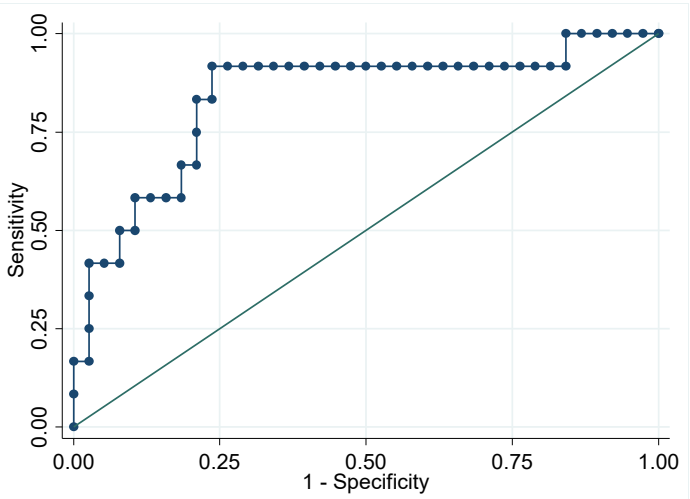
Table 7 presents the regression estimates for the modified research model. In general, they confirm the results from the original model. The impact of the size of the bakery remains insignificant, regardless of the employed measure of the bakery size. Time spent in the VAT system remains a significant variable, despite change in its measurement. Type of the VAT taxpayer (monthly or quarterly) is insignificant in predicting the fraudulent behavior of bakeries. In addition, it may

be overall concluded that bakeries in smaller and poorer municipalities are more probable to misuse the reduced VAT rate.

As for the original research model, Hosmer-Lemeshow test shows that the modified research model fits the data well. However, chi-square statistic is slightly higher (13.675), while p-value is slightly lower (0.091) than in the original research model, though the p-value is still higher than the usual referent value $\alpha = 0.05$. ROC curve for modified research model is presented in the Figure 2. In this case, area under curve equals to 0.838 and indicates good predictive ability of the modified research model.

F i g u r e 2

ROC Curve for Modified Research Model



Source: Author.

In the Table 8 is presented forecast analysis for the modified research model, which, with the overall rate of correct classification of 84%, confirms that the modified model is acceptable. As for the original research model, modified model particularly correctly classifies bakeries that do not misuse the reduced VAT rate.

T a b l e 8

Forecast Values for Modified Research Model

Observed		**Forecast**		
		A bakery misuses reduced VAT rate		***Percentage correct***
		No	Yes	
A bakery misuses reduced VAT rate	No	37	1	97.4
	Yes	7	5	41.7
Overall percentage				84.0

Source: Author.

Analogous to the original research model, I have run probit regression for the modified research model. Estimations of the logistic and probit regressions are overall similar for the modified research model. Due to the reasons of space, probit estimations for modified research model are given in the Appendix (Table A2).

4.4. Recommendations

According to the results of this research, it seems that, besides intentional tax evasion motives, many bakeries misuse reduced VAT rate as a result of unintentional mistakes due to inexperience with the VAT and complex nature of the national tax regulation. For instance, one sampled individual bakery entrepreneur that misuses reduced VAT rate have six sales objects, but sells pizza slice in only two of them, implying that this product is of second-order importance to it. Therefore, it is rational to assume that his inexperience with sales of pizza leads to the fraudulent behavior. In this regard, national tax authorities should not only have a role in punishing bakeries, but also to educate (in particular small and recently established) taxpayers.

In order to ensure clearer and fairer tax regulation, national tax authorities should change the distribution of the tax regulation. In particular, it refers to the opinions of the Ministry of Finance, that are issued in a large number, but without electronic register of them. Currently, these opinions are hard to be found among a bunch of documents on the official website of the ministry. In addition, some opinions (with some of them highly relevant for the bakeries) are currently not publicly accessible online. In this regard, Ministry of Finance and national tax authorities should collaborate to publicly disclose each issued opinion and to develop online database of issued opinions (with browsing option through key words).

Ministry of Finance may also consider changes of the VAT Law in order to propose the unique tax rate for food items (or at least food items sold in bakeries), as many European countries already did. Such change would remove the confusing differential tax treatment of food items sold in bakeries. Therefore, the potential for VAT evasion (either intentional or due to mistaken application of the tax regulation) would vanish if all food items were taxed at the same rate.

National tax authorities of Serbia should consider changing the system of punishment for detected tax evasion. Under current Law on Fiscalization, a bakery that evades VAT should be punished with closing the sales object for 15 days. If such foul is repeated in the following two years, a sales object closes for 90 days. For the third foul in two-years period, the object is being closed for a one year.

Closing the sales object may not be the best alternative for punishment due to several reasons. First, it leads to the loss in the VAT revenue for the country during the punishment period in which sales object is closed and does not generate further

sales. Second, it leads to the problems for (especially smaller) bakers that are left without income in the punishment period. Third, it alters the behavior of the bakery consumers, since they are forced to find another sales object or even another bakery. In smaller municipalities, a closed sales object is often the only bakery in the town, so consumers are fully denied from using bakery products.

A particular problem lies in the fact that VAT evasion is primarily conducted by bakeries that are relatively recently founded and new to the VAT system. These bakeries only started to grow and are vulnerable to the economic failure. Temporarily closing such bakeries may be disastrous for them. In fact, punishment through paying the multiple amount of detected evaded VAT (but to withdraw rules about closing the object) seems to be more efficient alternative.

Conclusions

The misuse of the reduced VAT rate in bakery industry in the emerging country of Serbia is examined in order to study the extent in which bakeries misuse the reduced VAT rate and some determinants of it. In this regard, I developed a field research on fifty bakeries from fifteen municipalities that I have visited and studied the VAT rate they calculated when selling pizza slice. In general, I estimate that nearly a quarter of bakeries registered in the VAT system misuse the reduced VAT rate.

Size of the bakery, measured by number of employees, does not appear to have significant impact on probability of the misuse of the reduced VAT rate. Therefore, the first research hypothesis can be rejected. On the other hand, bakeries that are registered in the VAT system for a shorter time are significantly more probable to misuse the reduced VAT rate. This finding is in line with some previous research (Hageman, 2010; Beck et al., 2014). Therefore, the second research hypothesis cannot be rejected.

Our research also showed that there is no significant difference between individual bakery entrepreneurs and bakery companies in probability to misuse the reduced VAT rate. Therefore, the third research hypothesis can be rejected. On the other hand, bakeries located in smaller municipalities, measured by number of inhabitants, appear to be significantly more probable to misuse the reduced VAT rate. This finding is also in line with some previous research (Beck et al., 2014; Mohamad et al., 2016; Vo et al., 2020). Therefore, the fourth research hypothesis cannot be rejected.

Results of this research may be the useful guideline for many interest groups. First, national tax authorities should make tax regulation (particularly the opinions of the Ministry of Finance) easier accessible through the development of the

electronic registry of the opinions. In addition, they should reconsider the punishment system for bakeries which are caught in the tax evasion, particularly for those who unintentionally misused the reduced VAT rate. Second, bakeries (particularly those newly established and located in smaller municipalities) should recheck implemented VAT rates on products they offer, in order to fully comply with the tax regulation and avoid problems during a tax audit.

Presented research results should be used in the light of certain limitations. The main limitation may be found in the relatively small size of the research sample, as a typical limitation of the field research. It is possible that the research results would be different if more bakeries were sampled. In addition, this research captured only one country and the conclusions cannot be applied on other emerging countries, bearing in mind cross-national differences in tax regulation and tax morale.

The method of field research may be substituted with using data from national tax authorities. In this case, research sample might be significantly larger. It would be also interesting to study the misuse of the reduced VAT rate in other emerging countries, to capture other industry beyond bakery or to apply different methodology. Further, it would be useful to identify whether intentional or unintentional VAT evasion motives are more prevalent. However, I leave these questions for future research.

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A p p e n d i x – Probit Estimates

T a b l e A1

Probit Regression Estimations

	Dependent: FRAUD				
Constant	12.447*** (2.723)	–0.194 (–0.565)	0.603 (1.071)	–0.516** (–2.251)	10.640*** (2.819)
SIZE	–0.005 (–0.440)	–0.022 (–1.320)			
TIME	–0.633** (–1.978)		–0.633** (–2.451)		
LEGAL	0.136 (0.237)			–0.671 (–1.467)	
POPUL	–1.051*** (–2.634)				–1.012*** (–3.008)
McFadden R^2 LR Statistic Observations	0.338 18.612*** 50	0.115 6.312** 50	0.114 6.270** 50	0.042 2.308 50	0.211 11.627*** 50

Note: beta coefficients in front of parentheses, z-statistics in parentheses; *, **, and *** denote statistically significance at the 10%, 5% and 1% level, respectively.

Source: Author.

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Probit Regression Estimations for Modified Research Model

	Dependent: FRAUD				
Constant	92.648** (2.009)	–0.558** (–2.563)	0.351 (0.745)	–0.566 (–1.593)	113.907*** (2.833)
SIZE2	0.284 (0.696)	–0.474 (–1.294)			
TIME2	–0.654* (–1.871)		–0.544** (–2.442)		
PERIOD	–0.770 (–1.153)			–0.199 (–0.468)	
SALARY	–8.381** (–1.976)				–10.480*** (–2.848)
McFadden R^2 LR Statistic Observations	0.257 14.184*** 50	0.040 2.188 50	0.113 6.213** 50	0.004 0.218 50	0.187 10.332*** 50

Note: beta coefficients in front of parentheses, z-statistics in parentheses; *, **, and *** denote statistically significance at the 10%, 5% and 1% level, respectively.

Source: Author.