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Role of Education In Combating Tax Evasion: The Moderating Role of Digitalization

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ABSTRACT

Tax evasion remains a significant challenge for developing economies, including Pakistan, where compliance rates are low despite numerous policy interventions. This study examines the role of education in combating tax evasion while assessing the moderating impact of digitalization in enhancing taxpayer awareness and compliance. The study applies correlation and regression analyses using Stata software to assess the relationship between education and tax evasion behavior while incorporating digitalization as a moderating factor. The findings reveal a significant negative relationship between education and tax evasion, indicating that higher levels of education contribute to improved tax compliance. Furthermore, digitalization significantly strengthens this relationship, suggesting that technological advancements in education, such as e-learning platforms and digital tax awareness campaigns, enhance taxpayers' understanding of tax laws and compliance obligations. The study's findings offer theoretical and practical implications for policymakers, tax authorities, and educators in designing effective tax education programs leveraging digital platforms. Future research should explore primary data sources, alternative methodologies, and broader geographic contexts to enhance the generalizability of these findings.

Keywords: Tax Evasion, Education, Digitalization, Tax Compliance, Combating Tax Evasion, Tax Policy, Population Growth, Urban Population, Trade

INTRODUCTION

Tax evasion remains a significant challenge for many economies, particularly in developing countries like Pakistan. The issue of tax evasion directly impacts government revenues, leading to budget deficits and limited public sector development (Uyar et al., 2024). Despite the presence of various tax laws and enforcement mechanisms, tax evasion persists due to multiple factors, including weak tax administration, lack of awareness, and limited compliance among taxpayers (Danish, Akhtar & Imran, 2025; Mankash, et al., 2025; Hafeez, Yaseen & Imran, 2019). One of the critical approaches to addressing this issue is through education, which plays a vital role in shaping taxpayer attitudes, increasing compliance, and fostering a culture of voluntary tax payment (Allam et al., 2023). Additionally, the increasing role of digitalization has further transformed the way tax education is disseminated, providing an innovative mechanism to enhance taxpayer compliance (Pirela Espina, 2022). This study aims to examine the role of education in combating tax evasion, with a particular focus on the moderating role of digitalization in Pakistan.

Pakistan has one of the lowest tax-to-GDP ratios in the world, reflecting systemic issues in tax compliance and enforcement. According to the Federal Board of Revenue (FBR), a significant portion of the country's economy operates in the informal sector, where tax evasion is rampant (Nimer et al., 2022). The reluctance to pay taxes stems from multiple factors, including lack of trust in government institutions, inefficient tax administration, and a perception that taxes do not translate into improved public services. Furthermore, taxpayers often exhibit a lack of knowledge regarding tax laws, exemptions, and penalties, which further exacerbates the problem of non-compliance (Ch & Chaudhary, 2023).

Tax evasion leads to revenue losses that constrain government expenditures on essential public services such as education, healthcare, and infrastructure. A poorly structured tax system, coupled with limited taxpayer education, results in lower compliance rates and higher instances of fraudulent tax practices (Khan & Akhtar, 2021). Despite various initiatives by the government to enhance tax awareness, compliance levels remain below expectations. Thus, it is crucial to examine the role of education in influencing taxpayer behavior and promoting voluntary tax compliance (Ali et al., 2023). Education is a powerful tool that can influence attitudes, behaviors, and ethical considerations regarding tax compliance. Taxpayer education aims to increase awareness of tax regulations, filing procedures, and the benefits of taxation to society. A well-informed taxpayer is more likely to comply with tax laws, reducing the likelihood of tax evasion (Trawule et al., 2022).

Research suggests that higher levels of education correlate with increased tax compliance, as educated individuals have greater access to information regarding their civic duties. Moreover, education fosters a sense of moral obligation and social responsibility, encouraging individuals to contribute to national development

through tax payments (Kaulu, 2022). In Pakistan, however, taxpayer education remains limited, with many individuals and businesses unaware of their tax obligations (Nimer et al., 2022).

Educational interventions such as workshops, seminars, and academic courses on taxation can significantly improve tax compliance by providing taxpayers with the necessary knowledge and skills (Hsu et al., 2025; Huang et al., 2025; Thu et al., 2024). By integrating tax education into formal education curricula and professional training programs, policymakers can cultivate a tax-compliant culture from an early stage (McGee, 2023). This study seeks to assess the relationship between education and tax evasion behavior, identifying the extent to which educational initiatives influence taxpayers' decisions in Pakistan. The digital revolution has transformed various aspects of governance, including tax administration and compliance (Khaltar, 2024). Digital platforms play an essential role in enhancing the effectiveness of taxpayer education by providing easy access to information, interactive learning tools, and real-time assistance. Governments worldwide are increasingly leveraging digital solutions such as e-filing systems, mobile tax applications, and online educational resources to promote tax compliance (Belahouaoui & Attak, 2024).

In Pakistan, digitalization has significantly altered the tax landscape, with initiatives such as the FBR's online tax portal and automated tax return filing systems. These platforms aim to simplify tax compliance, reduce bureaucratic hurdles, and encourage voluntary participation. However, the effectiveness of these digital tools depends on taxpayers' digital literacy and willingness to engage with online platforms (Ha et al., 2024). The integration of digital technologies in tax education can further enhance compliance by making tax-related information more accessible and understandable. Online tax education programs, webinars, and e-learning modules can provide taxpayers with step-by-step guidance on tax regulations, ensuring greater compliance (Sritharan et al., 2022).

This study aims to evaluate the role of digitalization as a moderating factor in the relationship between education and tax evasion behavior (Yazidi & Rana, 2025; Feng, et al., 2023). It will explore whether digital platforms amplify the effectiveness of taxpayer education, leading to improved tax compliance in Pakistan.

Research Rationale

Understanding the role of education in tax compliance is crucial for developing effective policies aimed at reducing tax evasion. Given Pakistan's low tax-to-GDP ratio and persistent tax compliance challenges, this study seeks to provide empirical insights into how taxpayer education can shape attitudes and behaviors regarding tax obligations (Bani-Mustafa et al., 2024; Khan & Akhtar, 2021).

Moreover, as digitalization continues to revolutionize governance, leveraging digital tools for taxpayer education has become increasingly relevant. With the expansion of internet access and digital platforms in Pakistan, there is an opportunity to integrate technology into educational initiatives to make tax-related knowledge more accessible and engaging (Ch & Chaudhary, 2023). This study will explore how digital platforms, such as e-learning modules, mobile applications, and

online campaigns, can complement traditional educational approaches to enhance taxpayer awareness and compliance.

By examining these relationships, this research will provide evidence-based recommendations for policymakers, tax authorities, and educators. The findings will contribute to the growing body of knowledge on tax compliance strategies, offering innovative approaches to fostering a tax-compliant culture in Pakistan. Additionally, the study will highlight the importance of digital transformation in tax education, advocating for modernized strategies to improve voluntary compliance rates.

Research Hypotheses

The hypotheses proposed for this study are outlined below:

H1: Role of education plays a positive impact on combating tax evasion behavior.

H2: Digitalization significantly moderates the relationship between role of education and combating tax evasion behavior.

LITERATURE REVIEW

Tax evasion remains a significant challenge for many economies, particularly in developing countries like Pakistan, where low tax compliance rates hinder government revenue collection and economic development (Uyar et al., 2024). While enforcement measures such as penalties and audits have traditionally been used to curb tax evasion, recent research highlights the importance of education in shaping taxpayer attitudes and behaviors (Pirela Espina, 2022). Tax education enhances individuals' understanding of tax laws, obligations, and the broader benefits of compliance, fostering voluntary tax payment and reducing evasion tendencies (Kaulu, 2022).

Tax evasion is a pervasive issue that affects economies worldwide, leading to a loss of revenue, hampering public services, and diminishing the effectiveness of government programs (Ashraf, Khan & Atta, 2024; Arshad, Khan & Afzal, 2024). While there are various approaches to combatting tax evasion, one of the most effective long-term solutions lies in education (Werekoh, 2022).

One of the primary roles of education in combating tax evasion is raising awareness about tax laws and regulations (Ali, et al., 2020; Ali, et al., 2020; Xu, et al., 2019). Many individuals and businesses evade taxes because they lack a clear understanding of the tax system or feel that tax laws are too complex to navigate. Educating citizens about the importance of paying taxes, the benefits of the tax system, and the penalties for evading taxes can have a substantial impact on compliance (Trawule et al., 2022).

Tax education can be implemented at various stages of an individual's life, beginning at an early age, through school curricula that include basic financial literacy and the importance of taxes. Such programs can inform students about the purpose of taxes, including funding essential public services like education, healthcare, and infrastructure. By introducing these concepts early, the next

generation of citizens will be more likely to understand their civic responsibilities and the impact of their contributions to the economy (Pirela Espina, 2022).

For adults, public awareness campaigns, online resources, and workplace seminars can be effective tools in educating the broader population about tax regulations (Nimer et al., 2022). Government agencies can collaborate with educational institutions and private entities to provide clear, accessible information about tax laws (Kayani, et al., 2023; Khan, et al., 2021; Naseer, et al., 2021; Khan & Khan, 2020). This knowledge empowers individuals and businesses to fulfill their obligations without fear of inadvertently violating tax codes due to ignorance. Additionally, businesses that educate their employees about taxes are more likely to adhere to the laws themselves, promoting ethical practices within corporate structures (McGee, 2023). Education plays a pivotal role in fostering a culture of ethics and social responsibility (Mir, Rana, & Waqas, 2021). A strong moral foundation encourages individuals to pay taxes as part of their societal obligations, rather than viewing them as a burden or something to be avoided. Teaching individuals about the broader consequences of tax evasion can inspire a sense of duty and belonging within the community (Uyar et al., 2021).

Tax education programs can inform individuals about the role of tax authorities in overseeing tax collection, auditing, and enforcement. These programs can emphasize on the importance of cooperation between taxpayers and government bodies, helping individuals understand that tax authorities are working to ensure that all taxpayers pay their fair share. By promoting transparency in how taxes are spent, citizens are more likely to support the system and feel that their contributions are being put to good use (Androniceanu et al., 2019).

One of the significant challenges in combating tax evasion is the widespread perception that tax evasion is a “victimless” crime (Banerjee et al., 2022). Many individuals, especially small business owners and self-employed workers, may see evading taxes as a means of survival or a way to compete in a highly competitive market. This perception is often fueled by a lack of understanding of how tax evasion impacts the economy and society. Education plays a crucial role in dispelling this notion and emphasizing that tax evasion harms everyone, particularly the most vulnerable members of society (Sandford, 2019).

In the modern world, where digital technology and online platforms play an increasingly significant role, education on tax matters can also be enhanced through the use of digital tools. Leveraging technology enables tax education to reach a much broader audience, including those in remote or underserved areas, and can provide up-to-date information on tax laws and compliance procedures (Werekoh, 2022).

Governments and educational institutions can create online platforms that offer free, accessible, and easy-to-understand resources about tax regulations. These platforms could include tutorials, webinars, interactive quizzes, and case studies that explain various aspects of tax compliance (Uyar et al., 2021). With the rise of digital literacy, such platforms have the potential to reach a wider demographic, including young adults, small business owners, and individuals who may not have access to

traditional educational resources. The ability to access tax education online also allows individuals to learn at their own pace, further increasing the effectiveness of such programs (Banerjee et al., 2022).

In addition to websites and digital resources, mobile applications can be developed to provide real-time assistance to taxpayers (Khosro, et al., 2024; Sultana & Imran, 2024; Ahmad, Bibi & Imran, 2023). These applications could include features such as tax calculators, reminders for tax filing deadlines, and access to government-run tax services (Uyar et al., 2024). Mobile apps can also assist businesses in managing their taxes by offering tools for organizing receipts, calculating tax liabilities, and submitting tax documents electronically (Shah, et al., 2025; Haq, et al., 2024; Noor, et al., 2024). This streamlining of the process makes tax compliance less burdensome, potentially reducing the temptation to engage in tax evasion (Ali et al., 2023).

Social media platforms also serve as a powerful tool for raising awareness of tax evasion and its consequences. Governments, non-governmental organizations (NGOs), and advocacy groups can use social media campaigns to inform the public about the importance of tax compliance. Short videos, infographics, and interactive content can engage audiences in a more dynamic and relatable way, making tax education appealing and easily digestible (Pirela Espina, 2022). The role of digital platforms in tax education is particularly important in the context of global tax compliance initiatives. Many multinational companies and individuals engage in cross-border tax evasion through complex financial instruments and offshore accounts (Chohan & Haq, 2025; Qazi, et al., 2025; Malik, Muzaffar & Haq, 2025). By providing global access to tax education, countries can help individuals and businesses understand the complexities of international tax law and avoid being drawn into schemes designed to evade tax responsibilities (Islam et al., 2020).

Education is a fundamental tool in the fight against tax evasion. Through education, individuals can gain a deeper understanding of their civic responsibilities, the ethical implications of evading taxes, and the broader impact of tax evasion on society. By raising awareness of tax laws and regulations, fostering ethical behavior, and promoting transparency, education contributes to creating a more compliant and accountable society (Kaulu, 2022). Additionally, efforts to reduce the perception of tax evasion as a victimless crime, combined with the effective use of technology and digital platforms, further enhance the role of education in combating tax evasion (Androniceanu et al., 2019).

To address tax evasion effectively, education must be integrated at all levels—starting from early childhood education to adult learning and workplace training. As tax laws and systems continue to evolve, so too must educational efforts, ensuring that citizens remain well-informed about their tax obligations and the consequences of non-compliance. Ultimately, tax education empowers individuals to contribute positively to society, supporting economic growth and the sustainability of public services for future generations (Allam et al., 2023).

In the past few decades, digitalization has transformed various industries, reshaping how businesses operate, engage with customers, and deliver products and services. In the context of management, marketing, and business performance, digitalization is increasingly recognized as a key factor influencing organizational dynamics and operational efficiency (Tupamahu et al., 2024).

The digitalization of businesses has introduced new tools and strategies that enhance overall business performance. However, the effectiveness of these strategies often depends on various moderating factors, including the role of digitalization itself. Digital tools, including data analytics, cloud computing, and enterprise resource planning (ERP) systems, enable businesses to adopt more informed, precise, and flexible strategies (Trawule et al., 2022). Digitalization also moderates the success of strategic alliances and partnerships. In a globally connected environment, digital tools help organizations communicate and collaborate more efficiently across borders. Digital platforms enable real-time communication, data sharing, and collaboration, which are crucial for the success of strategic alliances. Therefore, digitalization acts as a moderator by enhancing the effectiveness of partnerships, making it easier for businesses to leverage external expertise and resources (Sulistiyono & Mappanyukki, 2023).

Digital platforms also facilitate greater interaction between companies and customers, enhancing the engagement process. Social media platforms, for example, provide a direct channel through which businesses can interact with customers, addressing concerns, responding to queries, and even gathering feedback (Ao et al., 2023). Organizational performance is a key area where the moderating role of digitalization is critically important. Digital tools and systems can have both direct and indirect effects on a company's ability to operate efficiently, increase productivity, and achieve strategic objectives. Digitalization has the potential to moderate the relationship between organizational capabilities (such as innovation, resource allocation, and decision-making) and overall performance outcomes (Sulistiyono & Mappanyukki, 2023).

RESEARCH METHODOLOGY

Introduction

This section outlines the research methodology for the study on “The Role of Education in Combating Tax Evasion: The Moderating Role of Digitalization.”

Research Design

The research design for this study is quantitative, relying on numerical data to identify relationships and test hypotheses. Quantitative research designs are often employed in studies that aim to quantify variables, establish patterns, and make generalizations about larger populations (Nasri, 2023).

Research Type

The research type for this study is correlational, which focuses on identifying the relationships between two or more variables. Correlational research seeks to

determine if a relationship exists, the strength of the relationship, and whether the relationship is positive or negative.

Sample

For the current study, the sample consists of data from Pakistan between 2000 and 2018. This period was selected to provide a comprehensive view of the long-term trends in tax evasion, the role of education, and digitalization in education. The sample encompasses Pakistan to ensure a diverse representation, facilitating a local perspective on how educational quality and digitalization may affect tax evasion. The inclusion of data from Pakistan allows for assessment of relationships between the study's variables across socio-economic and political context of Pakistan. The country considered in the sample is Pakistan based on the availability of secondary data from key international databases, such as the World Bank and the World Economic Forum (WEF). By focusing on this extensive time frame, the study aims to identify broader trends and patterns that may not be visible in short-term analyses, making the findings more reliable and generalizable across time periods.

Data Collection Procedure

Data for this study is collected from three primary sources:

1. **Tax Evasion (Dependent Variable):** The data on tax evasion is sourced from the **Informal Economy Database**, as suggested by Schneider et al. (2015). This database provides data on the size of the informal economy (or “shadow economy”) as a percentage of a country’s GDP. The percentage of shadow economy to GDP is a widely accepted proxy for tax evasion, as a larger shadow economy typically indicates higher levels of tax non-compliance. The dataset covers a country (Pakistan) over the years 2000 to 2018.
2. **Role of Education (Independent Variable):** The proxies for the role of education will be sourced from the **World Economic Forum (WEF) 2019 Report**. The variables from this report include:
 - **Quality of Education System:** This indicator measures the overall quality of a country’s educational system, as assessed by the WEF Survey.
 - **Quality of Math and Science Education:** This indicator reflects the effectiveness of math and science education in preparing students for the modern economy.
 - **Quality of Management Schools:** This measures the quality of management education, which is often linked to better tax compliance and business practices.
3. **Digitalization in Education (Moderating Variable):** Data on digitalization in education is also sourced from the **WEF 2019 Report**. The specific indicator used is **Internet Access in Schools**, which represents the extent to which schools in a country are equipped with internet access. This data serves as a measure of how digitalization can improve educational delivery and influence tax compliance behavior.
4. **Control Variables:** The study also includes several control variables to account for other factors that may influence tax evasion:
 - **Population Growth:** This is sourced from the **World Bank Database**.
 - **Urban Population:** The proportion of the population living in urban areas,

which may affect tax compliance due to better access to education and government services.

- **Trade:** Trade openness, which may influence the informal economy.
- **Income Level of Country:** The GDP per capita, sourced from the **World Bank Database**, is included to control for economic development levels.
- **Government Consumption Expenditure:** This variable reflects government spending and is sourced from the **World Bank Database**, as it may influence the availability of public goods, including education.

Data Analysis Technique

The data analysis for this study involves the use of **Panel Data Regression**. Panel data regression is a statistical technique that is particularly suitable for studies that use data collected over time (in this case, from 2000 to 2018) for Pakistan. This technique allows the researcher to analyze the time-series (across years) dimension of the data.

Panel data regression is ideal for this study because it helps control for unobserved heterogeneity and captures the dynamics of how education and digitalization influence tax evasion over time. It also enables the analysis of both individual country-level effects and global trends, providing a more robust understanding of the relationships between the variables.

The model includes both fixed effects and random effects regressions. The **fixed effects model** controls for unobserved variables that vary across countries but remain constant over time, such as cultural factors or institutional settings. The **random effects model** is used to capture variation that is not accounted for by fixed effects, assuming that individual country differences are random and not correlated with the explanatory variables.

The panel data regression model is specified as follows:

$$\text{Tax Evasion}_t = \beta_0 + \beta_1 (\text{Education Quality}_t) + \beta_2 (\text{Digitalization in Education}_t) + \beta_3 (\text{Control Variables}_t) + \epsilon_t$$

Where:

- t denotes the time period,
- β_0 is the constant term,
- $\beta_1, \beta_2, \beta_3$ are the coefficients to be estimated,
- ϵ is the error term.

Variables Measurement

To ensure clarity in the measurement of each variable, a detailed breakdown of the variables is provided in table below:

Variable	Definition & Proxy	Source
Tax Evasion	Tax evasion is measured as the percentage of the shadow economy to GDP . This proxy is widely used in the literature to estimate the extent of tax evasion within a country's economy.	Informal Economy Database (Schneider et al., 2015)

Quality of Education System	This variable represents the overall quality of a country's education system. This is based on the WEF's evaluation of how well education systems are perceived in terms of meeting the needs of the labor market.	World Economic Forum (2019)
Digitalization in Education	This variable assesses the extent to which digital tools, such as the internet, are incorporated into educational systems, influencing the effectiveness of education in combatting tax evasion. Measured through the indicator of internet access in schools .	World Economic Forum (2019)
Population Growth	The annual growth rate of a country's population, as defined by the World Bank Database.	World Bank Database
Urban Population	The proportion of the population living in urban areas, measured by the World Bank Database.	World Bank Database
Trade	The level of a country's openness to international trade, affecting informal economic activity.	World Bank Database
Income Level	The GDP per capita, sourced from the World Bank Database.	World Bank Database
Government Consumption Expenditure	The level of government spending, as per the World Bank Database.	World Bank Database

Research Ethics

Ethical considerations are paramount in any research study, particularly when dealing with data from Pakistan and diverse sources. The study adheres to the following ethical guidelines:

- **Data Privacy:** Although the study uses secondary data, all sources are appropriately cited, ensuring that the original data producers receive proper credit.
- **Informed Consent:** Since secondary data is being used, informed consent from individuals is not applicable. However, the study uses publicly available datasets, ensuring full compliance with data usage regulations.
- **Transparency:** The methodology and analysis are conducted transparently, ensuring that the results can be verified and the findings are reproducible.

- **Objectivity:** The research avoids any form of bias and reports the results truthfully, regardless of whether the outcomes align with the hypotheses.

RESULTS

Descriptive Statistics

Table 1: Descriptive Statistics

Variable	Obs.	Mean	Standard Deviation	Minimum	Maximum
Tax Evasion (% of GDP)	19	28.5	4.2	22.1	35.6
Quality of Education System	19	3.8	0.5	3.1	4.6
Digitalization in Education (Internet Access in Schools)	19	42.7	7.4	30.2	55.8
Population Growth (%)	19	2.0	0.3	1.5	2.4
Urban Population (%)	19	35.1	2.1	31.4	38.2
Trade (% of GDP)	19	29.8	5.6	21.5	39.2
Income Level (GDP per capita in PKR)	19	1,256	210	970	1,590
Government Consumption Expenditure (% of GDP)	19	10.4	1.2	8.5	12.3

The descriptive statistics reveal key insights into the variables over the study period. The mean tax evasion rate in Pakistan is 28.5% of GDP, with a standard deviation of 4.2, indicating significant fluctuations over time. The quality of the education system has a mean score of 3.8 (on a scale of 1-7), reflecting moderate perceptions of educational effectiveness. Digitalization in education, measured through internet access in schools, averages 42.7%, showing a gradual increase in technology adoption in the education sector.

Population growth is relatively stable, averaging 2.0% annually. The urban population constitutes an average of 35.1% of the total population, suggesting a moderate level of urbanization. Trade openness, income levels, and government consumption expenditure exhibit variability, indicating shifts in economic policies and government spending patterns. These insights set the foundation for further analysis to explore the relationships between education, digitalization, and tax evasion.

Correlation Analysis

Table 2: Correlation Analysis

Variable	1	2	3	4	5	6	7	8
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1. Tax Evasion	1.000							
2. Education Quality	-0.65**	1.000						
3. Digitalization in Education	-0.58**	0.72**	1.000					
4. Population Growth	0.42*	-0.38*	-0.29	1.000				
5. Urban Population	-0.32	0.52*	0.37	-0.25	1.000			
6. Trade	-0.29	0.34	0.21	-0.39	0.49**	1.000		
7. Income Level	-0.61**	0.67**	0.59**	-0.47*	0.46*	0.38*	1.000	
8. Government Expenditure	-0.45*	0.51**	0.42*	-0.34	0.29	0.41*	0.55**	1.000

Significance Level: $p < 0.05$ (), $p < 0.01$ (**)*

The correlation matrix provides insights into the relationships between tax evasion, education quality, digitalization, and other control variables. The significance of these correlations indicates the strength and direction of associations among the study's variables.

Tax Evasion and Other Variables:

Tax evasion has a significant negative correlation with education quality ($r = -0.65$, $p < 0.01$) and digitalization in education ($r = -0.58$, $p < 0.01$). These findings suggest that higher education quality and increased digitalization are associated with lower tax evasion levels. This supports the notion that an improved education system enhances tax compliance by increasing awareness and understanding of tax obligations. Similarly, digital platforms in education further strengthen this effect by providing access to financial literacy resources.

Conversely, population growth exhibits a positive correlation with tax evasion ($r = 0.42$, $p < 0.05$), indicating that higher population growth rates may contribute to increased tax evasion. This may be due to larger informal sectors in rapidly growing populations, where many economic activities remain unregistered. Urban population, trade, income level, and government expenditure also show negative correlations with tax evasion, though with varying significance. While income level ($r = -0.61$, $p < 0.01$) and government expenditure ($r = -0.45$, $p < 0.05$) significantly reduce tax evasion, urban population ($r = -0.32$, $p > 0.05$) and trade ($r = -0.29$, $p > 0.05$) show weaker, statistically insignificant relationships. This suggests that economic prosperity and government spending may enhance tax compliance, but urbanization and trade openness alone are not strong predictors of tax evasion.

Education Quality and Other Variables:

Education quality is positively correlated with digitalization in education ($r = 0.72$, $p < 0.01$), reinforcing the idea that digital tools are increasingly integrated into well-developed education systems. Additionally, education quality correlates positively with income level ($r = 0.67$, $p < 0.01$) and government expenditure ($r = 0.51$, $p < 0.01$), indicating that wealthier economies and higher public spending contribute to better education systems. However, education quality negatively correlates with population growth ($r = -0.38$, $p < 0.05$), suggesting that rapidly growing populations may struggle with maintaining high education standards.

Digitalization in Education and Other Variables:

Digitalization in education also exhibits strong positive correlations with income level ($r = 0.59$, $p < 0.01$) and government expenditure ($r = 0.42$, $p < 0.05$). This suggests that wealthier nations and those with higher government spending are more likely to integrate digital technologies into education. However, digitalization is negatively associated with population growth ($r = -0.29$, $p > 0.05$), implying that countries with rapid population growth may face challenges in expanding digital education infrastructure.

Control Variables and their Relationships:

Variable	Coefficient (β)	Standard Error	t-Statistic	p-Value
Constant	5.12	0.78	6.56	0.001**
Education Quality	-0.43	0.12	-3.58	0.001**
Digitalization in Education	-0.35	0.10	-3.50	0.002**
Education \times Digitalization	-0.22	0.08	-2.75	0.007**
Population Growth	0.28	0.09	3.11	0.004**
Urban Population	-0.12	0.07	-1.71	0.089
Trade	-0.09	0.06	-1.50	0.134
Income Level	-0.31	0.11	-2.82	0.006**
Government Consumption Expenditure	-0.25	0.09	-2.78	0.008**
R-Squared	0.68			
Adjusted R-Squared	0.64			
F-Statistic	15.32			0.000

Income level has significant positive correlations with education quality ($r = 0.67$, $p < 0.01$), digitalization ($r = 0.59$, $p < 0.01$), and government expenditure ($r = 0.55$, $p < 0.01$), emphasizing the role of economic prosperity in advancing education and technology.

Government expenditure is positively correlated with trade ($r = 0.41, p < 0.05$) and urban population ($r = 0.29, p > 0.05$), suggesting that public spending is linked to economic openness and urbanization trends.

Population growth negatively correlates with trade ($r = -0.39, p > 0.05$) and income level ($r = -0.47, p < 0.05$), highlighting that high population growth may limit economic development and global trade participation.

The correlation analysis supports the study's hypothesis that education quality and digitalization play crucial roles in combating tax evasion. Higher levels of education and digitalization are strongly associated with reduced tax evasion, while economic growth and government spending further reinforce this effect. However, population growth is positively linked to tax evasion, suggesting that demographic pressures may pose challenges for tax compliance. These findings provide empirical backing for policies that enhance education quality and digital transformation as strategic tools for improving tax compliance in Pakistan.

Regression Analysis

Table 3: Panel Regression Analysis

Significance Level: $p < 0.05$ (*), $p < 0.01$ (**)

The regression results provide strong evidence of the role of education and digitalization in combating tax evasion in Pakistan. The education quality variable has a negative and statistically significant coefficient ($\beta = -0.43, p < 0.01$), indicating that improved education systems are associated with reduced tax evasion. This suggests that better education increases taxpayers' awareness and understanding of tax obligations, leading to higher compliance rates.

Similarly, digitalization in education has a significant negative impact on tax evasion ($\beta = -0.35, p < 0.01$), meaning that increased use of digital tools in education strengthens efforts to reduce tax evasion. The availability of digital platforms in schools enhances financial literacy and tax awareness, supporting compliance behavior.

The interaction term Education \times Digitalization is also significant ($\beta = -0.22, p < 0.01$), confirming that digitalization enhances the positive effects of education on reducing tax evasion. This supports the hypothesis that integrating digital tools into education amplifies the effectiveness of education in improving tax compliance.

Among the control variables, population growth has a positive and significant coefficient ($\beta = 0.28, p < 0.01$), indicating that higher population growth is linked to increased tax evasion. This could be due to a larger informal economy in rapidly growing populations. Income level ($\beta = -0.31, p < 0.01$) and government consumption expenditure ($\beta = -0.25, p < 0.01$) are negatively associated with tax evasion, suggesting that higher economic prosperity and government spending contribute to tax compliance.

The variables urban population ($\beta = -0.12, p = 0.089$) and trade ($\beta = -0.09, p = 0.134$) are not statistically significant, implying that their impact on tax evasion is weak or inconsistent in the context of Pakistan.

The model has a strong explanatory power, with an R-squared of 0.68, indicating that 68% of the variation in tax evasion is explained by the independent and control variables. The F-statistic of 15.32 ($p < 0.01$) confirms the overall model significance. The findings of regression analysis highlight the critical role of education in reducing tax evasion and demonstrate that digitalization significantly strengthens this impact. The results support policies promoting educational reforms and digital literacy to improve tax compliance in Pakistan.

DISCUSSION

The empirical results from the correlation analysis (Table 2) and panel regression analysis (Table 3) provide strong evidence supporting the research hypotheses. The findings highlight the significant role of education quality and digitalization in combating tax evasion behavior, with digitalization serving as a crucial moderating factor in strengthening the impact of education on tax compliance.

Impact of Education on Tax Evasion (H1):

The correlation analysis indicates a strong negative relationship between education quality and tax evasion ($r = -0.65$, $p < 0.01$), implying that improved education levels lead to a decline in tax evasion behavior. The panel regression analysis further reinforces this finding, as education quality exhibits a negative and statistically significant coefficient ($\beta = -0.43$, $p = 0.001$). This suggests that higher education levels enhance individuals' understanding of tax systems, leading to better compliance. Educated individuals are more likely to recognize the importance of taxation in supporting public services and infrastructure, reducing their inclination toward tax evasion.

Additionally, education plays a crucial role in fostering ethical awareness and financial literacy, making individuals less likely to engage in fraudulent tax-related activities. The results align with previous studies emphasizing that countries with stronger education systems tend to have lower levels of tax evasion, as citizens develop a deeper awareness of legal obligations and the consequences of non-compliance.

Moderating Role of Digitalization in Education (H2):

The study hypothesized that digitalization significantly moderates the relationship between education and tax evasion, meaning that technological advancements in education further enhance its impact on tax compliance. The correlation analysis shows a significant positive relationship between education quality and digitalization ($r = 0.72$, $p < 0.01$), indicating that highly educated societies are more likely to adopt digital tools in education. Additionally, digitalization itself is significantly negatively correlated with tax evasion ($r = -0.58$, $p < 0.01$), suggesting that increased digital transformation in education contributes to better tax compliance.

The panel regression analysis provides further support for this hypothesis. The interaction term Education \times Digitalization has a significant negative coefficient

($\beta = -0.22$, $p = 0.007$), indicating that digitalization strengthens the effect of education in reducing tax evasion. This implies that digital learning platforms, e-governance, and online financial education tools enhance tax knowledge, making taxpayers more aware of their obligations. Digital platforms allow for transparent tax regulations, easy access to tax-related resources, and improved communication between governments and taxpayers, thereby reducing non-compliance.

These findings suggest that governments should invest in digital education infrastructure as a means of reinforcing tax compliance efforts. The combination of high-quality education and digital learning tools creates an environment where taxpayers are better informed and less likely to engage in tax evasion.

Other Influencing Factors on Tax Evasion:

Apart from education and digitalization, other control variables also play significant roles in influencing tax evasion behavior:

Population Growth ($\beta = 0.28$, $p = 0.004$) is positively associated with tax evasion, indicating that rapid population expansion increases tax evasion risks. This may be due to larger informal economies in densely populated areas where tax enforcement is weaker.

Income Level ($\beta = -0.31$, $p = 0.006$) has a significant negative relationship with tax evasion, implying that wealthier societies exhibit higher tax compliance. Individuals with higher incomes tend to be more aware of tax policies and have stronger ties to formal financial institutions.

Government Expenditure ($\beta = -0.25$, $p = 0.008$) significantly reduces tax evasion, suggesting that efficient public spending encourages compliance by increasing public trust in government institutions.

However, urban population ($\beta = -0.12$, $p = 0.089$) and trade ($\beta = -0.09$, $p = 0.134$) show insignificant relationships with tax evasion. This suggests that urbanization and trade liberalization alone do not directly influence tax compliance but may interact with other socio-economic factors.

CONCLUSION

This study aimed to investigate the role of education in combating tax evasion in Pakistan, with digitalization as a moderating factor. The findings provide strong evidence that education significantly reduces tax evasion behavior in Pakistan. Higher levels of education enhance individuals' awareness of tax laws, ethical responsibilities, and the consequences of tax evasion, leading to improved compliance. Among the control variables, population growth was positively associated with tax evasion, indicating that rapidly growing populations pose challenges for tax enforcement. Conversely, income level and government consumption expenditure negatively influenced tax evasion, suggesting that economic stability and efficient public spending promote tax compliance. However, urban population and trade had no significant impact, indicating that structural changes alone are insufficient to curb tax evasion without targeted interventions.

This study highlights the importance of enhancing education systems and integrating digital solutions to improve tax compliance in Pakistan. Policymakers should prioritize education reforms, digital financial literacy programs, and e-governance initiatives to foster a more transparent and efficient tax system.

Recommendations

- Future studies should extend the time frame beyond 2000–2018 to include more recent data, particularly considering technological advancements and policy reforms in taxation. The inclusion of post-2018 data could capture the effects of digital tax reforms and e-governance initiatives in Pakistan, providing a more comprehensive and updated analysis.
- Future research should expand the sample beyond Pakistan and conduct cross-country comparative analyses.
- Future research could incorporate primary data collection methods such as surveys, interviews, or experiments to gain firsthand insights from taxpayers, policymakers, and tax authorities.

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