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Electronic Services and Tax Compliance: Evidence from Medium and Small Businesses in Burkina Faso

Jule Kaïni Tinta, Mouhamed Zerbo, Fabrizio Santoro, Awa Diouf, Kèrabouro
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Summary

African governments are increasingly digitalising their tax systems, with the hope of raising more revenue through digitalisation. This paper investigates the adoption and impact of electronic services on tax outcomes, focusing on small and medium enterprises (SMEs) in Burkina Faso. We focus on three indicators of e-service adoption by taxpayers – namely registering for the eSINTAX platform, using it for e-filing (called eSINTAX filing), and paying taxes digitally (called tax e-payment). We rely on survey data from 1,090 SMEs and tax administrative data of about 17,000 SMEs on eSINTAX, tax returns and payments. We present three sets of results. First, key drivers for adopting eSINTAX services include having SARL legal status, using electronic billing machines, having higher tax knowledge, operating in the trade sector, undergoing audits, having a dedicated accounting department, and being an older business. Second, we explore how technology usage shapes tax attitudes and perceptions. While no strong relationship is found between eSINTAX filing and practical perceptions of navigating the tax system, tax e-payment significantly improves the perceived ease of filing and facilitates compliance, particularly after tax adjustments. Also, eSINTAX enhances perceptions of tax system fairness, transparency, and trust, and reduces perceived corruption. Lastly, we document the causal impacts of eSINTAX services on tax declarations and payments. Registering for eSINTAX significantly increases declared tax liabilities, a trend that continues with eSINTAX filing. Tax e-payment results in higher tax amounts paid compared to non-digital methods. Based on these findings, the paper offers policy recommendations for the Burkinabe revenue authority and other African governments aiming to leverage digitalisation to strengthen their tax systems. These recommendations include the launch of targeted awareness-raising campaigns and the organisation of practical training to encourage the adoption of digital tax services. There should also be more investment in digital infrastructure and e-payment security to ensure reliability and trust in e-payment systems.

Keywords: electronic services, technology adoption, tax compliance, tax administration, Burkina Faso.

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Acronyms

CFA	West African Franc
CIT	Corporate income tax
DFS	Digital financial services
DGI	Direction Général des Impôts (Burkina Revenue Authority)
EBM	Electronic billing machine
ES	Electronic services
ICT	Information and communication technology
IFU	Identifiant fiscal unique (tax identification number)
INSD	Institut National de la Statistique et de la Démographie (National Institute of Statistics and Demography)
MFI	Microfinance institutions
SARL	Société à Responsabilité Limitée (limited liability company)
SMEs	Small and medium enterprises
RN	Régime du réel normal d'imposition (real regime)
RSI	Régime du réel simplifié d'imposition (simplified regime)
RUMAP	Référence unique de montant à payer (unique reference for amount payable)
VAT	Value added tax

1. Introduction

The digital revolution has radically transformed the financial services landscape globally, a transformation that has significantly accelerated on the African continent (Arewa and Santoro 2022). The rapid emergence of information and communication technology (ICT) has remarkably shaped the economic landscape in Burkina Faso, the country under study, as in other developing economies around the world. Digitalisation allowed African tax administrations to introduce electronic services for tax purposes in recent years (Okunogbe and Santoro 2023b). Following this path, the government of Burkina Faso took an important step in April 2018 by launching a digital platform for tax filing and payments. This initiative is part of a broader drive to modernise and digitise tax processes and demonstrates the commitment of the government and tax authority to leveraging the benefits of digitalisation.

Electronic services are now emerging as a key lever to overcome the traditional challenges associated with tax collection. They facilitate more efficient and transparent management of tax revenues by simplifying procedures. The introduction of digital platforms is revolutionising various administrative tasks, such as tax collection, verification, and the processing of tax information. This automation reduces potential human errors and speeds up overall processing, thereby improving the efficiency of tax administration (Apeti and Edoh 2023; Okunogbe and Santoro 2023b). In addition, the digital transformation of tax reduces compliance costs for taxpayers while strengthening the capacity of tax administrations to monitor and promote compliance (Okunogbe and Pouliquen 2022). By simplifying tax procedures, digitalisation reduces the administrative burden on taxpayers. It allows them to save time and resources previously spent on filling out tedious paper forms (Kochanova, Hasnain and Larson 2020). In addition, e-services provide taxpayers with easy access to tax information, reducing the costs associated with physical travel to tax offices and facilitating access to the resources needed to better understand tax obligations. The usefulness of electronic services is crucial in the promotion of taxpayers' tax compliance. As procedures become simpler, taxpayers have a natural incentive to fulfil their tax obligations more easily, thus contributing to an overall improvement in the financial health of the tax system (Santoro *et al.* 2023; Hakizimana and Santoro 2023).

The study of Burkina Faso's context in terms of the adoption of electronic tax services is particularly pertinent, considering the important initiatives implemented to promote the use of these services. The introduction of the electronic tax filing and payment platform, eSINTAX, in 2018 represents a significant step forward in the modernisation of tax procedures in Burkina Faso. The government's reform to make the use of this technology mandatory for businesses, especially small and

micro businesses, from 2022 underscores its commitment to the transition to electronic tax processes. According to January 2023 statistics from the Direction Générale des Impôts du Burkina (DGI), the General Directorate of Taxes, the platform has 15,837 registered taxpayers, with 8,473 electronic filings and 9,765 online payments since its beginning. Small companies show an adoption rate of 44 per cent, while medium-sized companies reach around 98 per cent and large companies 100 per cent. Although the overall adoption rate is relatively higher, the actual usage of online filing and payment applications remains lower. Existing literature on the subject highlights that effective use of electronic systems in the tax area requires a significant level of sophistication (Conley and Udry 2010). To raise awareness and encourage the adoption of these systems, governments have implemented various strategies, including the introduction of mandatory electronic filing and payment (Santoro, Amine and Magongo 2024), the phasing out of paper filing, and the simplification of tax procedures. These initiatives aim to increase taxpayers' ability to interact directly with electronic systems (Kochanova *et al.* 2020). However, despite the increased accessibility of online procedures, many tax administrations still fail to provide technical assistance to many taxpayers. This situation can be explained by a lack of resources, insufficient training of administrative staff, or inadequate technological infrastructure to fully support these online services. Against this background, we seek to answer the following questions in the context of Burkina Faso: (i) what are the determinants of the adoption of tax electronic services? and (ii) how does the use of these services influence taxpayers' tax compliance behaviour?

To conduct our analysis, we opt for a methodology that combines different data sources. This includes the use of administrative data provided by the DGI, as well as survey data from a sample of 1,090 small and medium-sized enterprises. The DGI data provides a solid quantitative basis for examining general trends in adoption and usage of e-filing, and e-payments. It allows us to assess the impact of platform adoption in terms of actual compliance behaviours. In addition, the survey data gives us a detailed, more granular insight into taxpayers' motivations, practical barriers, and experiences in using tax services. By interviewing this sample directly, we gather contextualised information on the perceptions, preferences, and concerns of potential and actual users of e-services. We distinguish in our analysis between taxpayers who have adopted the eSINTAX, those who actively use it to file tax returns, and those who pay taxes digitally.

We present three sets of findings. First, a set of findings related to the descriptive mapping of eSINTAX adoption shows that such a platform is massively adopted, mainly because of the time and effort savings it offers in the tax filing and payment process (Mascagni, Santoro and Mukama 2019). In addition, easier access to tax documents, such as proof of tax status, real-time monitoring of tax records and reduced opportunities for corruption are also motivating factors. However, despite this uptake, effective use of eSINTAX is hampered by barriers such as the inability to use the platform effectively and connectivity issues,

highlighting the importance of know-how and infrastructure (Shaikh and Karjaluoto 2015; Conley and Udry 2010). In a more robust regression framework, we elucidate the determinants driving the adoption of tax e-services. A coherent narrative emerges across the three indicators of technology utilisation employed in our study of registration for eSINTAX, active use for e-filing, and the digital payment of taxes. Variables such as possessing SARL legal status,¹ the deployment of electronic sales machines, elevated levels of tax knowledge, engagement in the trade sector, prior audit experiences, the presence of a dedicated accounting department, and the longevity of business operations exhibit a significant positive correlation with all three indicators.

Second, we attempt to link technology utilisation with shifts in tax attitudes and perceptions. Our findings indicate no robust relationships between registering and using the platform and practical perceptions of navigating the tax system. Nonetheless, the adoption of digital payment methods for tax remittance markedly enhances perceptions of the ease of filing and compliance following tax adjustments, underscoring the notable advantages of this technology.² Regarding broader tax perceptions, our evidence consistently highlights technology's potential at varying degrees across the three indicators to improve the perceived fairness of the tax system, diminish perceived corruption, bolster trust in the DGI, and enhance the perception that the DGI is entitled to conduct audits. However, we observe mixed evidence regarding changes in satisfaction with public services, warranting further investigation to unravel the underlying mechanisms. Focusing on our result, we obtained information concerning tax perceptions and satisfaction with public services among taxpayers surveyed. Our data shows that, although these taxpayers benefit from quality public services, their perceptions of taxes remain overwhelmingly negative. This situation reflects a notable contradiction, where relatively high satisfaction with public services fails to offset the negative feelings associated with paying taxes. This phenomenon highlights a complexity in the relationship between the quality of services provided and attitudes towards tax obligations, requiring further analysis to fully understand these mixed perceptions.

Third, we document significant causal impacts of technology adoption on the

¹ The Société à Responsabilité Limitée (SARL) is the most common form of commercial company in Burkina Faso. It is established by one or more partners who are only liable for the company's debts up to the amount of their capital contributions. The SARL is managed by one or more individuals, who may or may not be partners, as specified in the articles of association or decided collectively by the partners. Besides SARLs, there are approximately seven other types of legal statuses available.

² Awareness of the benefits of digital payments can encourage taxpayers to adopt the digital platform, improving the overall efficiency of the tax system and user satisfaction. By informing taxpayers of the benefits of using digital payments, such as 24/7 accessibility, speed of transactions, immediate verification of payments, increased security and simplification of tax adjustments, they are more inclined to adopt these new technologies. In order to achieve this, tax authorities need to run effective information and awareness campaigns, using a variety of communication channels to reach a wide audience.

amounts of tax declared and paid. The act of registering on the platform alone substantially increases declared tax liabilities (about 33.7 per cent), a finding that remains consistent with the actual usage of e-filing (around 31.2 per cent). Furthermore, the digital payment of taxes results in higher tax amounts paid compared to traditional non-digital methods (about 22 per cent).³

This study contributes to the public finance literature in several important ways. The literature on the adoption of tax e-services in developing countries highlights significant disparities in this process. Studies examining this issue have identified factors that influence adoption and use. For example, Davis (1989) used the Technology Acceptance Model to predict the main factors influencing an individual's intention to adopt and use a new technology. The results of his study highlighted two predominant elements: perceived usefulness and ease of use. These elements suggest that individuals are more likely to adopt and integrate technology into their daily lives if it is perceived as useful and easy to use. More recently, several studies have shown that demographic factors such as education, gender, income, age, and geographical location significantly influence the adoption and use of electronic services (Santoro *et al.* 2023; Anane *et al.* 2022; Efobi *et al.* 2019; Borg and Smith 2018; Zins and Weill 2016). However, the adoption of electronic services can be hindered by a lack of information or awareness, know-how, and high transaction costs (Shaikh and Karjaluoto 2015; Foster and Rosenweig 2010; Conley and Udry 2010). Santoro *et al.* (2023) examined the determinants of tax e-service adoption in Rwanda and found that certain groups, such as women, less educated taxpayers, and less sophisticated businesses, have lower awareness of online services. They also highlighted a significant positive correlation between interactions with the tax administration and taxpayer awareness, a relationship we also observed in our study. In addition, some research on small taxpayers in Nigeria has highlighted similar barriers that may hinder the adoption of e-filing, such as education level, age, familiarity with technology, and the use of an external tax professional (Efobi *et al.* 2019).⁴ Second, we contribute to a recent body of quantitative impact evaluation assessing the effects of e-services on compliance.

³ To rule out reverse causality in our analysis of the impact of technology adoption on reported tax amounts, we use the impact methodology developed by Callaway and Sant'Anna (2021). This method is particularly suited to our administrative panel data and the staggered introduction of eSINTAX. It allows us to estimate the impact of technology adoption by analysing changes in tax returns before and after adoption, while comparing these changes with those of a control group that has not yet adopted the technology. This approach helps us to isolate the causal effect of eSINTAX adoption, ruling out the possibility that changes in reported amounts preceded and motivated the adoption of the technology. To ensure the robustness of our results, we include taxpayer and time fixed effects to control for individual and time variation that may affect the results. In this way, we confirm that the increase in reported tax liabilities is indeed due to the adoption of the technology and not to pre-existing factors or reverse causality.

⁴ Frequent power outages and network congestion during peak hours have hampered the effectiveness of eSINTAX systems in Kenya and Tanzania (Eilu 2018). Sifile *et al.* (2018) report similar challenges in Zimbabwe, noting that limited internet connectivity, frequent power outages, and a lack of taxpayer knowledge also hinder the effective use of remote tax filing.

Recently, an IMF study (Nose and Mengistu 2023) found that the incorporation of digital technologies could potentially boost tax collection, but that the benefits vary depending on the type of services introduced. Its findings show a significant correlation between the adoption of digital tax processes and improved tax performance, but the realisation of the financial benefits depends largely on policy, legal, and administrative reforms, as well as the availability of adequate digital connectivity and skilled tax staff. Another case study from Eswatini (Santoro *et al.* 2024), assessing the mandate of adopting e-filing during the pandemic, shows the positive impacts of e-filing on timeliness and accuracy of reporting. Similar positive results have been produced for a different technology, electronic fiscal devices or e-invoicing, in Rwanda (Hakizimana and Santoro 2023), Ethiopia (Mascagni, Mengistu and Woldeyes 2021) and Peru (Bellon *et al.* 2022).⁵

We contribute to these strands of literature in different ways. First, we fill a gap by focusing on Francophone Africa, a region often neglected in academic studies. To the best of our knowledge, no research has been conducted on the adoption of electronic services and its impact on tax compliance in Francophone African countries, while most existing studies on this topic have focused on English-speaking countries (Yimam, Lidetu and Belete 2024; Hakizimana and Santoro 2023; Arewa and Santoro 2022; Anane *et al.* 2022). Second, we originally combined survey and administrative data, a methodology only partially followed in the literature, to provide a more comprehensive picture of technology adoption. Lastly, we exploit valuable information from tax administrative data that allows us to disentangle between e-filing adoption proxied by registration on the eSINTAX platform and actual usage proxied by filing returns on the platform. We show how adoption does not necessarily translate into usage. We therefore add further nuances in the understanding of taxpayers' experience with technology, while most of the studies are not able to disentangle the aspect of adoption from usage, due to data limitations.

Lastly, our empirical findings, derived from in-depth analyses of tax administration data and surveys, provide valuable guidance to policymakers and tax administrations on how to improve digital services to optimise tax revenue mobilisation. This primary data, collected on the ground, plays a crucial role in formulating targeted policy reforms, ensuring an evidence-based approach, and meeting the needs of stakeholders such as policymakers and taxpayers. It also highlights the importance of tax administrations putting in place measures to improve taxpayer behaviour, such as effective communication channels, ongoing training programmes, awareness-raising initiatives in the form of games, and regular reminders of tax module updates. This evidence is particularly relevant as

⁵ The introduction of mandatory electronic invoicing in Peru has led to a significant improvement in tax compliance. As a result, companies reported higher sales (+6.6 per cent) and higher deductions of VAT paid on inputs (+4.5 per cent), leading to a 7.2 per cent increase in net VAT liability. The impact of e-invoicing on net VAT liability was greatest for small enterprises, with an increase of 9.7 per cent (Bellon *et al.* 2022).

African governments have recently implemented public policies aimed at making digital fiscal processes mandatory (Santoro *et al.* 2024), often accompanied by awareness-raising campaigns and training initiatives (Okunogbe and Santoro 2023a).

The paper is structured as follows. We start with a description of the context in Burkina Faso in section 2, followed by a detailed description of the research design in section 3. Section 4 presents the results on adoption factors and impacts on tax perceptions and behaviour. Section 5 concludes the paper.

2. Context and rationale for the study

2.1 Burkina Faso's tax system

The tax system in Burkina Faso is, like most African Francophone countries with a tax pressure, at about 17.3 per cent in 2018. It was the second-best performance in the West African Economic and Monetary Union (WEAMU) area behind Togo (18.4 per cent). Value added tax (VAT) and corporate income tax (CIT) are the most relevant sources of tax revenue, representing respectively about 37 per cent and 23 per cent of total tax revenue in 2022.⁶ Importantly, tax revenue mobilised by the tax authority is mostly extracted from large enterprises with about 40 per cent of tax revenue coming from the ten largest enterprises, 55 per cent from the 20 largest enterprises, and 70 per cent of tax revenue from the 50 largest enterprises in 2018. Despite the relative growth of small and medium formal businesses in the last decade, from about 14,000 in 2010 to 36,000 in 2018, large firms remain the main source of tax income. The informal sector recorded about 80 per cent of firms and contributed to about 0.29 per cent of domestic tax revenue in 2018.⁷

In terms of compliance, the tax revenue potential from companies remains somehow untapped, particularly for small and medium enterprises. The recovery rate from tax audits remains low and the outstanding tax remains higher.⁸ Despite these challenges, clearly, the role of firms is central to tax collection in Burkina. They collect VAT from customers and remit CIT, as well as other taxes, to the tax administration. Ensuring optimal tax compliance from these taxpayers is central to the growth of tax revenue in Burkina Faso. International reports indicate that Burkinabe firms tend to perform more tax payments in a year, about 45, than their peers in other Sub-Saharan African (SSA) countries (36.6).⁹ The time taken to

⁶ All statistics are from Burkina Revenue Authority reports.

⁷ See Etude pour l'elaboration d'une Strategie de Promotion du Civisme Fiscal au Burkina Faso, <https://dgi.bf/wp-content/uploads/2023/10/RAPPORT-SUR-LA-PROMOTION-DU-CIVISME-FISCAL.pdf> (accessed 12 September 2024) for more information. All very small-scale economic activities that do not fall into one of the various tax regimes described in this document, pay a 'patente' (tax) linked to their activity (occupancy of a square, etc.), which the local council collects (this is known as the 'contribution de micro-entreprise au forfait'). This contribution also applies to itinerant vendors on foot, bicycle, motorcycle or vehicle. This level of contribution does not require a tax identification number (TIN) registration.

⁸ Etude pour l'elaboration d'une Strategie de Promotion du Civisme Fiscal au Burkina Faso, <https://dgi.bf/wp-content/uploads/2023/10/RAPPORT-SUR-LA-PROMOTION-DU-CIVISME-FISCAL.pdf> (accessed 12 September 2024)

⁹ World Bank, [Doing business: Paying taxes, Latest available data](#) (accessed 12 September 2024)

fulfil tax formalities is about 270 hours per year, slightly less than in the SSA region (284.4 hours). The share of total taxes and contributions paid by firms in percentage of total profit is about 41.3 per cent in Burkina Faso, lower than the SSA average (47.3 per cent).

2.2 Technology for tax

In the last decade, the Burkinabe government heavily invested in technology to modernise its systems and offer digital services to citizens. The journey of the DGI is illustrative in this sense. In 2017, it introduced a digitalised anti-forgery system for bills to combat fraud in the economy. Traders were invited to buy a digital sticker, approved by the DGI, to put on their bills. This sticker contains all information about the firm that has produced the bill and is used to authenticate the invoice and ensure traceability. This year, the DGI also initiated the payment of the residence tax through mobile money (via Orange), a test exercise for the subsequently scaled e-payment platform.

The year 2018 marked the beginning of several digital measures introduced in the tax system, notably the development of the digital tax process platform called eSINTAX. Its online availability allows taxpayers to request services, declare, and pay their taxes and duties online. The implementation of this platform has gone through several stages. In fact, in March 2018, the e-filing module was developed with the possibility of declaring as many as 15 taxes online. July of the same year saw the development of the e-payment module for online payment by bank transfer and the extension of remote declaration to all 33 taxes in the tax system. Finally, in October, the development of the module for the automatic generation of withholding tax certificates enabled taxpayers to automatically receive online the withholding tax certificates to then declare and pay.

During 2019, the DGI developed new functionalities on eSINTAX. Firstly, in January 2019, it created the mpayment module for online payment through mobile money. In June 2019, it developed DGI-CASH for cash payments at bank counters. However, only the United Bank for Africa (UBA) currently allows this.¹⁰ Finally, in June 2019, the DGI created a unique online taxpayer account, which allows taxpayers to consult their tax files online.

In March 2020, the use of the platform was extended to all taxpayers. The

¹⁰ Also in June 2019, the module for requesting tax status certificates (ASF) online was developed. Taxpayers could receive secure ASFs and no longer need physical signatures. However, they must be stamped as by the provisions of the General Tax Code to be valid. In the same month, the DGI introduced the online turnover certification request module, which allows taxpayers to request and receive their turnover certifications online. The online VAT credit refund request module, which enables taxpayers to request refunds of their VAT credits online, has also been developed. Requests are submitted electronically for processing by the administration's internal procedures. Taxpayers are notified of each stage in the processing of their claim on their eSINTAX personal space.

adoption began with medium and large firms that represent about 90 per cent of tax revenue. Now, as well, e-service adoption is mandated for small enterprises and possibly for micro businesses as well. At the beginning of 2023, 15,837 firms subscribed to eSINTAX. Since its creation in the first month of 2023, there have been 847,053 eSINTAX filings via eSINTAX. Likewise, the number of digital payments exceeds 100,000 with around 97,000 via bank transfer.¹¹

In 2023, the start of the last quarter marks the beginning of e-CME¹² devices for microenterprises with less than CFA francs 5,000,000 (US\$8,276) annual turnover digital tax obligations. However, microenterprises with less than CFA francs 15,000,000 (US\$24,828) and more than CFA francs 5,000,000 (US\$8,276) remain declarative using eSINTAX. To continue the journey of tax digitisation exemplified in eSINTAX, the Burkina Revenue Authority implemented the e-CME to allow tax payment via mobile money for microenterprises. It is also possible to pay taxes in instalments.

¹¹ Direction Générale des Impôts Burkina Faso.

¹² eCME (Contribution des Micro Entreprises au forfait) is the digital payment device for micro-businesses with annual turnover less than CFA francs 5,000,000 (US\$8,276). The main options available on the platform are: payment of taxes via mobile money, consultation of unpaid eCME, storage of RUMAP and IFU, and cancellation of RUMAP and IFU.

3. Research methodology

3.1 Data

Drawing on recent literature (Santoro 2021; Mascagni and Santoro 2021), we adopt an approach of combining different data sources, such as administrative data from the DGI for quantitative analysis, more qualitative survey data and in-depth interviews.

3.1.1 Tax administration data

Our collaboration with the DGI was a crucial step in gaining access to the taxpayer registry, a rich source of tax and administrative data. The data was updated in January 2023. The registry contains a wealth of data, including key elements such as the year of registration, the tax regime to which each taxpayer is subject (whether normal or simplified), telephone details, geographical location, and details of the sector of activity, which includes commerce, industry, and services. The administrative data in our analysis covers all active small and medium businesses operating in Burkina Faso that are registered for the CIT. Large firms and microenterprises are not part of this study, as for them adoption has been mandatory for many years.¹³

The data on income tax returns and payments provides a detailed view of the tax behaviour of taxpayers before our survey began. It covers the period from 2018 to 2022. Income tax returns include the amounts of profits declared by taxpayers for each tax year, the filing year, the deadline, and the method of declaration. Payment data includes the amounts paid, showing both the amount due and the amount paid to the tax authorities. The methods of payment, such as bank transfers, electronic payments, or cash, are available for each tax year.

In addition, the information available in the eSINTAX register allowed us to access more specific data, such as the date of taxpayers' adoption of the system, the taxes declared, the methods of declaration, the taxes paid, and the payment methods used by taxpayers. To carry out our analysis, we drew a representative sample, focusing on the Central Region, considered the economic engine of Burkina Faso, and the secondary regions of Hauts-Bassins and Centre-Ouest. These regions were chosen because of their high level of economic activity and relative security stability. However, to ensure the quality and relevance of our sample, we had to exclude certain taxpayers. We excluded taxpayers with invalid contact details and 'never filers', i.e., taxpayers who were registered but never

¹³ A large firm is a business with a turnover which excluding tax is equal to or greater than CFA francs 1 billion. Microenterprise is a business with a turnover less than CFA francs 15,000,000.

filed a tax return. The purpose of this measure is to avoid potential bias in our analyses that could result from intensive registration campaigns specifically targeting these inactive units (Mascagni *et al.* 2022). Despite these exclusions, we have maintained the representativeness based on the regions selected and the reliability of our sample by excluding these inactive taxpayers to ensure statistically robust and consistent results. As a result, the final number of businesses included in our sample is estimated to be 17,082, allowing us to conduct relevant and meaningful analyses on the adoption and use of digital financial services.

3.1.2 Survey data and in-depth interviews

The survey data provides a detailed profile of taxpayers, with a particular focus on individual characteristics and business specifics.¹⁴ While individual characteristics include demographic elements, company characteristics encompass organisational aspects. The data also collects taxpayers' attitudes and perceptions around the tax system. It is important to note that each taxpayer is represented by a unique IFU (tax identification number), which simplifies identification across all databases. This standardisation facilitates the integration of information, ensures consistency of analysis, and guarantees more accurate results. By combining tax administration and survey data, our study aims to obtain a complete picture of the taxpayer profile, providing a solid basis for informed conclusions and relevant recommendations.

The survey was meticulously designed to ensure a balanced representation of taxpayers across the selected regions in Burkina Faso. We successfully interviewed approximately 1,090 taxpayers registered for income tax, divided into different regimes: 61 per cent RSI and 39 per cent RN.¹⁵ The business sectors covered include 47 per cent services, 33 per cent commerce, and 20 per cent handicrafts. The sample also represents 12 per cent women, 41 per cent taxpayers with higher education (university training level), and 50 per cent Muslims, to ensure that the sample is as representative as possible of the national taxpayer population. Also, the collaboration with a survey company based in Ouagadougou provided valuable local expertise and solid experience in

¹⁴ In terms of business practices, we are referring to the specific methods, procedures, and behaviours that companies adopt to achieve their business objectives. This encompasses a variety of activities and operational strategies. For example, the use of Momopay in commercial transactions illustrates a specific business practice, where a company integrates this digital payment platform to facilitate financial transactions and therefore improve the fluidity of payments.

¹⁵ RN: régime du réel normal d'imposition (real regime): individuals or legal entities whose annual turnover excluding tax is equal to or greater than CFA francs 50 million are subject to the normal real profit tax regime.

RSI: régime du réel simplifié d'imposition (simplified regime): individuals or legal entities whose annual turnover excluding tax is equal to or greater than CFA francs 15 million and less than CFA francs 50 million are subject to the simplified real profit tax regime.

conducting surveys in Burkina Faso. This strategic collaboration also made it possible to recruit competent local interviewers who were well-informed about local realities. The interviewers underwent comprehensive training on the various survey modules, with a particular focus on grasping the intricacies of the tax system and digital financial services. The survey process commenced on 4 July 2022 and concluded on 14 August 2022, with an average interview duration of 46 minutes. This approach ensured that the target areas were adequately covered, with a particular focus on the major urban centres, including Ouagadougou, Bobo-Dioulasso, and Koudougou.¹⁶

The survey modules were designed to cover all relevant aspects of the taxpayers' tax experience. Detailed demographic data of the main person responsible was collected, as well as the specific characteristics of each business.¹⁷ A key aspect of the survey was an in-depth exploration of experiences with the tax system. It included questions on the reasons for adopting and using the electronic tax platform, to gather detailed information on the factors influencing taxpayers' use of this technology. Finally, the module on the perception of tax discipline collected subjective data on taxpayers' morale and attitudes toward paying their taxes (see Table A.1 for a description of the variables, survey questions, response modalities, and coding).

Additionally, we conducted in-depth interviews with key players in the Burkina Faso business environment. This crucial phase of our methodology involved in-depth dialogues with key figures from the DGI, the Chambre de Commerce et de l'Industrie, the Maison de l'Entreprise, and Orange Burkina. During these discussions, we carefully addressed key issues related to the adoption and use of digital services in the context of doing business in Burkina Faso. The discussions focused on the experiences, perceptions, and challenges faced by these key players in integrating and implementing digital services in the Burkina Faso business landscape. The conclusions of these interviews provide a better understanding of the context and enable the results of the study to be interpreted.

3.2 Estimation strategy

3.2.1 Drivers of adoption

As a first exercise, we analyse the factors that explain taxpayers' adoption of tax e-filing and e-payment services. Our approach is encapsulated in the following probit equation, which forms the framework of our methodology:

¹⁶ The utilisation of the SurveyCollect application enabled the collection of data in an expedient and secure manner, ensuring the maintenance of high data quality standards.

¹⁷ We refer mainly to the CEO of the company.

$$Y_i = f(\beta'Individ; \gamma'Business; \lambda'ES; \delta'Tax; \mu; \epsilon) \quad (1)$$

where we consider Y_i as the dependent variable, which is a binary variable indicating either eSINTAX adoption, eSINTAX filing, or tax e-payment. Indeed, the eSINTAX adoption is defined by the registration with the electronic tax payment platform – eSINTAX. The eSINTAX filing is the eSINTAX used for filing and tax e-payment for digital tax payment. eSINTAX adoption, eSINTAX filing, and tax e-payment are respectively the first, second, and third levels of eSINTAX. Filing electronically requires registering for eSINTAX, and paying taxes digitally requires taxpayers to first file via eSINTAX the taxes they are due to pay (Table A.2).

In terms of explanatory factors, we divide these into four different categories. In each eSINTAX step, we use the same set of covariates. First, we consider a set of individual characteristics of the primary taxpayer. Second, we consider a set of characteristics related to the firm. Thirdly, we analyse a set of characteristics specific to tax-related electronic services (Table A.3). The associated probit coefficients, denoted β' , γ' , λ' , and δ' , indicate the relative importance of each factor in the adoption process of digital financial services. Importantly, location-fixed effects embedded in the μ were also included in our analysis to better contextualise the results. In addition, we run a few regressions in which we distinguish between the two tax systems. The associated probit coefficients, denoted β' , γ' , λ' , and δ' , indicate the relative importance of each factor in the electronic tax level. μ is the vector of location-fixed effects to take into account the regional specifics. ϵ is the error term. In addition, we run a few regressions in which we distinguish between the two tax systems. In addition to the above estimations, we use the probit to highlight the tax perceptions of eSINTAX services.

3.2.2 Impacts on tax perceptions

Concerning the impact of eSINTAX on tax perceptions, we carried out a linear regression using the OLS model. We performed this regression using the survey-based attitude measures as follows:

$$Y_i = f(\beta'eSINTAX; \gamma'Controls) \quad (2)$$

where Y_i represents two groups of variables concerning tax perceptions. We distinguish more practical tax perceptions from more general and broad ones. The practical tax perceptions are defined by three specific indicators, i.e. variables representing respectively ease of contact with the tax authorities, ease of tax filing/payment, and ease of tax recovery. For the more general tax perceptions, there are eight indicators. These are a set of soft motivations to comply that are related to conditional tax morality (Prichard 2022) such as the fairness of the tax amount, paying taxes to benefit from better public services, satisfaction with public services, transparent use of tax revenues, the

presumption of betting, and a set of perceptions related to deterrence and trust in the tax authority, namely being selected for an audit, trust in the DGI and perceptions about if corruption can or cannot make doing business easier (see Table A.4 for statistic descriptive). The key explanatory variables (ES) in equation (2) highlighting each level of eSINTAX (dummy variable) are eSINTAX adoption, eSINTAX filing and tax e-payments. The set of controls includes all the variables mentioned in equation (1), such as individual, company, electronic services, and tax characteristics.

3.2.3. Impact on tax behaviour

Then, we focus on the impact of eSINTAX services on tax behaviour. We assess the effect of each step of eSINTAX (adoption, filing and payment) on the tax declared and tax paid in separate regressions. Thus, we have three different treatments (eSINTAX adoption, eSINTAX filing and tax e-payment) and two outcomes (tax declared and tax paid). This is a great advantage allowing us to analyse some heterogeneity in technology adoption compared to other similar studies. Data on the annual amount of tax declared and tax paid derives from the DGI system and covers the period of 2018–2022. Our study adopts a difference-in-differences (DiD) method with staggered treatment adoption, as proposed by Callaway and Sant’Anna (2021), which best exploits the panel nature of our administrative data on filings and payments, also allowing for different outcome trends after adoption. This method is also best suited for staggered treatment adoption, as for eSINTAX users who register for the technology at different points in time. Following Bernad *et al.* (2023), we restrict our analysis only to those taxpayers who do not just register for eSINTAX, but actually go on to use the platform. In addition, we restrict our study to taxpayers for whom at least one filing period before and after the first period of eSINTAX usage can be observed in the administrative data. Then, we assess the effect of the eSINTAX on tax declared and tax paid amount using a difference-in-differences (DiD) with staggered treatment. In this approach, when one unit is treated, it remains treated in the next periods – that is, the treatment status is absorbing. This approach is proven to be more robust as it does not suffer from the common pitfalls with two-way fixed effects, namely the ‘negative weight problem’ with linear regressions, highlighted by De Chaisemartin and d’Haultfoeuille (2020) and Sun and Abraham (2021). We apply the average treatment effect of units who are members of a specific group g at a particular period t , that is they started using eSINTAX at the same time – conditional on pre-treatment covariates X as follows:

$$ATT(g, t) \equiv E[Y_t(g) - Y_t(0) | X, G_g = 1] \quad (3)$$

Where G_g is a binary variable that is equal to one if a unit is first treated in period g . Here, there are three different treatments in separate regressions (eSINTAX adoption, eSINTAX filing, and e-tax payment). Y_t represents the amount of CIT declared and paid in each reporting period t . X represents a set of covariates,

such as an Ouagadougou-specific binary variable taking the value of 1 for firms located in the capital and 0 otherwise, a dummy variable taking the value of 1 for firms operating in the trade sector and 0 if not, and another dummy variable taking the value of 1 if filing/payments before the deadline and 0 otherwise.

Then, we measure the overall effect of policy intervention by aggregating the average treatment effect for all groups across all periods. In other words, we aggregate the results by averaging the year-by-year effect in a single series of estimations relative to the ATT for the event study. We calculate the average effect of treated ATT for event times e relative to the year of treatment $g(e = t - g)$. In equation 4, we use the suggested group-dependent weights $w(g, t)$ following Callaway and Sant'Anna (2021).

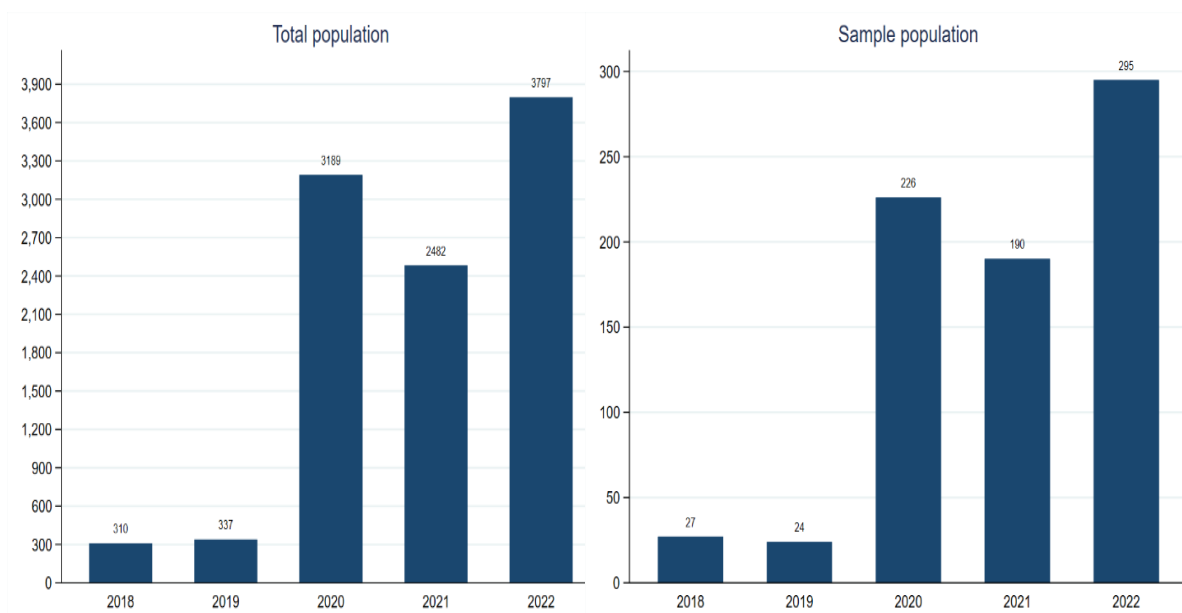
$$ATT = \sum_{g \in G} w(g, t) * ATT(g, t) \quad (4)$$

4. Results

4.1 Patterns of tax e-service adoption

Figure 4.1 displays eSINTAX adoption trends over time. Of the 17,082 SMEs in the tax register, 10,115 (59 per cent) adopted the platform between 2018 and 2022. In 2018, 310 SMEs adopted the platform, increasing slightly to 337 in 2019. The COVID-19 pandemic caused an explosion in adoptions in 2020 with 3,189 new companies. This trend continued with 2,482 adoptions in 2021 and 3,797 in 2022. The SMEs in the survey sample followed a similar progression, rising from 27 in 2018 to 295 in 2022. This sustained growth shows that adoption of the platform continues to rise strongly.

Figure 4.1 Evolution of eSINTAX registrations



Source: Authors' own elaborations on data derived from tax administration data on business registration.

Figure A.1 shows the main reasons for adopting the electronic tax platform. Saving time and effort is the dominant factor, leading 72 per cent of taxpayers to use the platform for the electronic submission of tax returns and payments. Easy access to tax documents, especially tax status certificates, is the second most important reason, with a rate of 47 per cent. Real-time monitoring of tax files is also an important factor, influencing 33 per cent of taxpayers. Other reasons include reducing opportunities for corruption (31 per cent), quick access to tax updates (21 per cent), reducing the cost of processing tax documents (19 per

cent), and access to 24/7 online services (28 per cent). On the other hand, the reduction of errors when filing tax returns and the ability to store tax documents online are mentioned at lower rates, at 17 per cent and 14 per cent respectively. These results highlight the range of functional and operational benefits that motivate taxpayers to adopt the electronic tax platform.

Figure A.2 provides a better understanding of the discernible difference between formal adoption and actual use of the eSINTAX platform by the total population of taxpayers. In this regard, we note an overall adoption rate of 59 per cent with 79 per cent use among adopters. In our sample of 1,090 taxpayers surveyed, 762 (70 per cent) have adopted the platform, while 328 (30 per cent) have not, as shown in Figure A.3. The nuance, however, is that adoption does not always translate into active use. Some taxpayers seem to have adopted eSINTAX without necessarily using it. Of the adopters, only 630 taxpayers actively use the platform to file and pay their taxes online, representing 82 per cent of the adopters. This result highlights the complexity of taxpayers' behaviour regarding tax technologies. Figure A.4 provides a more detailed explanation of the reasons why taxpayers who have registered for eSINTAX are not using the platform. It is mainly the difficulties of use and connection problems that demotivate the use of the platform.

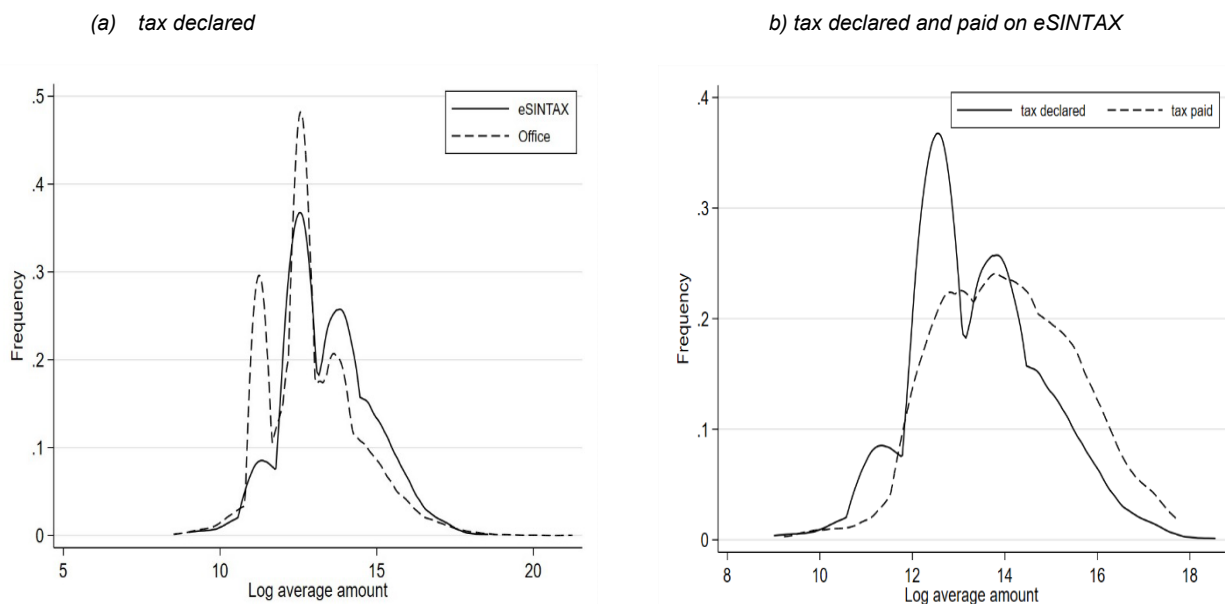
In addition, Figure A.5 shows the different payment methods integrated into the application, such as e-payment, mpayment, DGI-Cash, and cash. E-payment and mpayment are described as digital payments integrated into the application to allow taxpayers to pay online via their bank account or mobile money. DGI-Cash is an experimental payment method that requires payment in person at a bank counter after online submission. Payment by cash or credit advice is a manual option at the tax counter or by bank transfer. This distinction highlights the diversity of payment methods and emphasises the electronic aspect of certain methods compared to more traditional methods. The graph shows that digital payments are still not widely used, with just a third of the sample opting for cashless options, while at least two-thirds prefer cash-based payments.

From 2018 to 2022, the amounts of tax declared according to the method of declaration show a clear similarity between declarations made at the office and those made via the electronic platform, as illustrated in Figure 4.2 (a). However, a distinct trend emerges as in-office personal returns remain the preferred option for small amounts declared. This may be explained by the familiarity and perceived security that taxpayers associate with face-to-face interaction with tax agents for smaller amounts.

On the other hand, the use of the electronic platform has increased significantly for transactions involving larger amounts. This development suggests that taxpayers are increasingly confident in using technology to manage larger amounts. Several factors contribute to this increased confidence. Firstly, awareness of the benefits of the electronic platform, such as convenience, speed

of transactions, and reduced human error, has increased because of awareness campaigns and administrative reforms. Secondly, the positive experience of early adopters has probably reassured other taxpayers about the reliability and security of the platform. The increase in the use of the electronic platform for higher tax amounts also reflects a gradual adaptation of taxpayers to digital technologies, often encouraged by government initiatives to modernise tax services.

Figure 4.1 Average amounts per tax declared and paid from 2018 to 2022



Source: Authors' own elaborations on data derived from tax administration data on business registration.

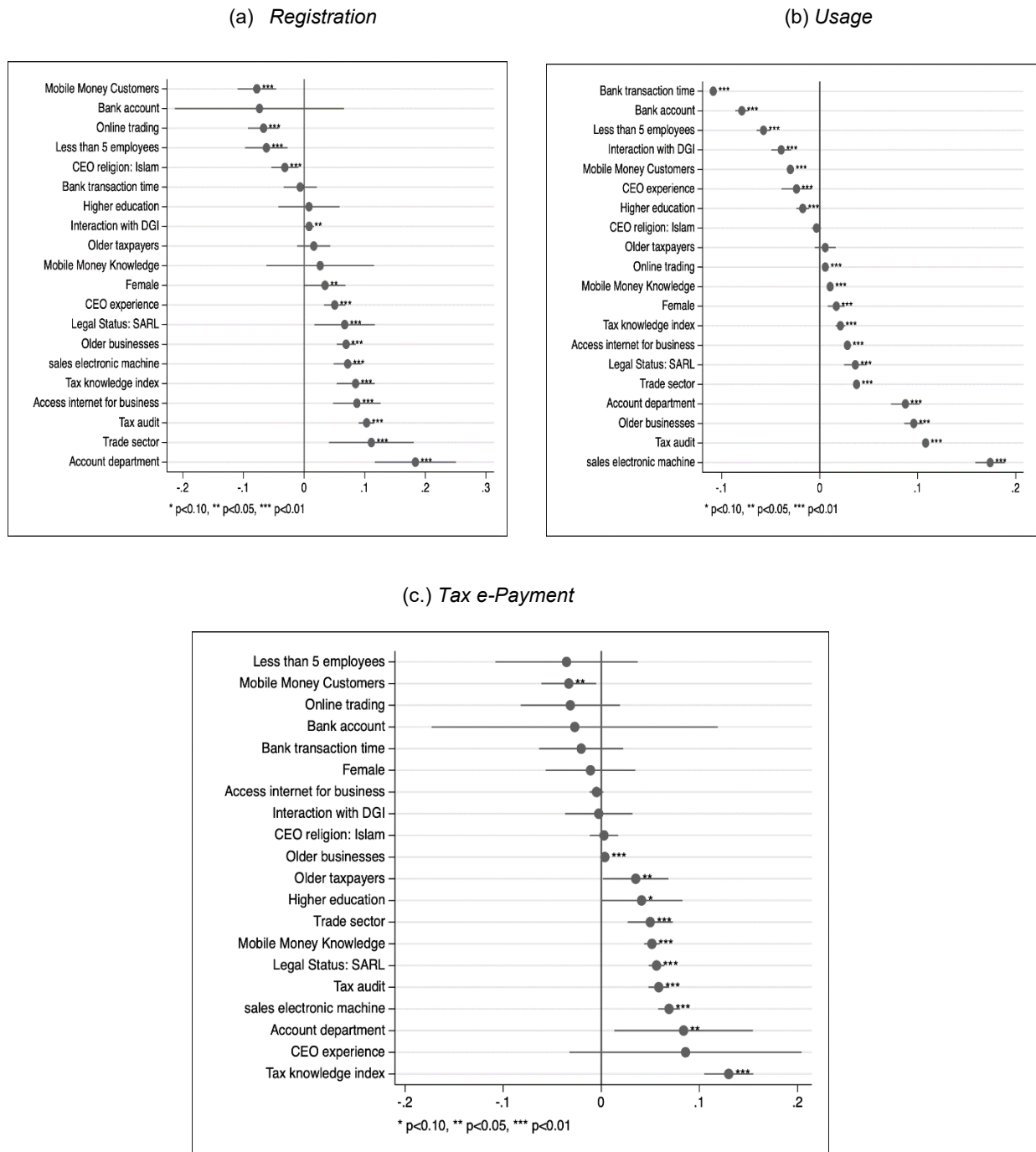
Figure 4.2 (b) shows a similar trend between the amounts of tax declared and paid through eSINTAX but shows that the amounts declared are generally higher than the payments. This discrepancy is natural, as there is often a delay between tax declaration and actual payment. Taxpayers may declare their taxes on time, but payments may be delayed due to financial or administrative constraints. It has also been observed that payments can sometimes exceed the amounts declared. This may be due to previous late payments or to tax adjustments where taxpayers pay arrears at the same time as their current obligations. Increasing usage of eSINTAX could also play a role in facilitating the regularisation of payments and allow a more accurate monitoring of tax liabilities, thus contributing to a better management of payment times.

4.2 Determinants of adoption of tax e-services

We now explore the main factors affecting the adoption of e-services, considering

the registration on the eSINTAX platform (adoption), actual filing through eSINTAX (usage), and digital payment of taxes (e-payment). We present the coefficient plots in Figure 4.3 for the three outcomes, respectively, following the estimation framework described in section 3.2.

Figure 4.2 Determinants of eSINTAX



Note: The outcome is a binary variable 0-1 for being registered with the eSINTAX platform, filing through the eSINTAX platform, and paying taxes with digital methods.

Source: Authors' own elaborations on data derived from the survey.

From Table 4.1, which summarises the previous graphs, it emerges that factors like using electronic sales machines, having higher tax knowledge, operating in the trade sector, having been audited, having a dedicated accounting department, and operating in older businesses are all significantly positively correlated with eSINTAX registration, actual filing and digital payments registration, actual filing, and digital payments. All these factors point to a pattern in which more established, IT-ready, and sophisticated businesses are more likely to adopt technology. This pattern has been established in other contexts as well, as in Rwanda and Eswatini (Santoro 2021; Santoro *et al.* 2023).

Table 4.1 Determinants of adoption of tax e-services

	Registration	E-filing	E-payment
Tax knowledge index	+	+	+
Legal status: SARL	+	+	+
Trade sector	+	+	+
Account department	+	+	+
Older businesses	+	+	+
Tax audit	+	+	+
Sales electronic machine	+	+	+
Mobile money customers	-	-	-
Female	+	+	
Access internet for business	+	+	
Interaction with DGI	+	-	
Manager experience	+	-	
Online trading	-	+	
Fewer than five employees	-	-	
Mobile money knowledge		+	+
Higher education		-	+
Manager religion: Islam	-		
Bank transaction time		-	
Bank account		-	
Older taxpayers			+

Note: This table shows the positive and negative correlation of the statistically significant results for each factor with the three eSINTAX outcomes (registration, e-filing, and e-payment).

Source: Authors' own elaboration based on survey data.

For instance, the SARL legal status of firms is more likely to characterise larger businesses in the trading sector. These more complex entities tend to have more rigorous accounting systems, and a higher familiarity with the tax system and hence with the different aspects of digitalisation. Consistently, very small businesses (fewer than five employees) are much less likely to adopt eSINTAX, even though this dimension does not matter for digital payments.¹⁸ Relatedly, being in the trade sector is also a key factor in all regressions. Considering that most trading companies are also active in foreign trade, they might be familiar with digital procedures to respect tax obligations (say, at customs), or with cashless payments. Relatedly, using electronic billing machines directly correlates with technology adoption, indicating positive spillovers across digital services. It is also true that EBM users might be more aware of the benefits of digital services and perceive higher scrutiny from the tax administration.

Furthermore, the relevance of tax knowledge can be explained as more knowledgeable firms might be more aware of the regulatory background and requirements, on top of knowing more about the benefits from digitalisation. This dimension also nicely resonates with the role played by the account department factor. Firms with an accounting department might benefit from accountants with high tax knowledge and IT readiness. Unsurprisingly, this translates into higher technology adoption.¹⁹ Interestingly, technology adoption correlates strongly with having received an audit, indicating that audited firms are more likely to respect regulations around eSINTAX adoption, probably due to a strong perception of being on the tax agency's radar.

Lastly, older businesses are more likely to make use of technology. These firms might be more familiar with the tax system and have witnessed the rise in technology in government services, adapting to it. Also, arguably these businesses have had more interaction with the tax administration and hence have been more exposed to the new digital advancements in the tax system. This finding might also simply suggest that it takes time to fully adopt technology, and more recently established firms are only slowly adapting to it.

Among the factors affecting eSINTAX registration and usage without affecting digital payments, it is worth mentioning the role of internet access. The eSINTAX platform requires a stable internet connection for registration and usage. Those firms without connections fail then to adopt technology and are left out of the platform. Another important factor to discuss is the gender dimension. The results

¹⁸ It is also true that eSINTAX adoption was originally meant for large and medium businesses, and it is only later that smaller businesses have been encouraged to use the platform (section 2).

¹⁹ Consistently, results show that Muslim respondents are less likely to register with the platform. Historically, the education level has been lower for Muslims compared to Christians, due to colonial legacies. This gap in education can explain the lower familiarity of Muslims with the eSINTAX platform.

show that female respondents are more likely to adopt eSINTAX and use it for filing taxes. This could be related to the fact that women are more likely to respect tax obligations (Stockard, Van De Kragt and Dodge 1988) hence they would abide more with the 2018 law concerning eSINTAX adoption. It could also simply mean that female taxpayers prefer the digital platform as it enables remote compliance, avoiding in-person interactions with tax officials.

As a last key factor to consider, having a higher knowledge of mobile money positively correlates with using cashless payments. This finding is consistent with recent research around digital merchant payments in Ghana (Abounabhan *et al.* 2024) and Rwanda (Bernad *et al.* 2023), where knowledge of mobile money is a direct enabling factor for merchants' digital payments with their customers. This happens also for person-to-government payments in Burkina Faso, where taxpayers who know more about mobile money prefer cashless means of tax payments.

However, contrary to expectations, certain factors influence the adoption and usage of eSINTAX in unexpected ways. Businesses whose customers use mobile money, those involved in e-commerce, those with a bank account, and those with fewer than five employees show the opposite trends to those expected.

Businesses using mobile money, despite their familiarity with digital transactions, may be reluctant to adopt new technologies that are perceived as complex or not in line with their current practices. E-commerce businesses, while accustomed to using digital tools, may have integrated and proven processes that make it difficult to integrate new systems. In addition, businesses with bank accounts, while having access to modern financial infrastructures, may have concerns about the security and confidentiality of data processed by the platform. Finally, small businesses, which often have limited resources and a heavy administrative burden, may find new technologies costly and difficult to meet their immediate needs. These factors highlight the complexity of the barriers to the adoption of tax technology and underline the need for more nuanced approaches to address these specific challenges.

4.3 Implications for tax perceptions and behaviour

In this section, we further check the effect of technology on tax perceptions and tax compliance behaviour. As described above, we consider the three digital procedures (eSINTAX registration, eSINTAX usage, and digital payment) to analyse these effects. For tax perceptions and following Bernad *et al.* (2023) for Rwanda, we consider two sets of indicators. The first aspect refers to practical perceptions around navigating the tax system. In Table 4.2, column (1) analyses the effect of technology on an outcome indicating the ease of contacting the tax revenue authority. Column (2) assesses the same effect on the variable 'easy to file' and the last column shows how technology can act on the opinion concerning the ease of tax adjustments.

The results in Table 4.2 reveal, in panel a, no tangible correlation between adopting eSINTAX and any of the practical perceptions. These results remain insignificant for panel b which shows the correlation between using the platform for filing and the practical perceptions. In panel c, where we evaluate the effect of digital payments, there is a positive relation concerning the outcomes 'easy to file' and 'easy adjustment'. This could be because the digital tax payment requires filing on the eSINTAX platform. This possibility of tax payment is accessible only to firms that can file on the platform. Thus, filing easiness is positively correlated to digital payment. On the 'easy adjustment' side, the positive and significant effects can be explained by the fact that the platform indicates the amount the firm must pay after the tax adjustment. This facilitates taxpayers' experience with the system at the time of paying.

Table 4.2 Correlates of technology adoption and practical tax perceptions

	(1)	(2)	(3)
	Easy to contact DGI	Easy to file	Easy adjustment
(a) eSINTAX registration			
eSINTAX reg.	-0.03	0.08	0.06
	(0.02)	(0.03)	(0.03)
District FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
R-sq.	0.09	0.20	0.28
Observations	975	1046	1005
(b) eSINTAX filing			
eSINTAX filing	0.01	0.02	0.05
	(0.01)	(0.02)	(0.04)
District FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
R-sq.	0.10	0.17	0.25
Observations	846	909	874
(c) Digital payments			
Digital payment	-0.00	0.11*	0.17**
	(0.02)	(0.03)	(0.03)
District FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
R-sq.	0.09	0.20	0.29
Observations	982	1054	1012

Note: Standard errors in parentheses. The outcome is a set of practical tax perceptions

(see section 3.2). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Authors' own elaboration based on survey data.

The second aspect of tax compliance is the effect of eSINTAX on moral tax perception, highlighted in Table 4.3. Here, we build indicators like peer pressure or social norms in column (1), agreeing with a statement of fiscal reciprocity in column (2), perceived fairness or high tax equity in column (3), perception of no corruption in the tax system in column (4), high satisfaction with the provision of public services in column (5), perceived transparency in how tax revenues are used in column (6), trust in tax administration in column (7) and acknowledgement of the DGI's right to audit or control taxpayers in column (8). We explore

correlations for our three main indicators of tax e-services adoption. Results in the first panel (a) reveal no effect of registering for eSINTAX on peer pressure, reciprocity, fairness, transparency, and right to audit. However, positive correlations are found between registering on the platform and perceiving no corruption in the system, feeling more satisfied with public services, and sensing higher trust towards the tax administration. This positive evidence hints at improvements in the perceived transparency of the tax system overall, thanks to the access to the platform. Users believe the system is now more predictable, less prone to corruption or bribery, and more trustworthy. The platform seems to significantly improve these margins. Even if marginally significant, we find a positive effect on satisfaction with public services – probably as taxpayers see the e-filing platform as a public service offered to them. Broader tax perceptions around social norms, reciprocity, fairness, and enforcement remain untouched, as these probably need a stronger intervention or policy change to be shaped.

Panel (b) indicates that actual usage correlates with a highly significant improvement in perceived fairness, and a less significant one in reciprocity, as well as with a negative change in satisfaction with public services. The positive variation is encouraging in the sense that using the platform to comply might be increasing the perceived equity in the amounts declared, now more transparent and predictable than a historically manual, paper-based, practice, which in turn stresses the role of tax remitted to fund public services. As for the deleterious effect on public service satisfaction, it is a surprising effect that is somehow in contrast to evidence in the case of panel a. This could be explained by the fact that actual users of eSINTAX, compared to those that merely registered, are declaring taxes to the DGI – while they now see value in those taxes to fund growth, they are still dissatisfied with the quality and provision of those public services their taxes are meant to fund.

In the third part of Table 4.3 (panel c), assessing the effect of tax digital payments, we find a positive and significant effect on the perceived absence of corruption, public service satisfaction, tax revenue transparency, and the DGI's right to audit variables. Focused on the strong, positive effects of lack of corruption, which also comes hand in hand with a smaller but significant increase in perceived transparency, we argue that digital payments inevitably reduce capricious practices.

Table 4.3 Correlates of technology adoption and broader tax perceptions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Peer pressure	Reciprocity	Fairness	No corruption	Service satisfaction	Revenue transparency	Trust	Right to audit
(a) eSINTAX registration								
eSINTAX reg.	-0.01	0.07	0.03	0.07**	0.14*	-0.01	0.10**	0.06
	(0.01)	(0.08)	(0.06)	(0.01)	(0.04)	(0.03)	(0.02)	(0.04)
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-sq.	0.26	0.27	0.26	0.19	0.13	0.13	0.19	0.18
Observations	1045	1079	1030	1052	1076	974	1054	1020
(b) eSINTAX filing								
eSINTAX filing	-0.05	0.05*	0.15***	-0.02	-0.09**	-0.01	-0.01	-0.02
	(0.03)	(0.02)	(0.01)	(0.03)	(0.02)	(0.03)	(0.02)	(0.03)
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-sq.	0.24	0.32	0.29	0.17	0.16	0.13	0.21	0.17
Observations	906	934	890	913	932	849	912	885
(c) Tax e-payments								
Digital payments	-0.02	0.05	0.01	0.09***	0.12*	0.01**	-0.02	0.06**
	(0.01)	(0.04)	(0.01)	(0.00)	(0.03)	(0.00)	(0.01)	(0.01)
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-sq.	0.26	0.27	0.26	0.19	0.14	0.13	0.18	0.18
Observations	1055	1089	1038	1062	1086	982	1063	1030

Note: Standard errors in parentheses. Outcomes are a set of broader tax perceptions (see sec. 3.2). Source: Authors' own elaboration based on survey data. *** p<0.01, ** p<0.05, * p<0.1

For users of digital payments solutions, cash-based payments, which are more prone to negotiation or bribe-extortion, are abandoned. Limiting physical interactions between taxpayers and tax collectors seems to reduce the possibility of collusion and corruption. When it comes to the enhanced endorsement of the DGI's right to audit taxpayers, this could be explained by taxpayers who pay digitally believing that corruption or evasion should be curbed. Given the higher transparency of digital payments, users would think that is the right of the DGI to prosecute non-compliant taxpayers, probably those paying in cash, with a higher

chance of collusion. We also document a weakly significant, positive effect on public service satisfaction, which is somewhat in contrast with the negative impact of eSINTAX filing described above, and thus needs further research to fully understand its underlying mechanisms.

The last part of this section is focused on tax filing and tax payment data from the DGI and covers all active firms in Burkina Faso that declared or paid CIT from 2018 to 2022. The main reason for choosing corporation tax for this study is its central importance in the tax system and its significant impact on government revenue. By focusing on this tax, we are targeting a homogeneous population of taxpayers representing different sizes and sectors of activity. This allows for a detailed and relevant analysis of tax behaviour and the impact of the adoption of tax technology such as the eSINTAX platform. We first assess the effect of eSINTAX registration and eSINTAX filing on the tax-declared amount. Second, we measure the effect of digital payment adoption on the amount of tax paid. For each analysis, we deploy the difference-in-difference with staggered treatment and dynamic trends following Callaway and Sant'Anna (2021). Table 4.4 (Figure A.6) highlights the result of eSINTAX adoption on the amount of tax declared for all taxpayers. Column (1) presents results without controls while column (2) produces more precise results by adding controls. In each case, the eSINTAX registration has a positive and significant effect on the tax-declared amount. These results show that eSINTAX adoption significantly improves CIT revenue mobilisation.

When considering impacts from eSINTAX filing on the platform, Table 4.5 (Figure A.7) produces the relevant results. In columns (1) and (2) we evaluate the impact of eSINTAX filing on the tax-declared amount without any restriction on our sample (in this case we also consider firms not registered for eSINTAX). Then, we add two columns, (3) and (4), in our analysis. In columns (3) and (4), we restrict the sample to only firms that are registered for eSINTAX, without and with controls respectively exploiting partial usage conditional on registration. The results show a positive and significant effect of eSINTAX filing on the amount of CIT declared at about 31 per cent and 19 per cent, respectively, for all taxpayers and for those registered with eSINTAX. The effect is stronger in all taxpayers without restrictions than the analysis focusing on taxpayers who are registered for eSINTAX because firms that already apply for eSINTAX are more compliant than taxpayers that do not apply for eSINTAX. These findings highlight the potential channel of fairness in the amount of tax declared raised thanks to eSINTAX filing.

Lastly, our analysis focuses on the effect of tax e-payments on the amount of tax paid. Table 4.6 (Figure A.8) shows a positive, albeit less significant, effect on tax paid. This observation suggests that the adoption of digital tax payment technologies has a favourable impact on tax revenues, even if this impact is moderate compared with initial expectations. The positive effect, albeit modest, indicates that taxpayers who adopt digital payment tend to pay higher amounts of

tax. This could be attributed to several factors, such as ease of use, fewer payment errors, and better traceability of transactions. These results corroborate the findings in Table 4.4, where the adoption of digital payment of taxes increases the perception of the absence of corruption thanks to the reduction in intermediaries and transaction costs and the right to audit because of the high level of compliance. Despite the less significant effect, this result highlights the potential of technology to improve the efficiency of the tax system and increase public revenue.

Table 4.1 Impacts of eSINTAX registration on tax declared

	(1)	(2)
	Log tax declared	Log tax declared
eSINTAX reg.	0.371***	0.337***
Controls	(7.42)	(6.70)
	No	Yes
<i>N</i>	9,986	9,939

Note: *t* statistics in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
Source: Authors' own elaboration based on survey data.

Table 4.2 Impacts of eSINTAX filing on tax declared

	(1)	(2)	(3)	(4)
	Log tax declared	Log tax declared	Log tax declared for eSINTAX registered	Log tax declared for eSINTAX registered
eSINTAX filing	0.344***	0.312***	0.210***	0.190**
Controls	(6.57)	(5.82)	(3.52)	(3.12)
	No	Yes	No	Yes
<i>N</i>	10,567	10,520	8,162	8,123

Note: *t* statistics in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
Source: Authors' own elaboration based on survey data.

Table 4.3 Impacts of digital payments on tax paid

	(1)	(2)
	Log tax paid	Log tax paid
Tax e-payment	0.229**	0.220**
	(2.16)	(2.04)
Controls	No	Yes
N	11,389	11,389

Note: *t* statistics in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Authors' own elaboration based on survey data.

5. Conclusions and policy recommendations

Digital tools are increasingly integrated into tax processes to facilitate tax filing and payment, improve transparency, and enhance compliance. However, the realisation of these benefits depends on the expansion and level of taxpayer adoption of digital tools. Understanding how using technology shapes taxpayers' perceptions is crucial, as that can influence their tax compliance behaviour.

In this paper, we first describe the drivers of the adoption of tax e-services. A consistent picture emerges across the three indicators of technology usage we deploy – eSINTAX registration, eSINTAX filing, and tax e-payment. Firms which are registered as SARLs, are electronic billing machine users, and have an accounting department are more likely to adopt these tools. In addition, older businesses, those in the retail sector, and those that have already undergone an audit are more likely to use digital tax services, motivated by their familiarity with the technology, their understanding of tax obligations, and their recognition of the benefits in terms of simplicity and time savings. Second, we try to connect technology usage and changes in tax attitudes and perceptions. Although registration and use of the eSINTAX platform do not appear to strongly influence practical perceptions of the tax system, digital tax payments significantly improve perceptions of ease of tax filing and adjustment. This shows that technology offers significant benefits, particularly in reducing transaction costs and facilitating tax compliance. In addition, the adoption of eSINTAX helps to improve perceptions of the fairness of the tax system, reduce perceptions of corruption, increase transparency about the use of tax revenues, and increase confidence in the DGI. However, the results of changes in satisfaction with public services remain mixed and merit further exploration. Lastly, we document important causal impacts of technology adoption on tax declared and paid. Merely registering on the platform strongly increases tax liabilities declared, a result that is sustained when we look at the actual usage of eSINTAX filing. Likewise, paying taxes digitally translates into higher tax amounts paid compared to non-digital options.

Based on these findings, we make relevant policy recommendations for the DGI, which ideally extend beyond Burkina Faso to all African governments seeking to digitise their tax systems. First, to promote the successful adoption of the eSINTAX platform, it is essential to launch targeted awareness campaigns. These campaigns should use various communication channels, such as traditional and digital media, to explain the benefits and the process of registering for eSINTAX. The aim is to clearly present the benefits of digital declaration and payment. In addition, it is crucial to organise practical training sessions for businesses that are less familiar with the technology. These should include live demonstrations, video

tutorials, and step-by-step guides. Particular attention should be paid to training older entrepreneurs who may be reluctant to adopt these technologies. Specialised training programmes, such as workshops and seminars, could help overcome this reluctance by providing personalised technical support and explaining the tangible benefits.

In parallel, it is essential to invest in internet infrastructure to ensure reliable access to eSINTAX. The government should develop public-private partnerships to improve connectivity and the quality of internet connections. These partnerships could focus on upgrading existing infrastructure and expanding coverage in urban areas. Encouraging the use of professional accounting services could also strengthen the tax expertise of businesses and facilitate their adoption of eSINTAX. Tax incentives or subsidies for companies working with qualified accountants could be considered to support this initiative.

Regarding electronic tax payments, it is crucial to raise awareness about the security of transactions. Educational campaigns should be launched to dispel misconceptions about the security of electronic payments and to explain the security measures built into payment systems. Workshops and practical guides could help businesses and taxpayers to adopt these technologies with confidence. At the same time, tax authorities should work closely with mobile payment service providers to improve the security and reliability of transactions. Developing new security features and building user confidence are key aspects of a smooth transition to electronic payment methods.

To further improve taxpayer perceptions and compliance, it is also important to increase transparency on the use of tax revenues. Albeit we show how e-services have already improved perceptions around corruption, enforcement, and trust, more can be done through digital platforms to ameliorate these and other perceptions, such as perceived transparency and fiscal reciprocity. Tax authorities should publish regular reports, to be disseminated via digital platforms, detailing the use of public funds, including information on the projects funded and the impact observed. This transparency can help reduce perceptions of corruption and increase taxpayers' confidence in the tax system.

In addition, more effective use of digitised data from online services can strengthen the core functions of the tax system. Albeit outside of the scope of this research, it remains unclear how the DGI is unlocking the full potential of digitised data flowing from e-services. The DGI should invest in advanced analytical capabilities to use this data to improve fraud detection, refine tax policies, and personalise services to taxpayers. Finally, to reap the full benefits of digital tools, it is important to continue to improve electronic filing and payment solutions. Tax administrations should invest in advanced technologies that provide a smoother and more predictable user experience. More robust, transparent, and informative systems will help make the filing and payment process more efficient and increase tax compliance.

By implementing these recommendations, the DGI, and the African governments, will be able to improve tax compliance, increase tax revenues, and provide a better experience for taxpayers. An integrated approach combining awareness, training, infrastructure, security, transparency, and data use will be essential to achieve these goals.

Appendix

Table A.1 Description of the interview questions and modality of responses

Category	Variable	Survey question	Possible response	Variable meaning
Demographic (individual)	Female	What is the gender of the company's 1st manager?	Female 1 Male 0	0.Male; 1.Female
	Age median	How old is the manager?	Open answer 18+	1. if age > age median; 0. if not
	Higher education	What is the highest level of education completed by the principal?	Lower secondary school (post primary) 04, Secondary school (lycée, BEP or CAP, BAC) 05, Post-secondary qualification (vocational training school) 06, University education (BTS, DUT, licence, Master, Doctorate) 07, Literacy (in national languages) 08	1. if 6. University education and 0. Otherwise
	Religion	What is the religious affiliation of the person in charge?	01. Atheism 02. Christianity 03. Islam 04. Animism 05. Other (please specify)	1. if 3.Islam and 0. Otherwise
	High Experience	How many years of professional experience does the 1st manager have in his field?	01. Between 1 and 5 years 02. Between 6 and 15 years 03. More than 15 years	1. if 3. More than 15 years and 0. Otherwise
Business characteristics	Less than 5 employees	How many permanent employees and temporary workers does your company employ in total?	01. Less than 5 02. 5-19 03. 20-49 04. 50-99 05. 100+	1. if 1.Less than 5 and 0. Otherwise
	Industry (trade)	What is the activity sector?	1.Trade, 2. Industry 3. Services	1. if 1.Trade and 0. Otherwise
	Account department	Does the company have an accounts department?	01. Yes 02. No	1. Yes; 0. No
	Online	Does the company sell its products or services online?	01. Yes 02. No	1. Yes; 0. No

	trading			
	Bank account	Does this establishment have a bank account?	01. Yes 02. No	1. Yes; 0. No
	Legal status	What is the current legal status of the company?	Open answer	1. if SARL; 0. if not
	Internet	Does the company have access to the Internet via mobile or optical fibre?	01. Yes 02. No	1. Yes; 0. No
Digital financial services	Mobile money for customer	Which of these payment methods do your customers accept?	01 Cash 02.Mobile money (Orange money and/or Moov money) 03.Credit cards 04.Bank transfer/internet banking 05.Cheques	1. if 2.Mobile money and 0. if not
	Electronic billing machine	When you make a sale, do you use an electronic machine at the point of sale	01. Yes 02. No	1. Yes; 0. No
	Bank transaction time median	How much time do you need to spend queuing at a bank to complete a transaction?	Open answers in hours	1. if Bank transaction time > Bank transaction time median; 0. if not
Tax	Tax knowledge index	Who is responsible for managing your company's tax obligations?	02. Friends/family members 03. An internal accountant 04. An external accountant 05. The owner 06. Business partner/external partner 07. Secretary 08. Tax official 09. Casual employee 11. Other [please specify]	
		What is the rate of corporation tax in Burkina Faso?	Open answer	
	Tax audit	During the last 5 years, has your company ever been subject to a tax audit by the DGI?	01. Yes 02. No	1. Yes; 0. No
	Interaction with tax authority	How often did you use the DGI for services other than returns and payments in 2022?	Open answer	1. Yes; 0. No
	Easy to contact DGI	More generally, how easy or difficult is it to contact the DGI for help, assistance or information?	01. Very easy 02. Easy 03. Difficult 04. Very difficult	1. if 1. or 2. and 0. if not
	Easy declaring	What is the level of difficulty related to the declaration/payment of taxes that may hinder the operation of	01.No difficulty 02.Moderate 03. Major 04. Severe	1. if 1. or 2. and 0. if not

	this business?		
Easy adjustment	What is the level of difficulty following an adjustment by the tax authorities that could hinder the operation of this business?	01. No difficulty 02. Moderate 03. Major 04. Severe	1. if 1. or 2. and 0. if not
Peer pressure	Please tell me whether you totally agree, somewhat agree, somewhat disagree or totally disagree with the following statement: If my neighbours don't pay tax, it's only fair that I don't pay tax either.	01. Totally disagree 02. Somewhat disagree 03. Somewhat agree 04. Totally agree	1. if 3. or 4. and 0. if not
Statement closest	Which of the following statements is closest to your point of view? Choose statement 1 or statement 2:	1. Taxpayers must pay their taxes to the government in order to benefit from better public services. 2. Taxpayers can refuse to pay their taxes if they do not receive adequate public services.	1. if 1. and 0. if not
Fairness	To what extent do you think the amount of all official taxes you have to pay is fair?	01. Very unfair 02. Unfair 03. Fair 04. Very fair	1. if 3. or 4. and 0. if not
No corruption	How many difficulties do you encounter in your work related to corruption?	01. No difficulties 02. Moderate 03. Major 04. Severe	1. if 1. or 2. and 0. if not
Service satisfactory	On a scale of 1 to 5, how satisfied are you with the delivery of public services?	01. totally dissatisfied 02. dissatisfied 03. neither satisfied nor dissatisfied 04. satisfied 05. totally satisfied	1. if 4. or 5. and 0. if not
Revenue satisfactory	In your experience, is it easy to find out how the government uses the revenue from citizens' taxes?	01. Very easy 02. Easy 03. Difficult 04. Very difficult	1. if 3. Islam and 0. if not
Trust	To what extent do you trust the DGI to act in the interests of ordinary taxpayers?	01. A great deal of confidence 02. Some confidence 03. Not very confident 04. No confidence at all	1. if 1. or 2. and 0. if not
Right to audit	Is selecting a company for an audit a bad thing?	01. Yes 02. No	1. Yes; 0. No

Source: Authors' own description of categories, variables, interview questions, modalities of response, and coding.

Table A.2 Interest variables description

Variables	Definition
eSINTAX registration	represents membership of the digital platform for online tax obligations
eSINTAX filing	represents the use of the digital platform for filing tax returns. eSINTAX filing require registering first for eSINTAX
Tax e-payment	represents tax payments via the eSINTAX. This step of eSINTAX require to declare taxes first on eSINTAX

Source: Authors' own, descriptions of interest variables.

Table A.3 Factors explaining DFS adoption

Category	Variable
Demographic (individual)	Female Age median Higher education Religion High experience
Business characteristics	Number of employees Industry (trade) Account department Online trading Bank account Legal status Internet
Digital financial services	Mobile money for customer Electronic sale machine Bank transaction time median
Tax characteristics	Tax knowledge index Tin registration year median Tax audit Interaction with tax authority

Source: Authors' own, descriptions of survey modules.

Table A.4 Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
esintax registered	1090	.699	.459	0	1
esintax user	1090	.578	.494	0	1
Tax e-payment	1090	.095	.294	0	1
Female	1090	.122	.327	0	1
High educ	1090	.415	.493	0	1
High experience	1090	.728	.445	0	1
CEO religion	1090	.486	.5	0	1
CEO age median	1090	.474	.5	0	1
less 5 than employees	1090	.355	.479	0	1
Internet	1090	.749	.434	0	1
Bank account biz	1090	.917	.275	0	1
Trade online	1090	.25	.433	0	1
Trade sector	1090	.339	.473	0	1
Accounts	1090	.833	.373	0	1
Legal tatus	1090	.622	.485	0	1
Time bank median	1090	.215	.411	0	1
Know MM	1090	.559	.497	0	1
EBM	1090	.082	.274	0	1
MM customers	1090	.619	.486	0	1
Tax knowledge index	1090	.62	.486	0	1
Tin reg year median	1090	.481	.5	0	1
Interaction	1090	.389	.488	0	1
Tax audit	1090	.277	.448	0	1
Peer pressure	1055	.223	.416	0	1
Statement closest	1089	.792	.406	0	1
Fairness	1038	.646	.478	0	1
No corruption	1062	.492	.5	0	1
Service satisfactory	1086	.245	.43	0	1
Revenue satisfactory	982	.495	.5	0	1
Trust	1063	.693	.461	0	1
Right to audit	1030	.099	.299	0	1
Easy contact DGI	982	.759	.428	0	1
Easy declaring	1054	.484	.5	0	1
Easy adjustment	1012	.488	.5	0	1

Source: Authors' own, descriptive statistics.

Table A.5 Comparison between normal regime and simplified regime

	(1) eSINTAX registration RN	(2) eSINTAX registration RSI	(3) eSINTAX USING RN	(4) eSINTAX USING RSI	(5) Tax e-payment RN	(6) Tax e-payment RSI
Female	0.01 (0.02)	0.02 (0.02)	0.01 (0.00)	-0.02*** (0.00)	-0.01 (0.05)	-0.01 (0.01)
Higher education	-0.00 (0.01)	-0.04** (0.01)	0.02*** (0.00)	-0.05** (0.00)	0.04 (0.04)	0.01 (0.01)
MANAGER experience	-0.04* (0.01)	0.03 (0.02)	-0.02* (0.01)	-0.07*** (0.00)	0.10 (0.06)	0.04** (0.00)
MANAGER religion: Islam	-0.00 (0.01)	-0.05** (0.01)	-0.01* (0.00)	-0.05*** (0.00)	0.02 (0.01)	-0.04* (0.01)
Older taxpayers	-0.01 (0.02)	0.00 (0.01)	-0.00 (0.00)	-0.04** (0.01)	0.01 (0.03)	0.07* (0.01)
Less than 5 employees	-0.06 (0.03)	0.02* (0.00)	-0.03 (0.01)	0.05*** (0.00)	0.06 (0.03)	-0.06* (0.01)
Access internet for business	0.06** (0.01)	0.07*** (0.00)	-0.01* (0.00)	0.03*** (0.00)	0.01 (0.03)	0.01* (0.00)
Bank account	-0.06 (0.08)	0.06** (0.01)	-0.04 (0.04)	-0.06** (0.01)	-0.01 (0.03)	0.01 (0.00)
Online trading	-0.01 (0.03)	-0.04 (0.02)	0.01 (0.01)	-0.01* (0.00)	-0.05 (0.04)	-0.01 (0.00)
Trade sector	0.02** (0.00)	0.06** (0.01)	0.00*** (0.00)	0.04*** (0.00)	0.04 (0.02)	0.00 (0.00)
Account department	0.03 (0.04)	0.13*** (0.00)	0.04* (0.01)	0.11*** (0.00)	0.10** (0.01)	0.01 (0.01)
Legal Statuts: SARL	-0.00 (0.04)	0.10** (0.01)	0.01 (0.01)	0.07*** (0.01)	0.10*** (0.01)	-0.03 (0.01)
Bank transaction time	0.01* (0.00)	0.02* (0.01)	0.00 (0.00)	-0.06*** (0.00)	0.00 (0.00)	0.01 (0.00)
Mobile money knowledge	0.04 (0.03)	0.02 (0.01)	-0.02*** (0.00)	0.06*** (0.00)	0.08*** (0.01)	-0.01* (0.00)
Sales electronic machine	0.01 (0.00)	-0.05** (0.01)	0.02*** (0.00)	0.24*** (0.00)	0.06* (0.02)	0.06** (0.00)
Mobile money customers	0.01 (0.01)	-0.02 (0.02)	-0.03** (0.01)	0.08*** (0.00)	-0.03 (0.02)	0.02* (0.00)
Tax knowledge index	0.03* (0.01)	0.07** (0.01)	-0.01* (0.00)	0.08*** (0.00)	0.04 (0.06)	-0.02 (0.00)
Older businesses	0.04 (0.02)	0.02 (0.03)	0.01 (0.00)	0.09*** (0.01)	0.02* (0.01)	-0.06 (0.01)
Interaction with DGI	-0.00 (0.00)	0.02 (0.01)	-0.01*** (0.00)	-0.12*** (0.00)	-0.05** (0.01)	0.09* (0.01)
Tax audit	0.05*** (0.00)	-0.15*** (0.01)	0.01* (0.00)	-0.04*** (0.00)	0.06 (0.03)	-0.06** (0.00)
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Mean of dep. variable	0.96	0.53	0.98	0.65	0.21	0.08
R-sq.	0.099	0.133	0.058	0.134	0.079	0.118
Observations	423	667	408	354	400	230

Note: Standard errors in parentheses. Outcome is an indicator variable for eSINTAX registration, eSINTAX using and tax e-payment. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Authors' own calculations based on survey data.

Table A.6 Determinants of eSINTAX registration probit

	(1) Demographics	(2) Business	(3) DFS	(4) All	(5) All+
Female	0.00 (0.03)			0.02 (0.02)	0.04** (0.02)
Higher education	0.04*** (0.01)			-0.02 (0.02)	0.01 (0.02)
Manager experience	0.14*** (0.01)			0.08*** (0.01)	0.05*** (0.01)
Manager religion: Islam	-0.04*** (0.01)			-0.03** (0.01)	-0.03*** (0.01)
Older taxpayers	0.03** (0.01)			0.02** (0.01)	0.02 (0.02)
Less than 5 employees		-0.12*** (0.02)		-0.09*** (0.02)	-0.05*** (0.02)
Access internet for business		0.12*** (0.03)		0.11*** (0.02)	0.09*** (0.02)
Bank account		-0.04 (0.07)		-0.07 (0.06)	-0.08 (0.07)
Online trading		-0.07*** (0.00)		-0.07*** (0.02)	-0.05*** (0.01)
Trade sector		0.11*** (0.03)		0.12*** (0.03)	0.11*** (0.04)
Account department		0.19*** (0.05)		0.19*** (0.04)	0.19*** (0.03)
Legal status: SARL		0.02 (0.04)		0.04* (0.02)	0.06** (0.02)
Bank transaction time			-0.01 (0.01)	-0.01** (0.00)	-0.00 (0.00)
Mobile money knowledge			0.05 (0.06)	0.06 (0.05)	0.03 (0.04)
Sales electronic machine			0.13*** (0.00)	0.07*** (0.01)	0.08*** (0.01)
Mobile money customers			-0.09*** (0.02)	-0.09*** (0.02)	-0.07*** (0.02)
Tax knowledge index					0.09*** (0.02)
Older businesses					0.07*** (0.01)
Interaction with DGI					0.01*** (0.00)
Tax audit					0.10*** (0.01)
District FE	Yes	Yes	Yes	Yes	Yes
Mean of dep. variable					
R-sq.					
Observations	1075	1088	1089	1074	1074

Note: Standard errors in parentheses. Outcome is an indicator variable for eSINTAX registration. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Authors' own calculations based on survey data.

Table A.7 Determinants of eSINTAX registration

	(1)	(2)	(3)	(4)	(5)
	Demographics	Business	DFS	All	All+
Female	0.00 (0.03)			0.02 (0.02)	0.03 (0.02)
Higher education	0.04* (0.01)			-0.01 (0.02)	0.01 (0.02)
Manager experience	0.15*** (0.01)			0.08** (0.01)	0.06** (0.01)
Manager religion: Islam	-0.04* (0.01)			-0.03 (0.01)	-0.03 (0.01)
Older taxpayers	0.02 (0.01)			0.02 (0.01)	0.01 (0.01)
Less than 5 employees		-0.12** (0.02)		-0.09* (0.02)	-0.05 (0.02)
Access internet for business		0.12* (0.03)		0.10** (0.02)	0.09** (0.02)
Bank account		-0.05 (0.08)		-0.06 (0.06)	-0.08 (0.07)
Online trading		-0.06*** (0.00)		-0.06* (0.02)	-0.03 (0.01)
Trade sector		0.10* (0.03)		0.10* (0.03)	0.09* (0.03)
Account department		0.21* (0.06)		0.19** (0.03)	0.18** (0.03)
Legal status: SARL		0.02 (0.04)		0.04 (0.02)	0.05 (0.03)
Bank transaction time			-0.01 (0.01)	-0.00 (0.00)	0.00 (0.00)
Mobile money knowledge			0.05 (0.06)	0.05 (0.05)	0.03 (0.04)
Sales electronic machine			0.11*** (0.00)	0.05** (0.01)	0.05** (0.01)
Mobile money customers			-0.08** (0.02)	-0.07** (0.02)	-0.05* (0.01)
Tax knowledge index					0.09** (0.02)
Older businesses					0.06*** (0.01)
Interaction with DGI					0.01* (0.00)
Tax audit					0.08*** (0.01)
District FE	Yes	Yes	Yes	Yes	Yes
Mean of dep. variable	0.70	0.70	0.70	0.70	0.70
R-sq.	0.044	0.094	0.032	0.120	0.147
Observations	1090	1090	1090	1090	1090

Note: Standard errors in parentheses. Outcome is an indicator variable for eSINTAX registration. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Authors' own calculations based on survey data.

Table A.8 Determinants of eSINTAX filing probit

	(1) Demographics	(2) Business	(3) DFS	(4) All	(5) All+
Female	-0.03*** (0.00)			0.00 (0.01)	0.02*** (0.00)
Higher education	-0.00 (0.00)			-0.03*** (0.00)	-0.02*** (0.00)
Manager experience	0.05*** (0.01)			0.00 (0.01)	-0.03*** (0.01)
Manager religion: Islam	-0.01*** (0.01)			-0.01 (0.01)	-0.01*** (0.00)
Older taxpayers	0.01 (0.01)			0.01 (0.01)	0.00 (0.01)
Less than 5 employees		-0.11*** (0.01)		-0.09*** (0.00)	-0.05*** (0.00)
Access internet for business		0.02*** (0.00)		0.02*** (0.01)	0.02*** (0.00)
Bank account		-0.09*** (0.00)		-0.10*** (0.00)	-0.09*** (0.00)
Online trading		-0.03*** (0.00)		-0.03*** (0.00)	-0.00 (0.00)
Trade sector		0.07*** (0.01)		0.06*** (0.00)	0.04*** (0.00)
Account department		0.09*** (0.01)		0.09*** (0.01)	0.10*** (0.01)
Legal status: SARL		0.01* (0.01)		0.01 (0.01)	0.04*** (0.01)
Bank transaction time			-0.05*** (0.00)	-0.05*** (0.00)	-0.04*** (0.00)
Mobile money knowledge			0.02*** (0.00)	0.02*** (0.00)	0.00*** (0.00)
Sales electronic machine			0.18*** (0.01)	0.17*** (0.01)	0.18*** (0.01)
Mobile money customers			-0.06*** (0.01)	-0.06*** (0.00)	-0.03*** (0.00)
Tax knowledge index					0.03*** (0.00)
Older businesses					0.09*** (0.00)
Interaction with DGI					-0.05*** (0.01)
Tax audit					0.11*** (0.00)
District FE	Yes	Yes	Yes	Yes	Yes
Mean of dep. variable					
R-sq.					
Observations	751	751	762	740	740

Note: Standard errors in parentheses. Outcome is an indicator variable for eSINTAX registration. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Authors' own calculations based on survey data.

Table A.9 Determinants of eSINTAX filing

	(1)	(2)	(3)	(4)	(5)
	Demographics	Business	DFS	All	All+
Female	-0.04** (0.01)			-0.00 (0.01)	0.02* (0.01)
Higher education	-0.00 (0.00)			-0.03** (0.00)	-0.02** (0.00)
Manager experience	0.05** (0.01)			0.01 (0.01)	-0.02 (0.01)
Manager religion: Islam	-0.02* (0.00)			-0.01 (0.01)	-0.00 (0.01)
Older taxpayers	0.01 (0.01)			0.01 (0.01)	-0.00 (0.01)
Less than 5 employees		-0.12** (0.02)		-0.10** (0.01)	-0.06** (0.01)
Access internet for business		0.02* (0.01)		0.02 (0.01)	0.02*** (0.00)
Bank account		-0.09* (0.03)		-0.09* (0.03)	-0.09** (0.02)
Online trading		-0.04** (0.00)		-0.03** (0.00)	0.00* (0.00)
Trade sector		0.07** (0.01)		0.05** (0.01)	0.03** (0.01)
Account department		0.10** (0.01)		0.10** (0.01)	0.10** (0.01)
Legal status: SARL		0.01 (0.01)		0.01 (0.01)	0.05* (0.01)
Bank transaction time			-0.06*** (0.00)	-0.05*** (0.00)	-0.04*** (0.00)
Mobile money knowledge			0.02*** (0.00)	0.02** (0.00)	0.01** (0.00)
Sales electronic machine			0.14** (0.02)	0.12** (0.02)	0.11** (0.02)
Mobile money customers			-0.06** (0.01)	-0.05*** (0.01)	-0.03** (0.00)
Tax knowledge index					0.03** (0.01)
Older businesses					0.09*** (0.01)
Interaction with DGI					-0.05** (0.01)
Tax audit					0.10*** (0.00)
_cons	0.96*** (0.00)	0.96*** (0.02)	1.04*** (0.00)	1.02*** (0.02)	0.90*** (0.02)
District FE	Yes	Yes	Yes	Yes	Yes
Mean of dep. variable	0.83	0.83	0.83	0.83	0.83
R-sq.	0.024	0.058	0.045	0.086	0.129
Observations	762	762	762	762	762

Note: Standard errors in parentheses. Outcome is an indicator variable for eSINTAX registration. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Authors' own calculations based on survey data.

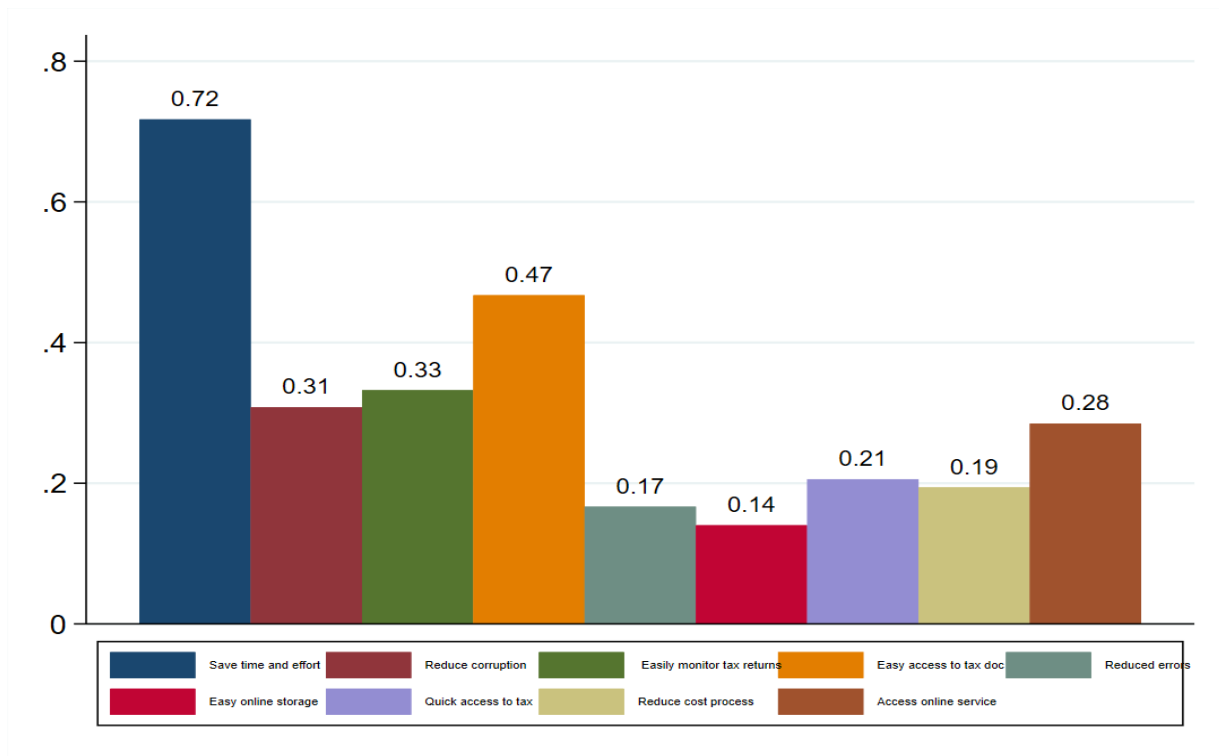
Table A.10 Determinants of using tax e-payment payment

	(1) Demographics	(2) Business	(3) DFS	(4) All	(5) All+
Female	-0.03 (0.02)			-0.02 (0.02)	-0.01 (0.02)
Higher education	0.06* (0.02)			0.04 (0.02)	0.05 (0.02)
Manager experience	0.10* (0.03)			0.07 (0.03)	0.06* (0.02)
Manager religion: Islam	0.01** (0.00)			-0.00 (0.01)	-0.00 (0.01)
Older taxpayers	0.04 (0.02)			0.04 (0.02)	0.03 (0.02)
Less than 5 employees		-0.09** (0.02)		-0.05 (0.02)	-0.02 (0.02)
Access internet for business		0.03** (0.00)		0.01** (0.00)	0.01 (0.01)
Bank account		-0.01 (0.05)		-0.02 (0.04)	-0.03 (0.04)
Online trading		-0.04 (0.03)		-0.05 (0.03)	-0.03 (0.02)
Trade sector		0.04* (0.01)		0.04 (0.02)	0.04 (0.02)
Account department		0.09* (0.02)		0.08* (0.02)	0.07** (0.01)
Legal status: SARL		0.05*** (0.00)		0.05*** (0.00)	0.06*** (0.00)
Bank transaction time			-0.00 (0.00)	0.01 (0.01)	0.01 (0.01)
Mobile money knowledge			0.03** (0.00)	0.05** (0.01)	0.04** (0.01)
sales electronic machine			0.12** (0.02)	0.08** (0.01)	0.08** (0.02)
Mobile money customers			-0.05** (0.01)	-0.03 (0.01)	-0.02 (0.01)
Tax knowledge index					0.04 (0.04)
Older businesses					0.01* (0.00)
Interaction with DGI					-0.01 (0.01)
Tax audit					0.07** (0.01)
District FE	Yes	Yes	Yes	Yes	Yes
Mean of dep. variable	0.17	0.17	0.17	0.17	0.17
R-sq.	0.042	0.042	0.027	0.081	0.092
Observations	630	630	630	630	630

Note: Standard errors in parentheses. Outcome is an indicator variable for using tax e-payment. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

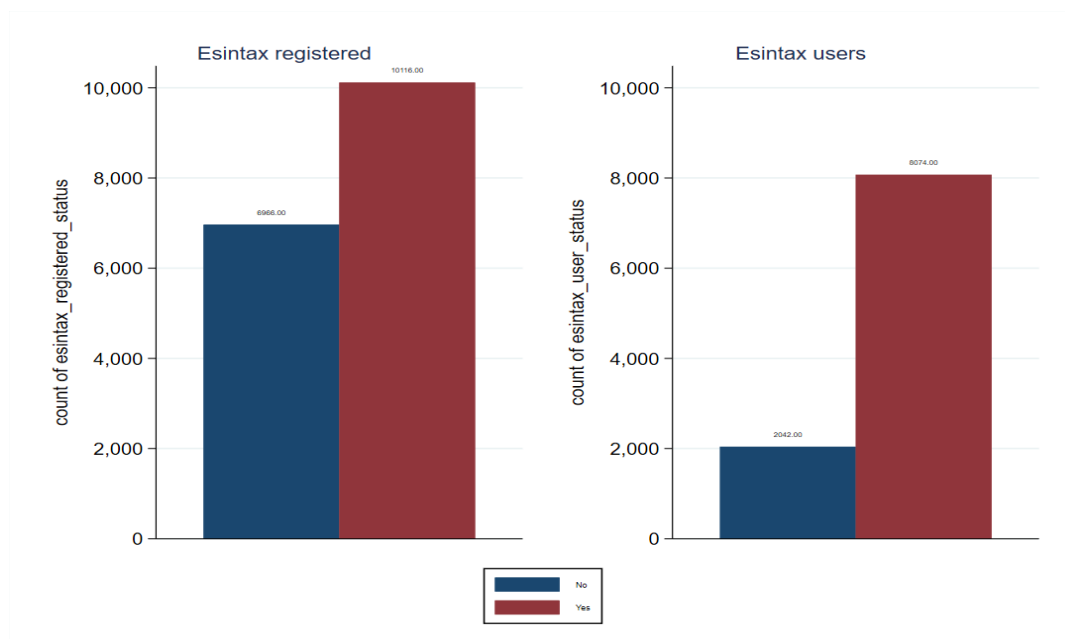
Source: Authors' own calculations based on survey data.

Figure A.1 Reasons for registering on eSINTAX



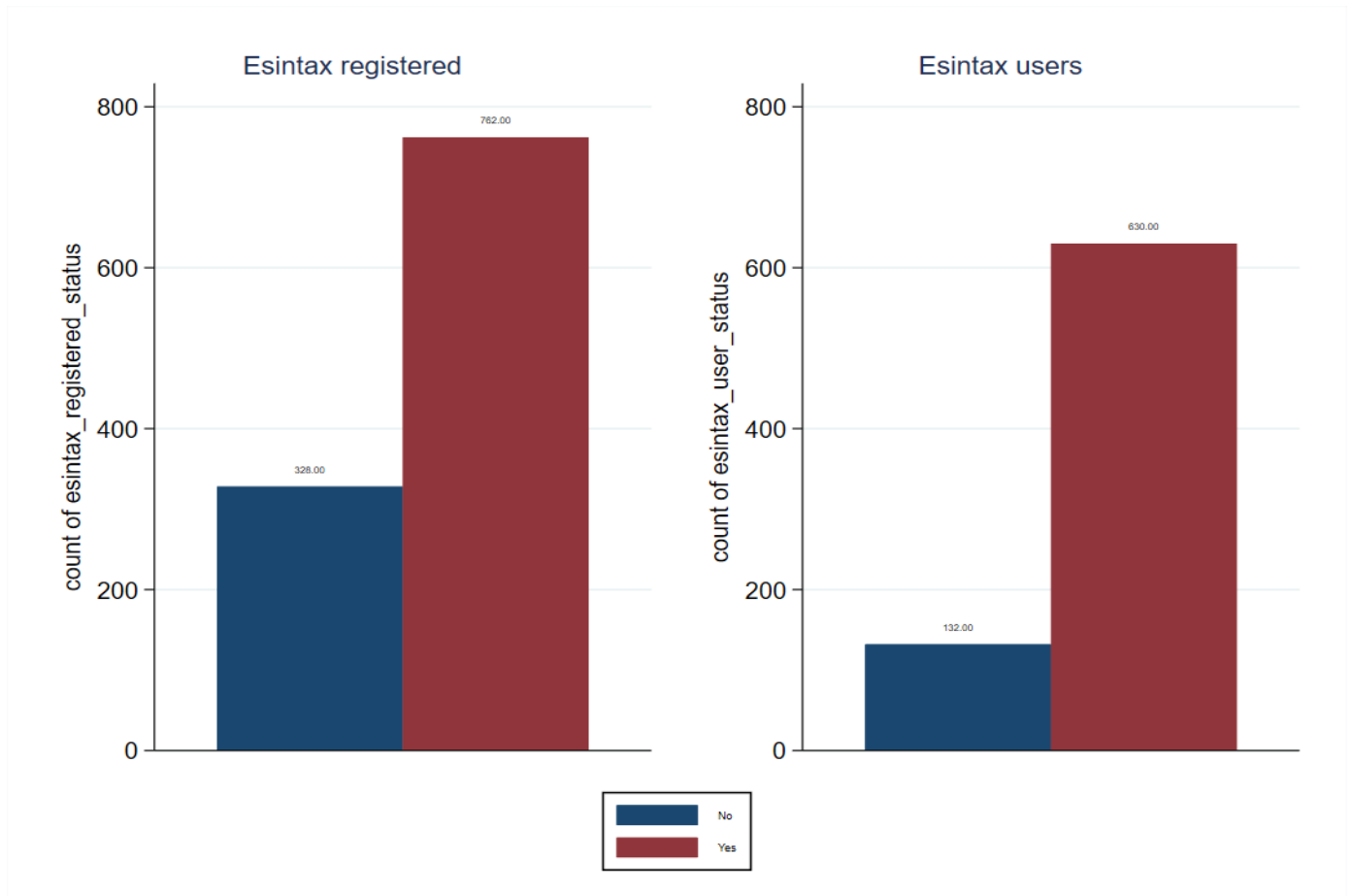
Note: This graph shows the proportion of eSINTAX adopters for each reason given in response to the question 'What are the reasons for adopting eSINTAX?' Data taken from the survey question. The respondent was able to choose several answers.
 Source: Authors' own elaborations based on survey data.

Figure A.2 eSINTAX status, entire population



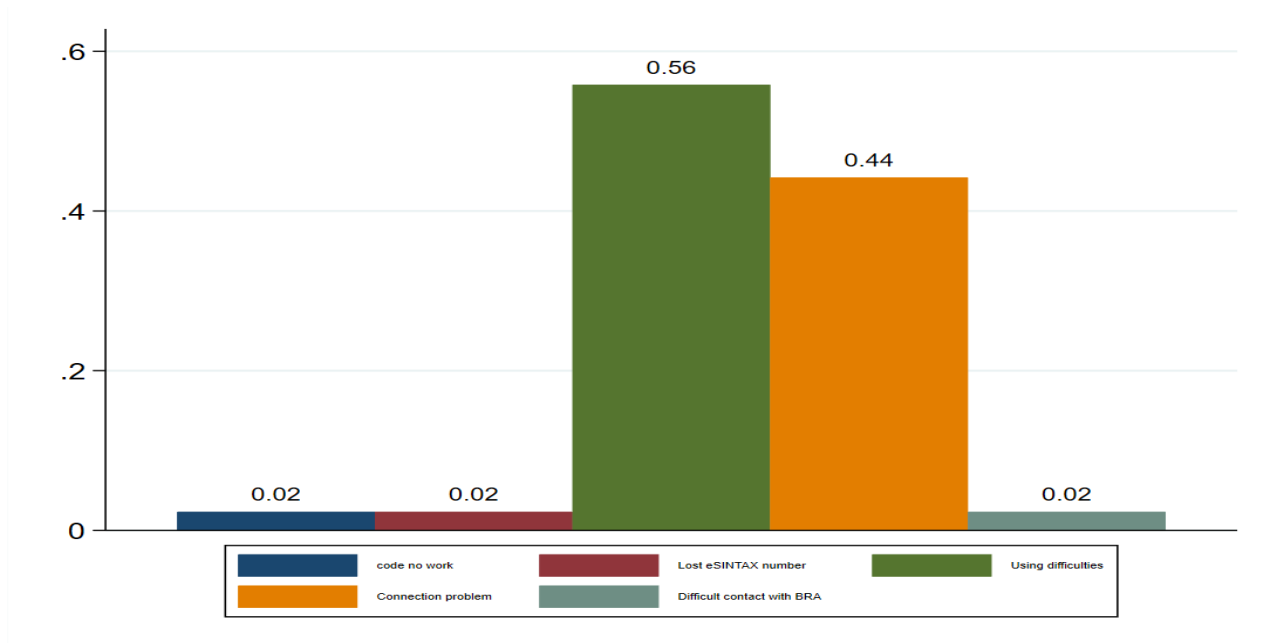
Source: Authors' own elaborations based on data derived from tax administration data on business registration.

Figure A.3 eSINTAX status, sample population



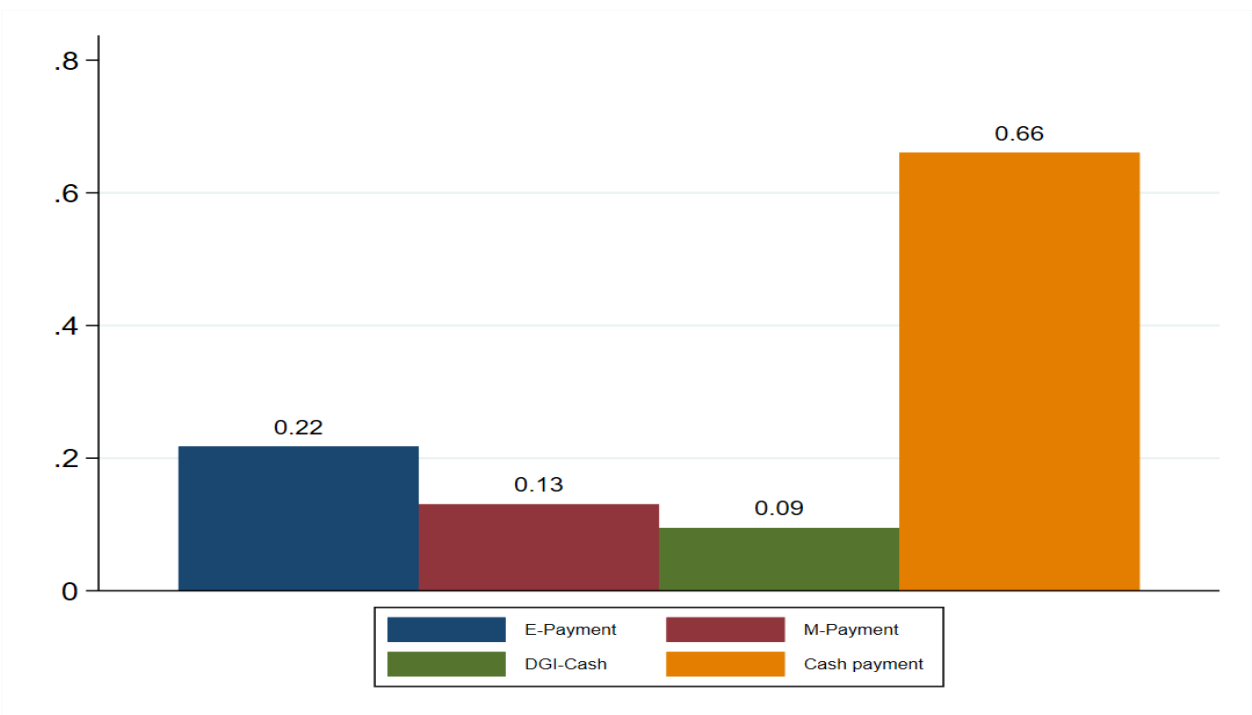
Source: Authors' own elaborations based on data derived from tax administration data on business registration.

Figure A.4 Reasons for not using eSINTAX



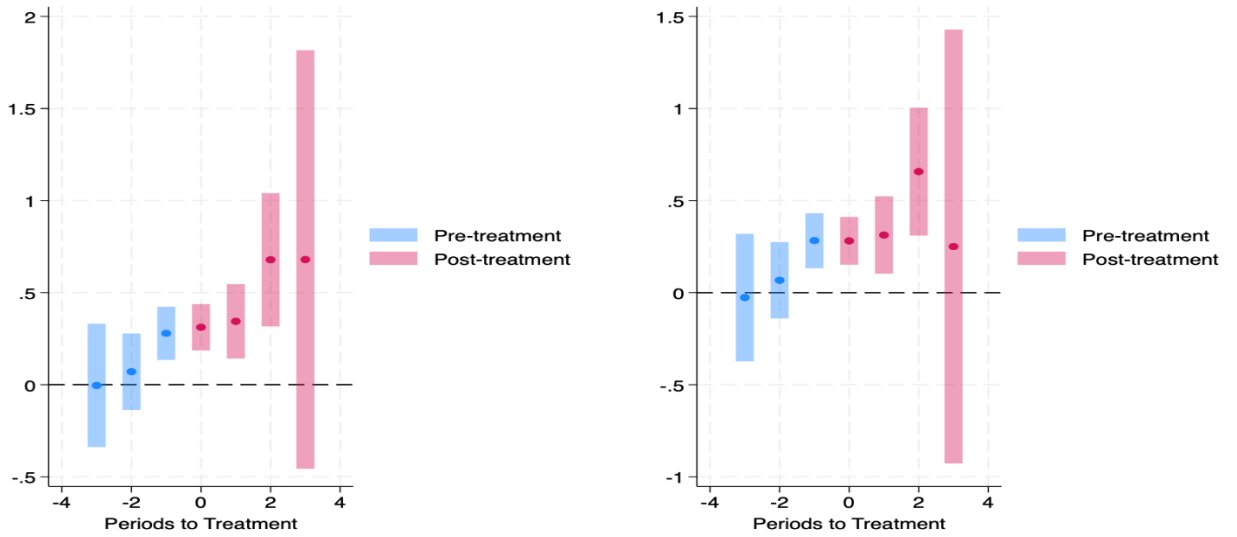
Note: This graph shows the proportion of non-users of eSINTAX after adoption for each reason given in response to the question ‘What are the reasons why you don’t use eSINTAX?’ Data extracted from the survey question. The respondent could choose several answers.
 Source: Authors’ own elaborations based on survey data.

Figure A.5 Tax payment eSINTAX



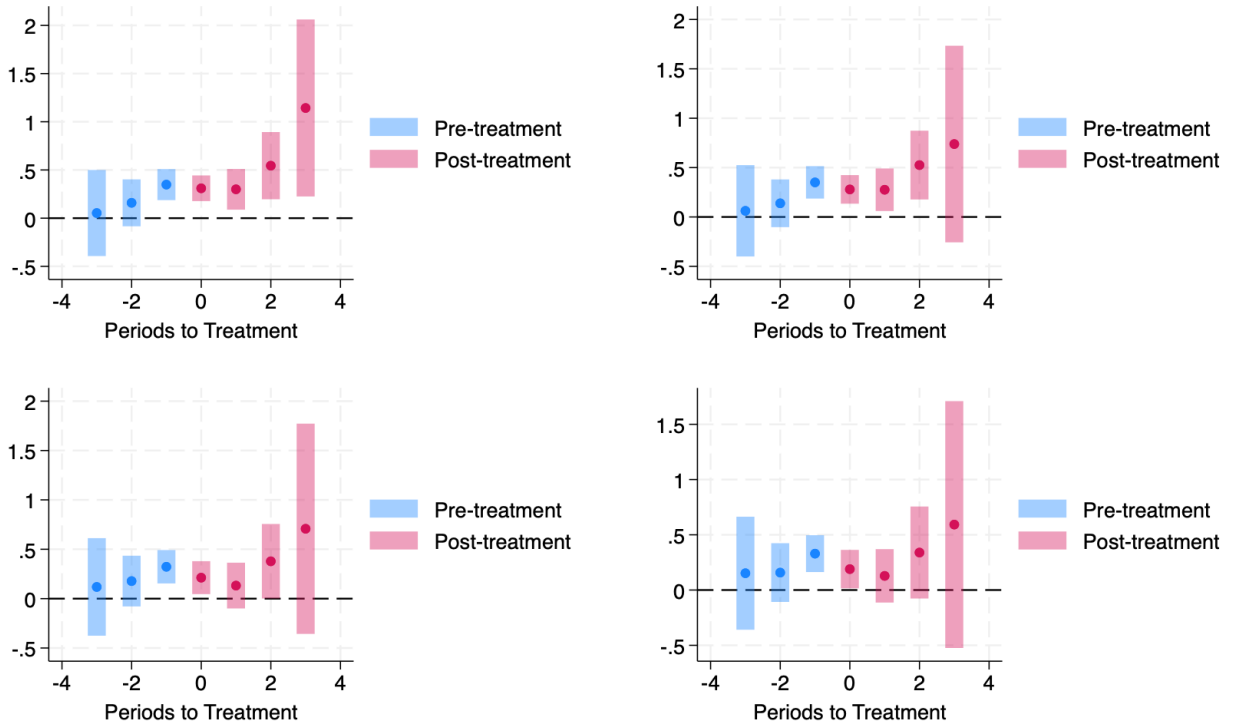
Note: This graph shows the proportion of payment methods adopted by eSINTAX users, i.e. those who file their tax returns on eSINTAX, based on the following question: ‘How do you pay your tax?’
 Source: Authors’ own elaborations based on survey data.

Figure A.6 eSINTAX registration impact on tax declared



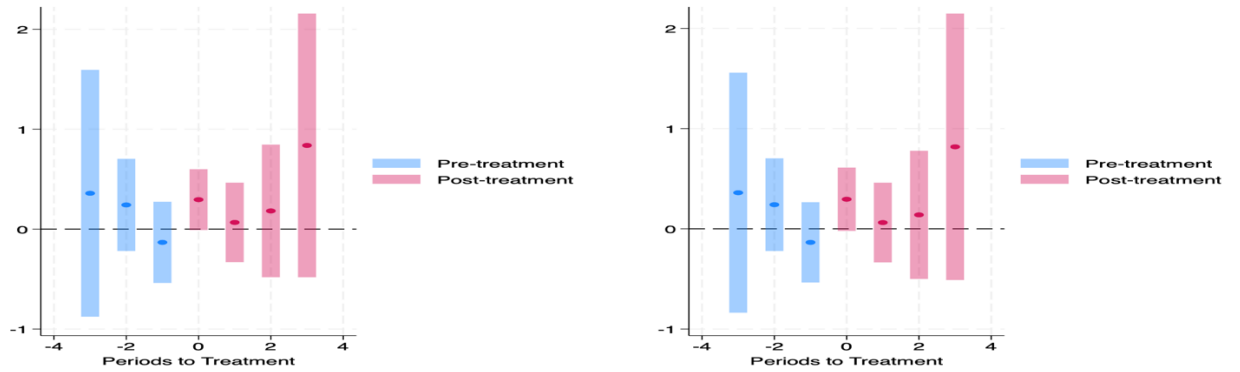
Source: Authors' own elaborations based on data derived from tax administration data on business registration.

Figure A.1 eSINTAX filing impact on tax declared



Source: Authors' own elaborations based on data derived from tax administration data on business registration.

Figure A.8 Tax e-payment impact on tax paid



Source: Authors' own elaborations based on data derived from tax administration data on business registration.

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