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Alphonse Noah and Ruth Tacneng

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Summary

Agents play a key role in making financial services more accessible, especially for those who are financially excluded. Agents act as intermediaries between mobile money account holders and mobile money service providers, helping them to register as new customers and to credit and take money out of their accounts. In this paper, we explore how introducing a 0.2 per cent tax on mobile money transactions in Cameroon in 2022 affected the performance and revenue of agents. We mainly analyse agents' commission and transactions using the administrative databases of those responsible for daily management of agent networks (henceforth superagents). To complement our analysis, we conducted a survey of agents in the Centre Region, asking about their business strategies after introducing the tax on mobile money.

Our findings show that agents earned less commission after introducing the mobile money tax. We find a greater reduction in the revenue of agents whose activities were potentially more exposed to the tax due to the regressive structure of network fees. We also find their commission is more likely to decline significantly (by at least 33 per cent), compared to agents performing smaller mobile money transactions. Agents employed various business strategies after the tax on mobile money – 23 per cent of them expanded their mobile money business by raising capital. A survey of inactive agents shows that the main reason for ceasing operations was not earning enough commission. Although the tax on mobile money was not a primary factor for quitting the mobile money business, they indicated that the mobile money tax, along with high operating expenses, competition, and fewer transactions, contributed to them earning less from mobile money. Overall, our results highlight important policy implications of taxation on digital financial services for the sustainability of agent networks and financial inclusion.

Keywords: mobile money tax; digital finance; mobile money agents; Cameroon; agent performance.

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Acronyms

DFS	Digital financial services
GSMA	GSM Association
IMTT	Intermediated money transfer tax
MFI	Microfinance institution
MM tax	Tax on mobile money
MNO	Mobile network operator
OLS	Ordinary least squares
OM	Orange Money
SSA	Sub-Saharan Africa
UNCDF	UN Capital Development Fund

1. Introduction

Mobile money services have expanded rapidly in sub-Saharan Africa (SSA) after the successful deployment of M-PESA in Kenya in 2007.[1] This helped the region to make significant progress in financial inclusion (Ahmad, Green and Jiang 2020).[2] SSA had 217.6 million active (30-day) mobile money accounts in 2022 (54.3 per cent of all active accounts in the world) – a significant increase from the 17.6 million active accounts recorded in 2012 (GSMA 2023). African governments and authorities are interested in introducing taxes on digital financial services (DFS), given the region's low tax-to-GDP ratio and prevalence of the informal sector, which has grown due to the COVID-19 pandemic.[3] African countries urgently need to broaden their fiscal base and explore new ways of generating tax revenue.

Against this backdrop, and taking a cue from Uganda, Zimbabwe, and Tanzania,[4] the Cameroonian authorities decided to introduce a 0.2 per cent tax on mobile money transactions with effect from 1 January 2022. Unlike other countries, Cameroonians received little information about the tax – it was announced less than two months before its introduction.

There are few studies that examine the consequences of mobile money taxes. Silue (2021) finds a positive effect of mobile money taxes on the demand for cash. Clifford (2020) adopts a more global approach, conducting interviews with various players in the mobile money market in Uganda, the Republic of Congo, Côte d'Ivoire, and Malawi. Overall, he finds an immediate decline in the volume and value of mobile money transactions following introduction of the tax. He also finds that the tax burden falls disproportionately on poor households. The UN Capital Development Fund (UNCDF) reaches a similar conclusion in a report analysing the impact of mobile money taxation in Uganda (UNCDF 2021). Katusiime (2021) shows that introducing the mobile money tax (MM tax) has led to a decline in both the volume and value of mobile money transactions. In a recent study, Anyidoho *et al.* (2023) examine how informal workers perceive the new mobile money tax (E-levy) introduced in Ghana in May 2022. Their findings

[1] M-PESA is a mobile phone-based service used for money transfer, payments and microfinancing.

[2] Numerous studies also highlight the positive impact of mobile money on poverty reduction, consumption, resilience to shock, agriculture, health, and education (see Nan, Zhu and Markus (2021) for a comprehensive review of the literature).

[3] In 2021, the tax-to-GDP ratio in sub-Saharan Africa was 15 per cent, compared to an average 21.7 per cent in emerging markets (UNU-WIDER Government Revenue Dataset 2023). The size of the informal sector was estimated at 40 per cent of GDP in 2018, compared to 27 per cent in emerging markets (Elgin *et al.* 2021).

[4] For a comprehensive overview of African countries that apply taxes to digital financial services, see Clifford (2020), Mpofu (2022), and Diouf and Niesten (2023).

show that the E-levy is highly regressive, implying that lower-income informal workers are more affected than those with higher income.[5] Takyi (2024) attempts to quantify the short-term effect of the E-levy, showing that its introduction led to a decline in the volume and value of mobile money transactions in Ghana by about 24 per cent and 47 per cent, respectively.

Although the related literature provides a comprehensive overview of the effects of MM tax,[6] mainly from a demand-side perspective, few address the impact of MM tax on the agents who act as intermediaries between end-users and mobile money service providers. Our approach complements previous studies on the implications of a tax on mobile money by undertaking a pioneering empirical investigation of the potential effects of MM tax on agents. To our knowledge, there are currently no empirical research studies looking at whether and how tax on mobile money transactions affects the activities of agents.[7]

This paper investigates whether agents' performance and revenue sustainability change after introduction of the 0.2 per cent tax on mobile money transactions in Cameroon on 1 January 2022. The hypotheses behind our research are:

- Introducing taxes on mobile money can adversely impact mobile money agents by reducing the demand for mobile money services. As agents primarily rely on commission from mobile money transactions (Unnikrishnan *et al.* 2019), these taxes could make the mobile money business less profitable (Karombo 2022), and less financially viable. This may disincentivise mobile money agents, especially if their commission is only slightly above the break-even point.
- By limiting demand, the new tax could increase the number of transactions agents need to break even, jeopardising their profitability and sustainability.
- Lower profits could decrease the capacity of agents to maintain sufficient liquidity to continue their operations, also negatively affecting their sustainability.
- This could lead to there being fewer mobile money agents, which may have an adverse impact on financial inclusion – especially in under-served areas, where they mainly cater to relatively lower-income households.
- Increasing the cost of mobile money transactions through taxes may also have a larger negative effect on poorer individuals and households, who are more sensitive to price increases. Thus, mobile money taxes may erode the

[5] In a recent paper Diouf, Carreras and Santoro (2023) look at the effects of excise duty on money transfers introduced in Kenya in 2013. The results indicate that the excise duty does not significantly affect aggregate indicators of the use of mobile money. However, the findings highlight a pronounced detrimental impact of the tax on poorer and larger households.

[6] See also Matheson and Petit (2021), Munoz *et al.* (2022), and Mpofu and Mhlanga (2022) for more details.

[7] Based on his interviews with agents across several SSA countries, Clifford (2020) indicates an adverse effect of the MM tax on the number of active agents, as well as their profits.

gains in financial inclusion and efficiency attributed to mobile money services. Recent evidence shows that geographical proximity to agents (Johnen, Parlasca and Mußhoff 2023) and transaction fees (Hamdan, Lehmann-Uschner and Menkhoff 2022) are significant drivers of mobile money adoption.

- We expect, however, lower agent performance after the MM tax, especially in areas where market competition between agents is relatively high, as the newly-introduced tax could exert downward pressure on agents' commission.
- Agents may alter their business models following the introduction of taxes – by diversifying their revenue-generating activities, expanding their mobile money business, or charging additional non-regulatory fees to their clients.
- Agents may be affected differently by the tax due to the regressive structure of network fees. Thus, the additional cost for their clients varies, depending on the value of the mobile money transaction.

We also investigate variations in agents' performance, according to agents' potential exposure to the tax. We measure an agent's potential exposure to the tax based on the size of their average transaction before the tax, primarily using data from two sources:

- Superagents' databases containing agent commission and transaction information in the Centre Region, before and after introducing MM tax.[8]
- A survey of a sample of active mobile money agents in Yaoundé, the capital of Cameroon, and in communities outside Yaoundé, including rural areas. The survey requested information on agents' socio-demographic characteristics, general business information and mobile money operations, business strategies and perspectives, competitors, and market structure, among others.

We also explore insights from 150 agents who stopped their mobile money operations, about 60 per cent of which ceased their operations after MM tax was introduced.

Using a sample of 9,815 agents, our findings indicate lower agent performance and revenue sustainability after introducing the MM tax. Our results also show that agents whose mobile money activities are potentially more exposed to the tax, due to the fee structure imposed by network service providers, experience a larger decline in their commission (at least 33 per cent) than their counterparts. Potentially more exposed agents are those who performed larger and more mobile money transactions before the tax, conduct their mobile money activity in local commercial areas rather than road stands and kiosks, and were in the business before 2019. We also find a significant differential effect on agents' performance between those who are located in the capital (Yaoundé) and where there are relatively more agents (i.e. far from remittance agencies, banks,

[8] Superagents, also known as partners, function as subcontractors for mobile network operators, serving as managers of agent networks.

cooperatives, and microfinance institutions (MFIs)), depending on their potential activity exposure to the tax.

Our results also show significant differences in agents' business strategies after introducing the MM tax. Agents who are potentially more exposed to the tax are more likely to expand their mobile money business after the tax. Those whose activities are potentially less exposed to the tax are more likely to charge their clients additional fees.

Overall, our findings are robust to alternative specifications, different definitions of pre- and post-MM tax periods, examining subsamples of agents that earn more from the mobile money operations, and subsamples of agents in the survey, while controlling particularly for agent-specific factors.

We also study further issues, and analyse findings from the survey of inactive agents. Our results indicate that agents who ceased their operations after MM tax cited not getting enough commission as the primary reason for stopping their mobile money activity. Although not considered the key factor for quitting the mobile money business, 10 of the 103 former agents who gave a second reason attributed quitting the mobile money business to the MM tax.

We organise the rest of the paper as follows. Section 2 discusses the mobile money ecosystem and mobile money tax in Cameroon. We present the data and descriptive statistics in Section 3. We tackle the empirical methodology and report the results in Section 4. We check the robustness of our findings and examine further issues in Section 5. We conclude in Section 6.

2. Institutional setting

2.1 Mobile money ecosystem in Cameroon

The mobile money system in Cameroon, similar to other African countries, has five key participants: mobile network operators (MNOs), financial institutions (banks), superagents, agents, and regulatory bodies.

There are four MNOs (Camtel Mobile, MTN, Nexttel and Orange) in Cameroon, but only MTN and Orange offer mobile money services, as of 2022.[9] In March 2011, MTN Cameroon, a subsidiary of the South African multinational mobile telecommunications company MTN, pioneered introducing a mobile money service known as MTN Mobile Money (or MTN MoMo). Following suit, Orange Cameroon, a subsidiary of the French telecommunications company, introduced its own mobile money service called Orange Money (OM) in September 2011. By the end of 2022, these two MNOs shared a market of almost 10.32 million active mobile money accounts (BEAC 2023).[10] The International Monetary Fund's 2023 *Financial Access Survey* (IMF 2023) reports the value of transactions amounts to CFA F12,544 billion (US$21.8 billion) in 2020,[11] or a daily average of nearly CFA F34.4 billion (US$59.76 million). Without official market share data, Orange and MTN are vying for the top spot in the mobile money market. In the first half of 2023, MTN Group reported a turnover of CFA F26.4 billion (US$ 43.52 million) for its mobile money branch in Cameroon.[12] Orange does not disclose the revenue related to its mobile money activity, but claims a user base of 10 million Orange Money subscribers as at 30 June 2023.

Similar to other Central African countries, MNOs in Cameroon do not have the status of financial institutions – which have exclusive rights to collect deposits, and manage means of payment and mechanisms to store value or provide loans. Consequently, MTN and Orange Cameroon have partnered with local banks to offer mobile money services.[13] This partnership allows MTN and Orange to comply with Cameroon's financial regulatory framework by delegating the

[9] In October 2023, Camtel initiated a feasibility study for a new mobile money service called 'Blue Money'.

[10] A mobile money account is considered active when it has been used to conduct at least one transaction during a certain period, typically 90 days or 30 days.

[11] The symbol CFA F (Central African CFA franc) is used throughout the paper. US$1 = CFA F575.53 in 2020, according to the IMF International Financial Statistics (IFS).

[12] US$1 = CFA F606.57 in 2023.

[13] Banks are increasingly turning their attention to mobile money services in Cameroon. After the failure of the Yup service in July 2022 (a product launched by Société Générale in 2017), Afriland First Bank Cameroon and United Bank for Africa Cameroon introduced their own mobile money services in 2022, known as Sara Money and M2U Money, respectively.

financial responsibilities of mobile money operations to banks. As a result, banks assume the responsibility for holding a float for agents and end-users. Banks also act as intermediaries between the MNOs and the distribution channel (superagents and agents), facilitating the acquisition or re-balancing of the e-float. Banks are the only entities mandated to handle cross-border financial transactions, including sending and receiving remittances.

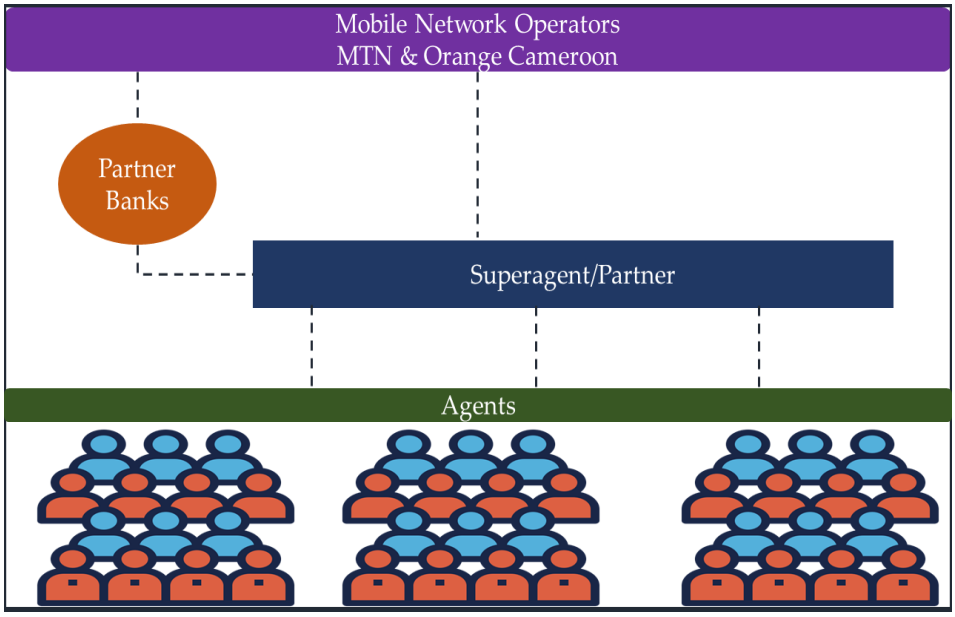
However, it is anticipated that this collaboration will soon change. Orange obtained a payment service provider licence in July 2022, followed by MTN in May 2023. This licence allows them to independently offer various payment services, including deposits, facilitating transfers and withdrawals of funds, conducting international remittances, and even offering micro-credit as part of payment operations for goods or services up to a limit of CFA F100,000 (US$160.32).[14]

MNOs typically rely on two key players to ensure the distribution of their mobile money services – superagents and agents. In Cameroon, MTN and Orange collaborate with subcontractors, known as superagents (or partners), who are responsible for the daily management of the agent network. Superagents act as intermediaries between the agents and MNOs, taking charge of tasks like recruiting new agents, and maintaining or expanding the agent network. However, their primary role is to serve as re-balancing points for small and medium-sized agents – facilitating the exchange of e-money for cash. In doing so, they serve as intermediaries between certain agents and partner banks.

The agents, who play a crucial role as the primary interface with customers, are the second essential component in the mobile money services distribution chain in Cameroon. They play a pivotal role by performing two main functions – providing mobile money services, mainly cash-out and cash-in transactions, and managing the procedures for opening mobile money accounts. The agent network has grown considerably in recent years, increasing from 25,443 to 203,144 registered mobile money agents between 2015 and 2020, representing an average annual growth rate of 51.5 per cent (IMF 2023) . Most are located in urban areas, mainly conducting their mobile money activities through small kiosks or roadside stands. Most agents are non-dedicated – they have another parallel activity to the mobile money business, such as running a small business or retail store. Agents earn money through commission on the mobile money services provided. On average, they earn 42 per cent of the commission from a transaction, with the remaining 58 per cent split between the mobile network operator, partner banks, and the superagent. Figure 2.1 shows key players in the mobile money services distribution in Cameroon.

[14] Refer to *Réglement N°04/18/CEMAC/UMAC/COBAC, relative aux services de paiement dans la Communauté Economique et Monétaire de l'Afrique Centrale* for further details. US$1 = CFA F623.76 in 2022.

Figure 2.1 Key players in mobile money services distribution



Source: Authors' own elaboration based on information from Orange and MTN Cameroon websites.

The existing regulatory framework for mobile money in Cameroon involves four entities – the Central Bank, banking supervisor, telecommunications regulatory agency, and Ministry of Finance. The Ministry of Finance issues licences for operating as a payment service provider, and the banking supervisory authority supervises and monitors payment service providers.[15]

2.2 Mobile money tax in Cameroon

Introducing a new tax on mobile money transactions in Cameroon is part of a broader objective to expand the country's fiscal base and tax revenue. Diversifying African economies' sources of revenue has become even more important following the COVID-19 pandemic. The Cameroonian government, as part of the 2022 Finance Bill presented to parliament in November 2021, proposed implementing a new 0.2 per cent tax on mobile money transactions. The revenue from this new tax was estimated to be around CFA F20 billion in the first year. The newly-introduced tax applies to all mobile money transfer transactions, except for bank transfers, and transfers made to pay other taxes, duties, and levies. The taxable base for this new tax is the value of funds transferred or withdrawn. The service providers collect it, and subsequently remit it to the tax authorities. The Cameroonian government views this new tax as a way to increase the fiscal revenue generated from mobile money activities. It is

[15] In a recent paper, Avom, Bidiasse and Mvogo (2022) discuss the constraints inherent in such a regulatory framework.

also considered an opportunity to leverage investment for developing information technology infrastructure within the country.

The Finance Bill attracted initial criticism – notably from the Cameroon Taxpayers' Rights Association, which expressed concern about the possibility of double taxation. The Association argued that money transfer transactions were already subject to value added tax. However, the new tax did not generate substantial debate, mainly due to the government's strong majority in parliament. President Paul Biya promulgated the 2022 Finance Law on 16 December 2021, making the new MM tax effective from 1 January 2022. Criticism from civil society and the general public then intensified, sparking an online campaign with the hashtag #EndMobileMoneyTax. Opponents of the new tax expressed concern about its potential impact on financial inclusion of the poor and unbanked population. In particular, they stressed that mobile financial services are vital for rural and impoverished individuals to access financial services. Taxing mobile money transactions could hinder their ability to participate in the formal financial system. In addition, opponents voiced their discontent with what they perceived as unequal treatment, pointing out that other means of payment, such as bank transfers, cheques, and even cash, are not subject to the same taxation. In a report published in February 2022 the IMF acknowledges these two risks, along with the additional concern of potentially overestimating tax revenue based on lessons learned from experience in Uganda (IMF 2022).[16]

Cameroon is not the only African country applying a tax on mobile money transactions. Several African countries have recently adopted taxes on mobile money transactions, using different forms and approaches (see Table 2.1).

Uganda was the first African country to implement a 1 per cent tax levy on the value of all mobile money transactions,[17] including cash-in, transfer, and cash-out. Effective July 2018, this tax caused a public outcry, leading the government to revise the Finance Bill in November 2018. The revised version replaced the 1 per cent tax with a 0.5 per cent levy exclusively on the withdrawal value. A recent study by the UN Capital Development Fund (UNCDF 2021) reveals that as a result of this tax many users have migrated to cash-based transactions, or use agent banking services that are not subject to the tax on withdrawals.

In 2018, Cote d'Ivoire tried to introduce a 0.5 per cent tax on mobile money transactions. This tax was subsequently withdrawn, and replaced in 2019 by a tax on mobile network operators' total revenue instead of mobile money transactions.

[16] Uganda recorded higher-than-expected initial revenue from the MM tax. These gains were short-lived, as they were quickly offset by a decline in tax revenue from the telecommunications sector. This drop was mainly attributed to the decline in mobile money activity (IMF 2019).

[17] It is important to note that Tanzania led the way in July 2013 by implementing a 0.15 per cent excise duty on funds transferred via banks, financial institutions, or telecom companies.

Table 2.1 Taxes on mobile money transactions in Africa

Country	Date introduced	Current rate
Uganda	July 2018	0.50%
Zimbabwe	2019	2%
Nigeria	January 2021	₦50
Tanzania*	July 2021	TSh10-2,000
Cameroon	January 2022	0.20%
Chad	January 2022	0.20%
Ghana*	May 2022	1%
Central African Republic	January 2024	1%

Source: Authors' own elaboration using the DFS TaxMap (Diouf and Niesten 2023). Notes: This table only includes countries imposing taxes on the value of mobile money transactions. Other countries apply other forms of taxation, such as excise duties or mobile money operator turnover taxes. For a comprehensive list of countries applying taxes on mobile money services, refer to Diouf and Niesten (2023). *The initial levy rate was TSh10 to TSh10,000, and 1.5% for Tanzania and Ghana, respectively.

In October 2018, the Zimbabwean authorities decided to include mobile money services in the scope of the Intermediated Money Transfer Tax (IMTT), first introduced in 2003.[18] The primary objective behind this tax was to levy taxes on the informal sector. The IMTT has been amended several times since 2018. The most recent amendment in January 2024 set the rate at 2 per cent, currently the highest rate in Africa.[19] Although widely unpopular, the IMTT has enabled the government to significantly increase its tax revenue – it contributes nearly half of total corporate tax collection. Consequently, the government intends to keep the rate without any immediate plans for revision.

From January 2021, Nigeria introduced an electronic money transfer levy of ₦50 (US$12) on transactions of ₦10,000 (US$22.14) or more for electronic money transfers and deposits. After introducing excise duty on money transfers in 2013, Tanzania officials decided to implement a tax on mobile money transactions for transfers and withdrawals in July 2021. The tax rate ranges from TSh10 to TSh10,000 (US$0.0043-US$4.32), depending on the value of transaction. As a result, users have complained about the increased costs associated with mobile money transfers. Businesses have also expressed concern about the adverse impact of this tax on their activities, as people seek alternatives to costly mobile money transactions. In response to the public outcry the Tanzanian government revised the levy rate in July 2022, and again in October 2022. The amended rate now falls within the range of TSh10 to TSh2,000 (US$ 0.0043-US$0.86).

[18] In January 2014, an amendment was introduced to incorporate mobile banking services within the purview of the IMTT.

[19] The rate is 2 per cent for Z$ transactions and 1 per cent for US$ transactions.

In January 2022, Chad introduced a 0.2 per cent tax on electronic money transfers and withdrawals, with an exemption for bank transfers and transfers for tax payments. In May 2022, Ghana introduced a new levy on electronic financial transactions (E-levy), including mobile money transactions, bank transfers, merchant payments, and inward remittances. Similarly to Zimbabwe, this new levy was motivated by a desire to tax the informal sector. The rate of the levy was first announced as 1.75 per cent, but in the end a rate of 1.5 per cent was implemented. This new tax also faced significant opposition from people concerned about its regressive effect on those with low incomes. In response, the government reduced the levy to 1 per cent in January 2023. The government also introduced a cumulative daily exemption of up to GH₵100 (US$ 9.09). Anyidoho *et al.* (2023) assess the impact of the E-levy on Ghanaian informal workers, underlining its highly regressive nature. In particular, their findings reveal that those with lower incomes in the informal sector bear a disproportionately greater burden from the levy than those with higher incomes. This suggests that the lowest-earning informal workers spend a higher percentage of their earnings on the levy than higher earners.

The latest newcomer, the Central African Republic, recently implemented a 1 per cent tax on mobile money transfers and withdrawals. Effective January 2024, this tax is designed to increase domestic tax revenue.

While there is some evidence of the impact of MM tax on users, there are few studies investigating the effects of MM tax on agents – who play a crucial role in the mobile money industry. We attempt to fill this gap by examining the impact on mobile money agents of introducing a 0.2 per cent tax on mobile money in Cameroon.

3. Background data on agents and sampling

3.1 Data sources and sampling process

We gather information on mobile money agents in the Centre Region of Cameroon from two sources: (i) superagents' databases of agent performance of the leading mobile money service providers in Cameroon (MTN Mobile Money and Orange Money); and (ii) the results of a survey we carried out with agents operating in the capital (Yaoundé) and peripheral communities, including rural areas outside Yaoundé, from 18 to 25 February 2023. Focusing on MTN and Orange provides a reasonable representation of the mobile money industry in the Centre Region of Cameroon, especially as we explore agents' behaviour pre- vs. post-MM tax. As noted above, some commercial banks only started providing mobile money services in 2022. Prior to closing its mobile money service, Yup, in July 2022, Société Générale had only 22,332 active accounts – only 0.22 per cent of total active mobile money accounts in 2022 (BEAC 2023).

We obtain data on agents' monthly commission and transactions from 12 MTN and Orange superagents before and after introducing the MM tax on 1 January 2022. There are, however, differences in the frequency and scope of information provided by the superagents. Although we have commission and transaction data from MTN mobile money agents in the Centre Region (in and outside Yaoundé) for many months, we only have information on Orange Money agents that are located in and outside Yaoundé for seven months – November and December 2021, and March, June, September, November, and December 2022. Thus, to provide a more comprehensive analysis encompassing information from both mobile money service providers, given constraints on availability of monthly commission and transaction data,[20] we mainly base our analysis on November and December 2021 (pre-MM tax period), and March and June 2022 (post-MM tax period). We check the robustness of our findings by focusing on MTN agents whose pre-MM tax agent monthly commission and transactions are available before November 2021, when the MM tax was first announced.

To add to our analysis of mobile money agents' behaviour before and after the MM tax, we use additional agent-specific information collected via the survey carried out in February 2023, a year after introducing the MM tax. We employed a three-stage sampling procedure. The Centre Region of Cameroon is

[20] We were mainly constrained by availability of mobile money agent monthly commission and transaction data satisfying the following main criteria: 1) monthly information must be available for both MTN and Orange agents before and after MM tax, and 2) information should be available for agents located in and outside Yaoundé.

administratively divided into ten departments, including 20 per cent of the country's total population. First, we selected the departments of Mfoundi, Lekié, Méfou-et-Afamba, Mbam-et-Inoubou, and Haute-Sanaga as our areas of focus. The Mfoundi department covers the city of Yaoundé (divided into seven districts), and the other four departments cover areas outside Yaoundé, including rural areas. Cameroon's National Institute of Statistics reports that these five departments account for around 80 per cent of the region's population. Second, agents were stratified by administrative division (districts in Yaoundé, and departments for those outside Yaoundé), based on the lists obtained from superagents. Finally, out of almost 16,000 agents, 1,200 were randomly selected to participate in the survey, based on population size of the district or department. Our initial target was to interview between 800 and 900 agents. We randomly selected more agents than our target in case of refusals to participate in the survey and location-related issues. In total, 807 agents participated in the survey – 624 (77.3 per cent) of which are from Yaoundé.[21] These agents are mostly aged between 25 and 50, and include 463 women and 344 men. Table 3.1 shows the distribution of the population by district in Yaoundé, and the number of agents in the survey.

Table 3.1 Yaoundé districts: population distribution and agent surveys

Districts	Population	Land area (km^2)	Agents in survey
Yaoundé 1	371,523	72	130
Yaoundé 2	317,331	17	82
Yaoundé 3	333,393	52	62
Yaoundé 4	628,045	53	133
Yaoundé 5	349,755	25	110
Yaoundé 6	354,766	69	60
Yaoundé 7	126,488	29	47
Total	**2,481,301**	**318**	**624**

Source: Yaoundé Metropolitan Area. Note: Outside Yaoundé, 79 agents were interviewed in Méfou-et-Afamba, 51 in Lékie, 44 in Mbam-et-Inoubou and 9 in Haute-Sanaga.

The questionnaire on active mobile money agents, or those who performed at least 1 mobile money operation in the previous 30 days, includes about 50 questions, structured into 7 themes: (i) agent socio-demographic information (age, gender, educational background, religion, etc.); (ii) general business information (years of experience as a mobile money agent or agent size, business model); (iii) mobile money operations (pre- and post-tax self-reported

[21] The survey was conducted through face-to-face interviews. The enumerators were students from the University of Yaoundé II, and one of the authors supervised the survey.

amount of daily transactions, client profile, self-reported expenses, and revenue, etc.); (iv) business strategies, perspectives, opportunities and threats (existing and future strategies, risks, liquidity needs, and other challenges); (v) competitors and market structure (presence of remittance agencies, banks and other financial institutions nearby, near commercial areas, direct competitors); (vi) effects of Covid-19; and (vii) tax morale (Luttmer and Singhal 2014) .

To construct our final sample, we apply two main selection criteria. First, we retain agents with complete commission and transaction information from November 2021 to June 2022 (we are left with 10,283 out of 15,996 agents). Second, we focus on agents with average monthly commission of at least CFA F1,000. Our final sample consists of 9,815 agents (7,143 and 2,672 from MTN and Orange databases, respectively), 470 of which were survey respondents. It was not possible to apply these criteria before the start of the survey, as we only received information on transactions and agent commission after the survey had been completed. For this reason, the final sample used for our survey-based estimations includes only 470 of the 807 respondents. From the 9,815 agents for which we could identify specific locations,[22] 7,250 are in Yaoundé, and 2,026 in peripheral areas, including rural areas outside Yaoundé.

3.2. Agents' commission and transactions using superagents' data

3.2.1 Full sample

Table 3.2 describes agents' commission from November 2021 to June 2022. We observe a decrease in commission per transaction, total commission, and growth of total commission between 2021 and 2022. On average, agent commission declined by 4.82 per cent between December 2021 and March 2022. This persisted from March to June 2022, with a reduction of 16.57 per cent on average. Half of the agents in our sample have total monthly commission growth rates below -18 per cent between December 2021 and March 2022. Although we observe positive average growth rates of 7.84 per cent and 3.67 per cent for the number and amount of agents' transactions, respectively, between December 2021 and March 2022, half of the agents in the sample experienced a decline in the growth rate of the number and amount of their mobile money transactions –

-4.58 per cent, and -12.12 per cent, respectively. As we do not have information on agents' commission from December 2020 to January 2021, we cannot

[22] Our sample of 7,143 MTN agents represents 50 per cent of MTN agents in the Centre Region with monthly commission and transaction information in November 2021, of which 55.15 per cent earned at least CFA F100, and 67.89 per cent earned at least CFA F1,000 in November 2021. Our sample of MTN agents located in Yaoundé (outside Yaoundé) represent 66.77 per cent (62.38 per cent) of agents who earned at least CFA F1,000 in November 2021, respectively. US$1 = CFA F554.53 in 2021.

attribute the decrease in commission to the MM tax. In the robustness checks in Section 5, we compare the evolution of agents' commission and transactions for a subsample of MTN agents, whose monthly commission and transaction data are available from January to March 2021, and 2022.

Table 3.2 Agents' commission from Nov 2021 to Jun 2022

		Pre-tax		Post-tax	
Variables	**Obs.**	**Nov 2021**	**Dec 2021**	**March 2022**	**June 2022**
Monthly average values					
Commission					
Commission divided by no. of transactions	9,815	65.96	66.58	57.87	57.22
Total commission (CFA F)	9,815	42,160.95	46,401.57	37,211.29	26,070.06
Total commission (natural log)	9,815	9.79	9.86	9.63	9.25
Growth of total commission (%)	9,815	-	20	-4.82	-16.57
Transactions					
Number of transactions	9,815	669.0255	707.3905	675.61	510.41
Amount of transactions (CFA F)	9,815	13,281,667	14,679,924	12,735,064	9,069,496
Growth in number of transactions (%)	9,815		14.55	7.84	-11.57
Growth in amount of transactions (%)	9,815		24.11	3.67	-14.21
Monthly median values					
Commission					
Commission divided by no. of transactions	9,815	46.09	47.19	40.17	37.23
Total commission (CFA F)	9,815	19,083.15	20,333	16,166.89	11,059
Total commission (natural log)	9,815	9.86	9.92	9.69	9.31
Growth of total commission (%)	9,815	-	7.53	-17.99	-30.29
Transactions					
Number of transactions	9,815	423	440	428	316
Amount of transactions (CFA F)	9,815	5,363,125	5,864,250	4,969,750	3,388,821
Growth in number of transactions (%)	9,815		5.76	-4.58	-26.43
Growth in amount of transactions (%)	9,815		9.98	-12.12	-30.09

Source: Authors' own elaboration using superagents' data.

3.2.2 Subsample of agents in Yaoundé vs. outside Yaoundé

We report the amount of agents' commission according to whether their mobile money business is in or outside Yaoundé in Appendix Table A2.1. Agents in Yaoundé earn more commission, on average, than those outside Yaoundé. This is not surprising as most of the population live in the capital. Yaoundé is relatively

more competitive, dynamic, and has more developed financial infrastructure than surrounding areas in the Centre Region. Although the amounts of commission are different between Yaoundé and outside Yaoundé across all months, the median value of growth rate of total commission between November and December 2021 (pre-MM tax) is not significantly different (7.68 per cent in Yaoundé and 7.65 per cent outside Yaoundé). Between December 2021 and March 2022 (pre- and post-MM tax) agents' commission in Yaoundé decreased on average by around CFA F10,000 (20 per cent). Outside Yaoundé, average monthly commission decreased by CFA F6,500 (17 per cent) between December 2021 and March 2022. However, there is no significant difference in the number of agents in and outside Yaoundé who experienced a significant decline in their monthly commission of at least 33 per cent or 50 per cent from November 2021 to June 2022.

3.2.3 Subsample of agents with relatively low vs. high average transaction sizes pre-tax

We also examine agents' commission before and after the MM tax, according to the average value of agents' transactions (Table 3.3). We distinguish between agents with relatively larger average transaction sizes in 2021 (greater than 75th percentile), against those with smaller ones (less than 25th percentile). From November to December 2021 the two sub-groups of agents have only a slight variation in their growth rates (less than five percentage points), particularly in terms of the median values (8.09 per cent vs. 7.21 per cent). However, between December 2021 and March 2022 the difference in average growth rate of their total commission is at least 10 percentage points: -9.56 per cent for agents conducting relatively larger transactions in 2021, compared to 7.26 per cent for those conducting smaller transactions. For the median value, 50 per cent of agents with relatively larger transactions in 2021 have commission growth rates between December 2021 and March 2022 of less than -21.91 per cent, compared to -11.41 per cent for agents with smaller transaction sizes in 2021.

We also use a second indicator to distinguish agents performing larger average transaction sizes than their counterparts, using a cut-off of CFA F10,000. The descriptive statistics are shown in Appendix Table A2.2. We observe the same trend in agents' commission before and after the MM tax. Between December 2021 and March 2022, while the average commission growth rate of agents performing less than CFA F10,000 average monthly transactions was 3.42 per cent, those conducting at least CFA F10,000 average monthly transactions have a negative average commission growth rate of -9.64 per cent. From November to December 2021, the corresponding growth rate in commission is 23.08 per cent and 18.29 per cent, respectively.

Table 3.3 Agents' monthly commission Nov 2021 to Jun 2022, subsample of agents in two extremes of distribution in 2021 (> 75th percentile vs. < 25th percentile)

A. Agents with relatively larger average transaction sizes in 2021 (>75th percentile value)					
		Before MM tax		After MM tax	
	Obs.	Nov 2021	Dec 2021	March 2022	June 2022
Average values					
Commission divided by no. of transactions	2,442	146.0795	146.3024	126.7616	128.0295
Total commission (CFA F)	2,442	80,261.22	90,568.81	70,174.62	47,494.79
Total commission (natural log)	2,442	10.58162	10.64116	10.35874	9.894671
Growth of total commission (%)	2,442	-	18.79	-9.56	-21.65
Median values					
Commissions divided by no. of transactions	2,442	111.7263	111.2333	94.8378	92.01813
Total commission (CFA F)	2,442	47,893	51,274.82	39,045.11	25,185
Total commission (natural log)	2,442	10.77672	10.84496	10.57247	10.134
Growth of total commission (%)	2,442	-	8.09	-21.91	-34.48
B. Agents with relatively lower average transaction sizes in 2021 (< 25th percentile value)					
	Obs.	**Nov 2021**	**Dec 2021**	**March 2022**	**June 2022**
Average values					
Commissions divided by no. of transactions	2,446	20.91821	21.34359	19.31292	18.7205
Total commission (CFA F)	2,446	9,205.843	9,985.821	9,225.682	6,814.14
Total commission (natural log)	2,446	8.634424	8.707379	8.577446	8.269638
Growth of total commission (%)	2,446	-	22.45	7.26	-9.35
Median values					
Commission divided by no. of transactions	2,446	21.47841	21.84724	18.82294	17.28847
Total commission (CFA F)	2,446	5581.965	5888.525	5199.35	3849.5
Total commission (natural log)	2,446	8.627296	8.680761	8.556289	8.255699
Growth of total commission (%)	2,446	-	7.21	-11.41	-26.71

Source: Authors' own elaboration using superagents' data.

3.3 Description of agents in survey

Appendix Table A2.3 describes the 470 agents in the survey whose monthly commission and transaction data is available during our study periods (November and December 2021, and March and June 2022). Most of these carry out their MM operations in Yaoundé (81 per cent), and are: non-dedicated or conducting other operations parallel to the mobile money business (70 per cent), relatively new agents, operating the MM business before 2019 (57 per cent), located near

commercial areas (around 70 per cent), far from remittance agencies (63 per cent), and far from financial institutions (54 per cent).

We also show the pre-MM tax average agent transaction size and monthly commission of the subsample of agents in the survey, according to agent-specific characteristics and market structure. On average the monthly transaction size, or total mobile money transaction value divided by the number of transactions performed by the agent in the survey, is CFA F18,910 (US$34.10). Agents who are located in Yaoundé, dedicated (those who do not have other business activities besides the mobile money business), relatively more established (those in the mobile money business before January 2019), female, and in more competitive environments, performed relatively larger mobile money transactions in 2021 than their respective counterparts. We find a similar pattern in their average monthly commission in 2021 – apart from female agents, who earned 21 per cent less commission than their male counterparts. Agents operating far from financial institutions made slightly more (1.77 per cent) monthly commission on average between November and December 2021 than their counterparts.

4. Methodology and results

4.1 Measuring agent performance and revenue sustainability: pre- vs. post-MM tax

We investigate whether agent performance varies before and after the MM tax, and whether the outcomes differ according to exposure of the agent's potential mobile money activity to the tax. Although the Cameroon government applies a uniform tax rate of 0.2 per cent of transaction value, the commission and revenue sustainability across agents may be affected differently. The cost of transactions pre-MM tax – network charges – are a decreasing function of transaction values (see Table 4.1). The increase in transaction costs post-MM tax is, thus, disproportionately higher for larger transactions.[23]

Table 4.1 Increase in transaction costs for cash withdrawals

	Bracket (CFA F)		Network charges	MM tax (0.2%)		MM tax as a share of network charges (%)	
	Min	Max		Min	Max	Min	Max
1	100	5,999	3%	0	12	0	6.67
2	6,000	10,050	175	12	20	6.86	11.43
3	10,051	13,550	300	20	27	6.67	9.00
4	13,551	25,050	350	27	50	7.71	14.29
5	25,051	50,050	700	50	100	7.14	14.29
6	50,051	75,100	1,350	100	150	7.41	11.11
7	75,101	100,101	1,800	150	200	8.33	11.11
8	100,101	200,500	2,150	200	401	9.30	18.65
9	200,501	300,500	2,600	401	601	15.42	23.12
10	300,501	400,500	3,100	601	801	19.39	25.84
11	400,501	500,000	3,500	801	1,000	22.89	28.57

Source: Mobile money operator (MTN).

Table 4.1 shows the increase in transaction costs, or MM tax, as a share of network charges, by transaction tranches for cash withdrawals from the MTN network service provider. There is an increase of 11.43 per cent in transaction

[23] Several tax-related studies, such as Ly and Paty (2020) and Rocha, Ulyssea and Rachter (2018), exploit heterogeneity in intensity of exposure to the tax to identify the causal impact of tax on economic outcomes. In our study, the heterogeneity of the client, and, thus, agents' potential exposure to MM tax, is observed due to the network operator's pricing structure.

costs for withdrawing CFA F10,000 after the MM tax. The increase in transaction costs attributed to withdrawing CFA F300,500 is 23.12 per cent.

We measure heterogeneity in potential agent activity exposure to the tax due to the operator's pricing structure by using agents' average transaction size before the MM tax. We examine whether agent performance differs before and after the MM tax, and the role played by heterogeneity of agents' potential mobile money activity exposure to the tax due to the operator's pricing structure. Hence, we estimate the following equations using the Ordinary Least Squares (OLS) regression:

$$AgentPerformance_{it} = \beta_0 + \beta_1 MMActivityExposure_i + \beta_2 Post_t + \nu_{it} \quad (1a)$$

$$AgentPerformance_{it} = \beta_0 + \beta_1 MMActivityExposure_i + \beta_2 Post_t + \beta_3 (Post_t \times MMActivityExposure_i) + \nu_{it} \quad (1a')$$

where *AgentPerformance* denotes the agents' commission.[24] We mainly use three measures: commission per transaction (*CommTrans*), total commission (in natural logarithm, *Comm*), and growth rate of total commission (*GrowthComm*).

Furthermore, we explore the effect of MM activity exposure on revenue sustainability using logistic regression in equation 1b:

$$Pr(AgentRevSustainability_{it} = 1) = \Phi(\gamma_0 + \gamma_1 MMActivityExposure_i) \quad (1b)$$

where *AgentRevSustainability* represents any of the two dummy variables indicating significant reduction in monthly commission (*NegComm33* (at least 33 per cent decline in commission between November 2021 and March 2022), *NegComm50* at least 50 per cent reduction)).[25] *MMActivityExposure* is any of the two indicators: *ActivityExposure*, or *HighActivityExposure*. *ActivityExposure* is a continuous variable denoting the extent to which an agent's clients, on average, potentially face higher transaction costs post-MM tax due to the operator's pricing structure. We note that clients performing larger transactions face a greater increase in transaction costs than their counterparts post-MM tax, as shown in Table 4.1. Thus, we define *ActivityExposure* as the average transaction size, or total amount of transactions divided by total number of transactions, of the MM agent in 2021 (pre-MM tax). Following Rocha *et al.* (2018), *HighActivityExposure* considers the two extremes of the distribution. It is a dummy variable equal to 1 for MM agents whose average transaction size in 2021 is greater than the 75th percentile value, and 0 for those whose average transaction size is less than the

[24] Information on self-reported commission was also gathered in the survey of active mobile money agents. Self-reported revenue, however, is subject to bias and limitations on agents' memories, especially when asked about revenue in previous years. They could also either underestimate or overestimate their earnings.

[25] We also consider the decline in clients as an alternative indicator of agent sustainability. It is equal to 1 if the agent experienced a decrease in number of clients between 2021 and 2022, and 0 otherwise. We do not find a significant impact of any of our variables on sustainability of agent revenue. The results are available on request from the authors.

25th percentile value.[26] *Post* is a dummy variable indicating the period after MM tax was introduced. It is equal to 1 in 2022, and 0 in 2021. $Post_t \times MMActivityExposure_i$ is our variable of interest, and, thus, we focus our analysis on the coefficient β_3 (see equation 1(a)), which captures the average differential effect on mobile money agents' commission across agents with varying potential MM activity exposure to the tax, pre- vs. post-MM tax. A negative and significant coefficient of $Post_t \times HighActivityExposure_i$ or $Post_t \times ActivityExposure_i$ suggests a larger adverse effect on the commission post-MM tax of agents with larger pre-MM tax average transaction sizes, or those whose clients are potentially more exposed, on average, to higher transaction costs after the MM tax.[27] In addition, we calculate the marginal effect of agents' clients' potential exposure to higher transaction costs in equation 1(b), to assess its effect on the likelihood that an agent experiences a significant decrease in their commission by at least 33 per cent pre- vs. post-MM tax. We report the definitions of variables used in our estimations in Appendix A, and present the descriptive statistics of variables used in our estimations in Appendix Table A2.4.

4.2. Results

4.2.1 Agent performance: pre- vs. post- MM tax[28]

We estimate equation 1(a) to examine agent performance pre- vs. post-MM tax, and equation 1(a') to determine whether there are differential effects on agent performance pre- vs. post-MM tax, for agents who have a higher potential activity exposure to the tax due to the operator's pricing structure vs. their counterparts. As indicated in Section 3, the differential effect on performance indicators across agents with varying potential activity exposure to the tax could be captured by the coefficients of the interaction terms: $Post_t \times HighActivityExposure_i$, and $Post_t \times ActivityExposure_i$.

Our findings confirm lower agent performance after introducing the MM tax (see Table 4.2).

[26] We also define an alternative measure for MM activity exposure, *LowActivityExposure*. This is a dummy variable equal to 1 for MM agents whose average transaction size in 2021 is less than CFA F10,000, and 0 otherwise. The results of equation 1(a) and equation 1(a') using this measure are reported in Appendix Table A2.18. We note that findings are consistent with use of the main indicators.

[27] We note that we observe similar trends in *CommTrans* and *Comm* pre-MM tax for agents identified to have a high potential activity exposure (*HighActivityExposure* = 1 vs. *HighActivityExposure* = 0) to the tax due to the operator's pricing structure. We do not reject the null hypothesis that the linear trends are parallel before the tax during the pre-treatment time period, with p-values equal to 0.3386 and 0.9441, respectively. The pre-trends graphs are shown in Appendix Figures A3.1(a) and A3.1(b).

[28] We find consistent results even when examining subsamples of MTN and Orange mobile money agents. The results are available upon request from the authors.

Table 4.2 Agent performance pre- vs. post-MM tax

	Comm trans	Comm	Growth comm	Comm trans	Comm	Growth comm	Comm trans	Comm	Growth comm	Comm trans	Comm	Growth comm
Post	-10.45***	-0.366***	-0.289***	-8.721***	-0.385***	-0.308***	-2.114***	-0.247***	-0.235***	56.14	0.562***	0.162
	(-4.22)	(-20.84)	(-24.10)	(-7.34)	(-30.34)	(-38.02)	(-8.19)	(-11.80)	(-13.05)	(0.99)	(3.81)	(1.62)
HighActivityExposure	116.7***	1.822***	-0.109***				125.1***	1.940***	-0.0366*			
	(47.09)	(103.75)	(-9.71)				(43.70)	(80.81)	(-1.86)			
ActivityExposure				62.88***	0.706***	-0.0354***				66.28***	0.756***	-0.0026
				(20.71)	(89.37)	(-7.39)				(19.68)	(69.26)	(-0.29)
*Post*HighActivityExposure*							-16.68***	-0.237***	-0.109***			
							(-3.37)	(-6.76)	(-4.54)			
*Post*ActivityExposure*										-6.799	-0.099***	-0.0493***
										(-1.12)	(-6.29)	(-4.70)
Constant	25.30***	8.730***	0.261***	-533.5***	3.089***	0.538***	21.13***	8.671***	0.225***	-566.0***	2.616***	0.225***
	(20.38)	(651.02)	(22.34)	(-18.65)	(41.59)	(11.65)	(188.93)	(605.83)	(15.27)	(-17.97)	(25.67)	(2.66)
Obs	19,552	19,552	14,664	39,260	39,260	29,445	19,552	19,552	14,664	39,260	39,260	29,445
F-stat	1327.2	5630.1	341.5	342.5	4532.3	758.1	894.7	3779.7	248.8	336.8	2984.5	517.9
R-squared	0.103	0.364	0.0445	0.191	0.220	0.0501	0.103	0.366	0.0458	0.191	0.221	0.0511
Adj R-squared	0.103	0.364	0.0444	0.190	0.220	0.0500	0.103	0.366	0.0456	0.191	0.221	0.0510

Source: Authors' own elaboration using superagents' data. Notes: *t* statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors are calculated to deal with heteroskedasticity. *Post* is a dummy variable indicating the MM tax period. *HighActivityExposure* is a dummy variable equal to 1 for MM agents whose average transaction size in 2021 is greater than the 75th percentile value, and 0 for those with average transaction size in 2021 less than the 25th percentile value. *ActivityExposure* is the average transaction size of the MM agent in 2021. *Post*HighActivityExposure* is the interaction term between *Post* and *HighActivityExposure*. *Post*ActivityExposure* is the interaction term between *Post* and *ActivityExposure*. Agent Performance indicators: *CommTrans* is the average MM agent commission per transaction (using monthly data) calculated by dividing total commission by the number of transactions; *Comm* is the total monthly MM agent commission, expressed in natural logarithm; *GrowthComm* is the growth of commission using monthly data (November and December 2021, March and June 2022).

Moreover, agents potentially more exposed to the tax are found to have significantly lower commission per transaction post-MM tax, by CFA F16.7 on average, vs. potentially less exposed agents. The relative difference in monthly agent commission before and after MM tax between less, as against more, potentially exposed agents is around 21.10 per cent ((e^{β_3}-1) x 100 per cent) on average. In addition, we find agents who are potentially more exposed to the tax have lower commission growth rates than their counterparts post-MM tax, by around 10.90 percentage points. We find consistent results when using the *ActivityExposure* measure.

4.2.2. Which agents have potentially high activity exposure post-MM tax?

Table 4.3 shows the characteristics of agents with relatively higher activity exposure to the MM tax (*HighActivityExposure*=1) due to the operator's pricing structure. They perform a larger average number and amount of transactions pre-MM tax. Compared to agents with relatively low activity exposure to MM tax (*HighActivityExposure*=0), they are more established (50 per cent vs. 38 per cent), mostly female (60 per cent vs. 55 per cent), and conduct their mobile money business in a local commercial building rather than at kiosks, road stands, or at home (40 per cent vs. 28 per cent).

Table 4.3 Which agents have potentially high activity exposure post-MM tax due to operator's pricing structure?

	HighActivityExposure=1	*HighActivityExposure=0*
Using superagent administrative data		
Amount of transactions in 2021 (mean in CFA F)	30,767,868	2,409,737
Std dev	52,567,329	2,933,370
Number of transactions in 2021 (avg)	686.03	458.89
Std dev	791.33	478.18
% of agents (using survey data)		
- Established agent	50%	38.46%
- Female	59.82%	55.38%
- Age	3.44	3.72
- *ActivityinLocalComml*	40.18%	27.69%

Source: Authors' own elaboration using survey and superagents' data.

4.2.3 Agent revenue sustainability: pre- vs. post-MM tax

We also assess agent revenue sustainability pre- vs. post-MM tax, between agents potentially exposed to MM tax, as discussed in Section 3, vs. their less

potentially exposed agents, by estimating equation 1(b) using logistic regression. We present the estimation results and calculated marginal effects in Table 4.4. We assume that agents with a higher likelihood of a significant decline in their revenue (by at least 33 per cent or 50 per cent) between November 2021 and June 2022, face increased instability in their mobile money revenue, which may have an adverse effect on continuity of their mobile money operations, especially in the long run. We find agents whose mobile money activity is potentially more exposed to the tax on mobile money transactions are more likely to experience a large decline in their commission than their counterparts. On average, they are 17.69 per cent (10.13 per cent) more likely to experience at least a 33 per cent (50 per cent) decrease in growth rate of their commission vs. their less potentially exposed counterparts.

Table 4.4 Agent revenue sustainability: pre- vs. post-MM tax, according to agent's potential activity exposure to the tax

	NegGrowth Comm33	***NegGrowth Comm50***	***NegGrowth Comm33***	***NegGrowth Comm50***
Logistic regression results				
HighActivityExposure	0.732***	0.435***		
	(12.43)	(7.30)		
ActivityExposure			0.277***	0.202***
			(11.55)	(8.68)
Constant	0.0183	-0.706***	-2.351***	-2.473***
	(0.57)	(-20.55)	(-10.27)	(-11.04)
Obs	4,888	4,888	9,815	9,815
Chi-squared	154.4***	53.35***	133.4***	75.35***
Pseudo R-squared	0.0236	0.00833	0.0109	0.00591
Calculated marginal effects				
HighActivityExposure	0.1769***	0.1013***		
	(0.0139)	(0.0138)		
ActivityExposure			0.0669***	0.0466***
			(0.0056)	(0.0053)

Source: Authors' own elaboration using superagents' data. Notes: *t* statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Description of variables: *NegGrowthComm33* and *NegGrowthComm50* are dummy variables equal to 1 if the agent experienced a decline of at least 33% and 50%, respectively, in its monthly commissions between November 2021 and June 2022, and 0 otherwise. *HighActivityExposure* is a dummy variable equal to 1 for MM agents whose average transaction size in 2021 is greater than the 75th percentile value, and 0 for those with average transaction size in 2021 less than the 25th percentile value. *ActivityExposure* is the average transaction size of the MM agent in 2021.

4.3. Does financial market structure matter?

We also examine whether potential variations in agent performance pre- vs. post-MM tax between potentially more (vs. less) exposed agents depends on the structure of the financial market in the agents' immediate environment. We conjecture that agents operating in less competitive environments are less likely to be affected by the new tax than their counterparts in more competitive environments (those in Yaoundé, near money transfer operators, banks, MFIs, etc.). The services agents provide in less competitive financial markets may be considered more indispensable, as there are no close substitutes for what they are offering, and they can offer other services to retain their customers (e.g. grant informal credit). However, agents far from money transfer operators and financial institutions may face more competition from other mobile money agents, as mobile money business is expected to grow in areas that are underserved by financial institutions, such as banks.

To investigate whether the financial market structure where an agent is located matters when investigating the differential effect on several agent outcomes pre- vs. post-MM tax, between more vs. less potentially exposed agents, we estimate equation 1(a') and equation 1(b) using subsamples of agents located in the capital (Yaoundé) vs. those located in peripheral communities outside the capital (outside Yaoundé). We also examine subsamples of agents in the survey according to their proximity to money transfer operators (near vs. far from remittance agencies) and financial institutions (near vs. far from banks, cooperatives, and MFIs), and assess the impact of the MM tax on agent performance and revenue sustainability.

4.3.1. Performance of agents potentially more vs. less exposed to the tax: Yaoundé vs. outside Yaoundé

We also estimate equation 1(a') for subsamples of agents located in Yaoundé and peripheral communities including rural areas. Overall, the findings in Table 4.5 show that agents potentially more exposed to the tax suffer a more significant decline in their commission than their counterparts in Yaoundé. Agents' commission growth rates declined by 15.10 percentage points, between less and more potentially exposed agents, post- vs. pre-MM tax. For agents outside Yaoundé, there is no significant variation in commission growth rates between less and more potentially exposed agents. We find the average relative difference in monthly agent commission pre- vs. post-MM tax between less vs. more potentially exposed agents approximately 21.65 per cent in Yaoundé vs. 18.13 per cent outside Yaoundé.

Table 4.5 Impact of MM tax on agent performance, subsample of agents in Yaoundé vs. outside Yaoundé

	Yaoundé						Outside Yaoundé					
	Comm trans	***Comm***	***Growth comm***	***Comm trans***	***Comm***	***Growth comm***	***Comm trans***	***Comm***	***Growth comm***	***Comm trans***	***Comm***	***Growth comm***
Post	-2.172***	-0.250***	-0.217***	75.15	0.620***	0.339***	-2.412***	-0.237***	-0.280***	-53.04	0.404	-0.269
	(-6.40)	(-9.78)	(-9.88)	(1.18)	(3.52)	(2.86)	(-7.22)	(-5.77)	(-8.09)	(-0.29)	(1.20)	(-1.16)
HighActivityExposure	122.2***	1.997***	-0.0239				119.9***	1.765***	-0.0923**			
	(37.91)	(73.75)	(-1.05)				(14.33)	(26.98)	(-2.06)			
ActivityExposure				66.86***	0.768***	0.00470				59.64***	0.794***	-0.0234
				(15.49)	(59.49)	(0.45)				(8.46)	(30.57)	(-1.19)
*Post*HighActivityExposure*	-17.86***	-0.244***	-0.151***				-5.233	-0.200**	0.0447			
	(-3.60)	(-6.13)	(-5.46)				(-0.24)	(-2.13)	(0.79)			
*Post*ActivityExposure*				-8.821	-0.105***	-0.0681***				5.093	-0.0809**	-0.00325
				(-1.30)	(-5.63)	(-5.55)				(0.25)	(-2.18)	(-0.13)
Constant	21.73***	8.688***	0.214***	-572.9***	2.546***	0.153	20.20***	8.667***	0.247***	-501.7***	2.194***	0.433**
	(163.70)	(498.74)	(12.04)	(-14.10)	(20.96)	(1.52)	(89.97)	(308.34)	(8.49)	(-7.78)	(9.29)	(2.33)
Obs	14,356	14,356	10,767	29,000	29,000	21,750	3,936	3,936	2,952	8,104	8,104	6,078
F-stat	741.7	3125.8	230.8	264.5	2196.8	438.8	97.69	438.0	31.26	52.69	599.1	88.54
R-squared	0.110	0.382	0.0547	0.207	0.223	0.0578	0.0575	0.297	0.0322	0.112	0.223	0.0429
Adjusted R-squared	0.110	0.382	0.0545	0.207	0.223	0.0577	0.0568	0.297	0.0312	0.111	0.223	0.0425

Source: Authors' own elaboration using superagents' data. Notes: *t* statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. *Post* is a dummy variable indicating the MM tax period. *HighActivityExposure* is a dummy variable equal to 1 for MM agents whose average transaction size in 2021 is greater than the 75th percentile value, and 0 for those with average transaction size in 2021 less than the 25th percentile value. *ActivityExposure* is the average transaction size of the MM agent in 2021. *Post*HighActivityExposure* is the interaction term between *Post* and *HighActivityExposure*. *Post*ActivityExposure* is the interaction term between *Post* and *ActivityExposure*. Agent Performance indicators: *CommTrans* is the average MM agent commission per transaction (using monthly data) calculated by dividing total commission by the number of transactions; *Comm* is the total monthly MM agent commission, expressed in natural logarithm; *GrowthComm* is the growth of commission using monthly data (November and December 2021, March and June 2022).

We report the marginal effects of an agent's potential exposure to the tax on agent revenue sustainability in Table 4.6. Agents who are potentially more exposed to the tax's effects in Yaoundé (outside Yaoundé) are 18.20 per cent (15.15 per cent) more likely to experience a decrease in their monthly commission by at least 33 per cent from November 2021 to June 2022 than their potentially less-exposed counterparts. In addition, we find agents with double the average mobile money transactions of others in Yaoundé (outside Yaoundé) 4.96 per cent (3.71 per cent) more likely to experience at least a 33 per cent decline in commission for the same period. We do not find a significant difference in the likelihood of potentially more- vs. less exposed agents experiencing a decline in growth of commission of at least 50 per cent before and after MM tax for those located in Yaoundé vs. outside Yaoundé (9.52 per cent vs. 9.89 per cent).

Table 4.6 Marginal effects of MM tax on agent revenue sustainability, subsample of agents in Yaoundé vs. outside Yaoundé

	NegGrowth Comm33	***NegGrowth Comm50***	***NegGrowth Comm33***	***NegGrowth Comm50***
Agents located in Yaoundé				
HighActivityExposure	0.1820***	0.0952***		
	(0.0163)	(0.0161)		
ActivityExposure			0.0715***	0.0487***
			(0.0067)	(0.0063)
Agents located outside Yaoundé				
HighActivityExposure	0.1516***	0.0989***		
	(0.0332)	(0.0329)		
ActivityExposure			0.0535***	0.0336***
			(0.0131)	(0.0123)

Source: Authors' own elaboration using superagents' data. Notes: Delta standard error in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

4.3.2. Agent performance according to market structure

We also estimate equation 1(a) for a subsample of agents located near vs. far from remittance agencies. We present the coefficients of the interaction term: $Post_t \times HighActivityExposure_i$and $Post_t \times ActivityExposure_i$ in Table 4.7.

Table 4.7 Performance of agents potentially more vs. less exposed to MM tax, subsample of agents in survey far from vs. near remittance agencies

	CommTrans		*Comm*		*GrowthComm*	
Agents located far from remittance agencies or money transfer operators						
Post	-2.790***	78.01***	-0.118	1.181	-0.111	1.333**
	(-3.16)	(2.80)	(-1.01)	(1.12)	(-1.36)	(2.28)
HighActivityExposure	77.36***		2.081***		-0.0247	
	(21.19)		(16.31)		(-0.27)	
ActivityExposure		47.16***		1.249***		0.0336
		(21.91)		(15.75)		(0.71)
*Post*HighActivityExposure*	-15.17***		-0.365*		-0.215*	
	(-2.99)		(-1.94)		(-1.87)	
*Post*ActivityExposure*		-9.084***		-0.151		-0.166***
		(-3.06)		(-1.36)		(-2.72)
Constant	27.56***	-393.3***	9.339***	-1.391*	0.177***	-0.119
	(47.30)	(-19.48)	(115.57)	(-1.86)	(3.02)	(-0.26)
Obs	544	1,192	544	1192	408	894
F-stat	257.0	316.6	144.0	152.7	10.71	21.63
R-squared	0.643	0.737	0.444	0.340	0.0540	0.0543
Adj R-squared	0.641	0.736	0.441	0.339	0.0470	0.0511
Agents located near remittance agencies or money transfer operators						
Post	-3.086**	81.33	-0.175	0.717	-0.292	0.173
	(-2.31)	(1.53)	(-1.02)	(0.54)	(-1.54)	(0.16)
HighActivityExposure	82.10***		1.884***		-0.123	
	(16.44)		(12.27)		(-0.66)	
ActivityExposure		49.73***		0.892***		-0.0489
		(11.53)		(8.67)		(-0.50)
*Post*HighActivityExposure*	-11.03		-0.187		-0.109	
	(-1.50)		(-0.86)		(-0.52)	
*Post*ActivityExposure*		-9.182		-0.101		-0.0534
		(-1.63)		(-0.73)		(-0.47)
Constant	28.17***	-416.4***	9.536***	2.077**	0.331*	0.716
	(27.45)	(-10.10)	(78.07)	(2.10)	(1.97)	(0.74)
Obs	380	688	380	688	285	516
F-stat	152.4	105.5	93.38	52.54	10.13	13.11
R-squared	0.455	0.596	0.429	0.288	0.0809	0.0776
Adj R-squared	0.451	0.594	0.425	0.285	0.0710	0.0722

Source: Authors' own elaboration using superagents' and survey data. Notes: *t* statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. *HighActivityExposure* is a dummy variable equal to 1 for MM agents whose average transaction size in 2021 is greater than the 75th percentile value, and 0 for those with average transaction size in 2021 less than the 25th percentile value. *ActivityExposure* is the average transaction size of the MM agent in 2021. *Post*HighActivityExposure* is the interaction term between *Post* and *HighActivityExposure*. *Post*ActivityExposure* is the interaction term between *Post* and *ActivityExposure*. Agent performance indicators: *CommTrans* is the average MM agent commission per transaction (using monthly data) calculated by dividing total commission by the number of transactions; *Comm* is the total

monthly MM agent commission, expressed in natural logarithm; *GrowthComm* is the growth of commissions using monthly data (November and December 2021, March and June 2022).

Overall, the findings suggest a differential effect on agents' performance for those potentially more vs. less exposed to the tax, primarily for agents in the survey far from remittance agencies or money transfer operators (298 agents), rather than their counterparts operating near remittance agencies (172 agents). They are found to have lower commission per transaction (by CFA F15.17 on average) than their less potentially exposed counterparts post- vs. pre-MM tax. We also find agents operating far from money transfer operators who have performed relatively larger transactions (twice their counterparts') to have lower commission growth rates by 11.51 per cent (0.6941 x -0.1666) post- compared to the pre-MM tax period. Although the mobile money business is more indispensable in these areas, there might also be more mobile money agents. Competitive pressure in the mobile money business could be stronger, driving commission down further.

These findings are consistent with the results examining the impact of MM tax on a subsample of 214 agents near vs. 256 located far from financial institutions, such as banks, cooperatives, and MFIs (Appendix Table A2.5). The results indicate that more potentially exposed agents far from financial institutions have significantly lower commission per transaction and commission growth rates post- compared to pre-MM tax period (at a 5 per cent significance level). Agents performing twice as large transactions in areas far from financial institutions have lower commission growth rates by 10.25 per cent, post- compared to pre-MM tax period.

Regarding agent revenue sustainability, the calculated marginal effects (Appendix Table A2.6) suggest mixed results. On one hand, agents who are potentially more exposed to the tax located far from remittance agencies are 33.77 per cent more likely to experience a decline in their commission growth rates by at least 33 per cent than their relatively less potentially exposed agent counterparts, pre- vs. post-MM tax. For those located near remittance agencies, on the other hand, potentially more exposed agents are 18.13 per cent more likely to experience a decline in commission of at least 33 per cent between November 2021 and June 2022 (before and after MM tax). We note, however, that a decline of almost half of commission before and after MM tax is more likely for potentially more exposed agents located near remittance agencies. Agents performing relatively larger monthly transactions per operation pre-MM tax, for example, CFA F40,000 (vs. CFA F20,000), are 6.08 per cent more likely to experience a larger decrease in their commission by at least 50 per cent before and after MM tax. Distinguishing agents according to their proximity to banks, cooperatives, and MFIs, our findings seem to indicate that, apart from *NegCommGrowth33* on *HighActivityExposure*, potentially more exposed agents operating near financial institutions are relatively

more likely to experience a significant decline in their commission of at least 50 per cent than less-exposed agent counterparts in the same area.

Overall, the results imply that agents located in areas where many mobile money agents are operating have lower agent performance post- vs. pre-MM tax. After MM tax agents near remittance agencies are, however, more likely to experience a significant decline in their monthly commission of at least 50 per cent than agents far from remittance agencies.

4.4. Agents' business strategies post-MM tax

We also estimate equation 2 to investigate the potential effect of the MM tax on mobile money agents' business strategies.

$$Pr(AgentBusStrategies_{it} = 1) = \Phi(\gamma_0 + \gamma_1 MMActivityExposure_i) \quad (2)$$

We use four indicators of agents' business strategies (*AgentBusStrategies*) after the MM tax: business expansion (*BusinessExpansion*), expansion of activities through raising capital (*CapitalIncrease*), charging of additional (non-regulatory) fees per transaction (*AdditionalFee*), and implementation of loyalty programme (*LoyaltyProgramme*).[29]

Summary statistics on mobile money business strategies after introducing the MM tax (see Table 4.8) show that around one in five agents (23 per cent) indicated they were expanding their business,[30] and 14.26 per cent reported raising capital to expand their mobile money business. Other mobile money agents reported charging their clients additional (non-regulatory) fees per transaction (16.60 per cent), while 12.13 per cent of agents in the survey implemented a loyalty programme. We observe a disparity in business strategies implemented by agents in Yaoundé vs. those outside Yaoundé from January 2022. More agents in the survey outside Yaoundé indicated charging additional fees (21.59 per cent vs. 15.45 per cent), while more agents in Yaoundé implemented loyalty programmes

[29] We base these measures on agents' responses to the following survey question: 'Please check all the statements applicable to your MM business since January 2022 (Please check all that apply). *Note that in 2022, the Coupe Afrique des Nations (CAN) was held in Cameroon from January to February, and the World Cup at the end of the year, November to December 2022*. 1) I have expanded my business. Specify how_____, 2) I offer the services of both network operators, MTN-MoMo and Orange Money, 3) I am no longer a full-time mobile money agent. I also do other remunerated activities, 4) I spend more time as a mobile money agent than my other activities, 5) I rely more on my other income besides revenue from mobile money operations, 6) I have implemented a customer loyalty policy, 7) Customers pay an additional fee per transaction, 8) Nothing has changed about how I handle my mobile money business operations.' We note that we are only able to estimate equation 2 using the four indicators of agents' business strategies.

[30] Business expansion includes raising capital, expanding mobile money and non-mobile money services, and increasing the attractiveness of the location of the mobile money activity (e.g. improving layout of the kiosk, or moving from a kiosk to a shop or business premises).

(13.61 per cent vs. 5.68 per cent) and expanded their business by increasing their capital (14.92 per cent vs. 11.36 per cent).

Table 4.8 Mobile money business strategies adopted by agents starting Jan 2022, based on survey results

	%
Business expansion	23.40
Yaoundé	23.30
Outside Yaoundé	23.86
Capital increase	14.26
Yaoundé	14.92
Outside Yaoundé	11.36
Additional fees	16.60
Yaoundé	15.45
Outside Yaoundé	21.59
Loyalty programme	12.13
Yaoundé	13.61
Outside Yaoundé	5.68

Source: Authors' own elaboration using survey data. Number of agents in survey: 470.

We report the logistic regression results in Appendix Table A2.7. The marginal effects of MM tax on the probability that an agent adopts a specific business strategy since January 2022 are shown in Appendix Table A2.8.

5. Robustness checks and further issues

We perform several robustness checks by employing an alternative specification using a regression-adjusted model (Card and Krueger 1994), investigating agent outcomes pre- vs. post-MM tax using different pre- and post-tax periods for a subsample of agents, and focusing on mobile money agents whose mobile money business represents a more significant source of their revenue. We also check the robustness of our findings by controlling for agent-specific factors when assessing the impact of MM tax on agent performance on a subsample of agents in the survey. We investigate further issues by analysing agent outcomes pre- vs. post-MM tax for dedicated vs. non-dedicated agents. Finally, we present the results of our survey conducted on inactive agents, providing insights on why they decided to quit their mobile money business.

5.1 Alternative specification evaluating agent performance pre- vs. post-MM tax

Following Card and Krueger (1994), we employ a regression-adjusted model to investigate whether there are significant differences (and growth) in average agent outcomes in 2021 and 2022 according to agents' potential activity exposure to MM tax. Thus, we calculate the average of two months just before (November and December 2021) and after introducing MM tax (March and June 2022).

$$\Delta AvgAgentPerformance_i = \alpha_0 + \alpha_1 MMActivityExposure_i + \Omega Z + \nu_i \quad (3)$$

where *ΔAvgAgentPerformance* is the change in average agent outcomes in 2021 and 2022, particularly in terms of the agent's average mobile money commission per transaction (*DiffAvgCommTrans*), as well as the agent's average monthly commission (*DiffAvgCommission*). We also calculate the growth rate of average agent monthly commission (*AvgGrowthComm*) just before (November and December 2021) and after introducing MM tax (March and June 2022).

We present the results of the regression-adjusted model in Appendix Table A2.9, which confirm findings of the baseline specification. Agents that tend to have a higher potential activity exposure to the tax due to the structure of the networks' fees have lower average commission per transaction, monthly commission, and commission growth rates post-MM tax relative to pre-MM tax months. We find the decline in commission growth rates post- compared with pre-MM tax periods larger by around 20 percentage points for agents with average transactions higher than CFA F22,900 (75th percentile value of agents' average transaction size in 2021) than less activity-exposed agents who performed smaller

transactions in 2021 (less than CFA F9,700). In addition, the decrease in growth rate of average commission between 2021 and 2022 is higher for agents performing transactions twice as large as others by about 5.43 percentage points.

5.2. Subsample of MTN agents, with different definitions of pre- and post-MM tax periods

As mentioned in Section 3.1, we check the robustness of our findings by using alternative definitions of pre- and post-MM tax periods. We only examine subsamples of MTN Mobile Money (MoMo) agents where agent commission and transaction data are available for several months in 2021 and 2022, both for those located in and outside Yaoundé. Examining alternative pre- and post-tax periods allows us to avoid capturing effects that could have artificially increased the number of transactions and agent commission between November and December 2021.

We use three subsamples of agents whose monthly commission and transactions are available for Alternative Period 1 (pre-tax: January and March 2021, post-tax: January and March 2022), Alternative Period 2 (pre-tax: May and July 2021, post-tax: January and March 2022), and Alternative Period 3 (pre-tax: July and November 2021, post-tax January and February 2022). We recalculate several dependent and independent variables, such as *HighActivityExposure*, whose values depend on the sample distribution, and growth of commission (*GrowthComm*). We note a decline in the number of agents studied, not only because subsamples only include MTN agents, but also because there are a larger number of agents with commission and transaction information from November 2021 onwards.

Appendix Table A2.10 gives results of our estimations investigating the differential effect on agents' commission pre- vs. post-MM tax between those potentially facing a larger increase in transaction costs after introducing the MM tax vs. their counterparts, due to the operator's pricing structure. We find the results consistent with previous findings using the initial pre-MM tax period (November and December 2021), and post-tax period (March and June 2022). Overall, we find agents whose MM activity, in general, is more exposed to the tax due to the operator's fee structure have lower commission per transaction, commission, and growth rate of commission in the post-MM tax period than in 2021, than their counterparts. When using January and March 2021 as pre-MM tax periods, and January and March 2022 as post-tax MM periods, the results indicate that agents potentially more exposed to MM tax due to the pricing structure of fees have lower commission growth rates of around 20.10 per cent in the post-MM tax vs. pre-MM tax periods than their counterparts. When comparing the difference in the relative change in their monthly commission post- compared to pre-MM tax periods, agents that performed three times the value of average

MM transactions in 2021 have lower commission growth rates by around 10.04 per cent (log 3*0.0914) than their less activity-exposed counterparts.

We also examine the impact of MM tax on sustainability of MTN agents' revenue by examining a subsample of agents whose commission growth rates have experienced a significant decline of 33 per cent and 50 per cent between March 2021 and March 2022 (Alternative Period 1), July 2021 and March 2022 (Alt Period II), and November 2021 and February 2022 (Alternative Period 3). Appendix Table A2.11 shows consistent results when using our alternative pre- and post-MM tax periods, but only when using the continuous variable *ActivityExposure*. These findings suggest that MTN agents performing larger transactions in 2021 (vs. those conducting smaller MM transactions) are more likely to experience a larger decline in their commission of at least 33 per cent than other MTN agents between pre-and post-MM tax periods. We also show descriptive statistics of MTN agents' commission and transaction indicators from January to March 2021, and January to March 2022, to have a better grasp of agents' activity and performance for the same period, before and after the MM tax. Our findings, shown in Appendix Table A2.12, indicate that MTN agents have a lower positive growth rate of total monthly commission from January to March, on average, in 2022 than 2021. The median value of the growth rate of total commission is negative from January to March 2022 (-1.4 per cent) vs. 12.49 per cent from January to March 2021, way before the MM tax. We observe the same trend with regard to agents' transactions. The mean and median growth rates of the number and amount of transactions performed by each agent in the sample is lower from January to March 2022 than in 2021 for the same period.

5.3. Subsample of agents with higher average monthly commission

We also check the robustness of our findings by investigating agents whose pre-MM tax average monthly commission is at least CFA F6,000 and CFA F12,000, respectively. This allows us to focus on mobile money agents whose MM business activities contribute more significantly to their global monthly revenue, and represent around one-fifth and over one-third of the minimum wage in Cameroon in 2021, respectively. Thus, we recalculate the variable *HighActivityExposure* to reflect the change in sample distribution by excluding agents that rely less on mobile money operations.

We show in Appendix Figure A3.2 the monthly average value of agent commission indicators for different samples according to varying average commission cut-off thresholds. The trend is similar, regardless of the 2021 average commission cut-off threshold used. We observe, however, that the decline in average growth rate of total commission is sharper when using samples of agents earning higher commission (-4.82 per cent between December

2021 and March 2022 for those earning at least CFA F1,000 (US$1.80) in 2021, -11.59 per cent for those earning at least CFA F6,000 (US$10.82), and -13.75 per cent for those earning at least CFA F12,000 (US$21.64), for the same period), suggesting that those earning more and performing larger transactions, and thus having higher average transaction sizes pre-MM tax, experience a sharper decrease in their total commission post-MM tax.

We also estimate equation 1(a') using the subsample of agents earning more in 2021. Overall, our findings in Appendix Table A2.13 indicate consistent results with our baseline specification. Agents with relatively higher potential activity exposure to the tax due to the operator's pricing structure have lower commission growth rates and commission per transaction than their counterparts in the post-MM tax period, compared to pre-MM tax. We note that coefficient estimates, however, are lower when using a higher commission threshold, due to the difference in composition of the sample distribution.

Further, we confirm the baseline results concerning agent revenue sustainability pre- vs. post-MM tax for agents whose activities are more vs. less potentially exposed to the tax. This suggests that exclusion of mobile money agents that earn relatively less from the mobile money business does not influence our results. Agents potentially more exposed to the tax are 13-15 per cent (8-9 per cent) more likely to experience a significant decline in their commission growth rates between November 2021 and June 2022 by 33 per cent (50 per cent) than their less potentially exposed counterparts (Appendix Table A2.14).

5.4 Performance of dedicated vs. non-dedicated agents: pre- vs. post-MM tax

We also investigate whether there is a differential effect on performance and strategies across agents with varying potential activity exposure to the tax due to the network provider pricing structure between dedicated and non-dedicated agents. Dedicated agents are agents whose sole activity is offering mobile money services. Non-dedicated agents operate multiple businesses, including mobile money operations. On one hand, dedicated agents may be more affected by MM tax because they have to pay rent and utilities, and need a relatively more significant number of transactions to break even than non-dedicated agents. The new tax may threaten dedicated agents' survival by rendering mobile money activity less profitable, encouraging them to change business activity or become non-dedicated agents. On the other hand, non-dedicated agents could be more impacted by MM tax because they are likely to have fewer clients. In addition, dedicated agents may be expected to have more loyal mobile money clients, or can provide better quality services for their clients, because they spend more time on their mobile money business than their non-dedicated counterparts.

To carry out our empirical investigation, we study subsamples of dedicated vs. non-dedicated agents in the survey. We classify agents as dedicated if they answered 'No' to the survey question: 'Do you have other activities/businesses parallel to the MTN Mobile Money/Orange Money business?' We show a summary of our empirical findings in Appendix Table A2.15.

Potentially more exposed, non-dedicated agents have lower commission per transaction than their less potentially exposed counterparts, post- vs. pre-MM tax. Regarding the marginal effects of MM tax on sustainability of agent revenue, we find dedicated agents whose activities are potentially more exposed to the tax to have a higher likelihood of experiencing a large decline in their commission before and after MM tax of at least 33 per cent or 50 per cent. Results indicate that dedicated (non-dedicated) more mobile money activity-exposed agents are 41.10 per cent (21.58 per cent) more likely to experience a decline of at least 33 per cent in monthly commission between November 2021 and June 2022. In addition, we find dedicated (non-dedicated) agents that relatively performed larger transactions pre-MM tax – for example, twice as large as others – are 14.67 per cent (6.15 per cent) more likely to experience a significant decline in the growth rate of commission following MM tax than their counterparts. We do not find significant heterogeneity across potentially more exposed agents than their counterparts, dedicated or non-dedicated, on the likelihood of experiencing a decline of at least 50 per cent of their commission between November 2021 and June 2022.

We also asked dedicated vs. non-dedicated agents in the survey about their business strategies after MM tax. Our results suggest differences in the strategies carried out by dedicated vs. non-dedicated agents just after mobile money tax policy. On one hand, potentially more activity-exposed dedicated agents are 14.20 per cent more likely to implement a customer loyalty policy than their counterparts. On the other hand, relatively more activity-exposed, non-dedicated agents are 10.80 per cent more likely to expand their business by increasing their capital, and 11.89 per cent less likely to charge additional (non-regulatory) fees than their counterparts.

5.5 Impact of MM tax on agent performance, including control variables for sample of agents in survey

Although the addition of control variables should not affect our results, we also consider factors that could affect agent profitability in estimating equation 1(a). We note that we can only estimate equation 1(a) for the subsample of respondents in the survey. We control for the agent's location (*Yaoundé*), agent's involvement in the mobile money business (*Dedicated*), age (*Age*), place of mobile money business (*ActivityinLocalComml*), sex (*FemaleAgent*), background

in business, management, or economics (*EconBackground*), and duration of mobile money activity (*Established*). We present the OLS estimation results in Appendix Tables A2.16 and A2.17 using our agent performance measures mentioned in Section 4.1, and using the alternative specification indicated in Section 5.1. Overall, even with inclusion of control variables, we still find a significant adverse impact of MM tax on agents' profitability.

5.6 Survey of inactive agents: perspectives

We also conducted a survey of 150 inactive agents in February 2023, 92 of which ceased their operations after 2022 when MM tax was introduced – 102 (68 per cent) of the respondents are from Yaoundé, and 48 (32 per cent) are from peripheral communities of Yaoundé and rural areas. In terms of their main activity at the time the survey was conducted, most respondents operated small businesses, worked in grocery stores and boutiques, or pursued further studies.

Most respondents said making additional income was the primary reason for becoming a mobile money agent. When asked why they had stopped their mobile money activity, the former agents indicated that not getting enough commission was the main reason. As shown in Appendix Table A2.19, this seems to be a more prevalent answer for those who quit after 2022. In addition, they mentioned the experience of household shocks (e.g. accidents, sickness, and death), scams, and attacks as other critical reasons for quitting the mobile money business. Only 5 per cent of the agents cited introducing the new tax as a primary factor for exiting their mobile money activity. We note, however, that ten of the inactive agents who gave a second main reason for quitting their mobile money business indicated introducing MM tax. Some agents who answered not having enough commission mentioned MM tax as one of the reasons, in addition to high operating expenses, too many competitors, and a decline in transactions.

Overall, our survey findings on inactive agents, and more precisely those who ceased their mobile money operations after MM tax was introduced, suggest an adverse effect of MM tax on former agents, although it is not the primary reason for stopping their operations.

6. Conclusion

The main objective of this paper is to examine agent performance and sustainability of revenue before and after introducing a 0.2 per cent tax on mobile money transactions in Cameroon.

Using superagents' databases, which contain data on agents' commission and transactions pre- and post-MM tax, our results indicate a decline in agents' commission after the MM tax. Agents' performance pre- vs. post-tax varies according to agents' potential exposure to the tax. Agents whose activities are potentially more exposed to the tax face a larger decline in their commission after the MM tax, especially those who are operating in the capital, Yaoundé, and in areas where there are many agents. We complement our analysis by carrying out a survey asking agents in the Centre region about their business strategies in 2022, just after the MM tax was introduced. Potentially more exposed agents are more likely to expand their mobile money business, particularly by increasing their capital investment. Relatively less potentially exposed agents are more likely to charge additional non-regulatory fees after the MM tax. Our findings are robust to various specifications, using different definitions of pre- and post-MM tax periods, and excluding agents that do not earn significantly from the mobile money business. As an extension of our analysis, we investigate agents who quit the mobile money business – our survey shows that the main reason for their departure is not getting enough commission. Only a few inactive agents gave the tax as a main reason for exiting the business, but considered it one of the reasons for agents' lack of profits. Overall, we find commission determines getting in, staying in, and getting out of the mobile money business.

Our findings have important policy implications. First, a careful evaluation of the negative externalities generated from introducing taxes on digital financial services is crucial, so as not to undermine efforts to achieve financial inclusion.

Second, African countries employ different forms and types of mobile money taxation. To assess the demand- and supply-side effects of these taxes comprehensively, it is important for policymakers to consider how tax design interacts with the pricing structure of mobile money services. We have shown that, although Cameroon imposes a uniform tax rate of 0.2 per cent on mobile money transactions, agents are affected differently due to the regressive structure of network fees.

Third, we note that, in addition to pressure on their business from MM tax, agents face other challenges to their operations that negatively impact the attractiveness of mobile money activities – such as network outages, fraud and scams, security concerns, and liquidity management issues. Based on this, revenue from MM tax could, for example, be used to strengthen mechanisms to counteract fraud and

scams. Mobile money regulatory policies could be further enhanced in Cameroon, particularly in terms of consumer protection and policy enablement.

Fourth, we underline the importance of improving agents' financial literacy by providing them with tools to manage their liquidity effectively, and prevent mishandling of cash.

Overall, our paper lays the groundwork for the literature on mobile money agents, about whom there is currently little knowledge. Looking closely at their main challenges, and formulating policies to address them, is vital for the success of the mobile money industry. An assessment of the long-term impact of mobile money taxes on agents is an interesting avenue for future research.

Appendices

Appendix 1 Description of variables

Table A1 Description of variables

Name of variable	Variable description	Data source
I. Agent outcomes		
A. Agent performance		
CommTrans	Average mobile money agent (MM agent) commission per transaction (using monthly data). It is calculated by dividing total commissions by the number of transactions	Superagent database (MTN & OM)
Comm	Total monthly MM agent commission, expressed in natural logarithm	Superagent database (MTN & OM)
GrowthComm	Growth of commission, using monthly data (November 2021, December 2021, March 2022, and June 2022)	Superagent database (MTN & OM)
DiffAvgCommTrans	Difference in agent average monthly commission per transaction in 2021 (November and December) and 2022 (March and June)	Superagent database (MTN & OM)
DiffAvgComm	Difference in agent average monthly commission in 2021 & 2022	Superagent database (MTN & OM)
AvgGrowthComm	Growth rate of agent average monthly commission in 2021 and 2022	Superagent database (MTN & OM)
B. Agent revenue sustainability		
NegGrowthComm33	Dummy variable equal to 1 if MM agent experienced a decline of its commission by at least 33% between November 2021 and March 2022; and 0, if less or if agent experienced an increase in their commission	Superagent database (MTN & OM)
NegGrowthComm50	Dummy variable equal to 1 if MM agent experienced a decline of its commission by at least 50 per cent between November 2021 and March 2022; and 0, if less or if the agent experienced an increase in their commission	Superagent database (MTN & OM)
C. Business strategies		
BusinessExpansion	Dummy variable equals 1 if MM agent indicated that it expanded its MM business since January 2022 (introduction of MM tax) and 0 otherwise	MM agent survey results
CapitalIncrease	Dummy variable equals 1 if the MM agent has expanded its MM business by increasing capital and 0 otherwise	MM agent survey results
AdditionalFee	Dummy variable equal to 1 if the MM agent charges additional (non-regulatory) fees per transaction, and 0 otherwise	MM agent survey results
LoyaltyProgramme	Dummy variable equals 1 if the MM agent implemented a loyalty programme from its clients since January 2022 and 0 otherwise	MM agent survey results
II. MM activity exposure		

HighActivityExpsoure	Dummy variable equal to 1 for MM agents whose average transaction size in 2021 is greater than the 75th percentile value, and 0 for those with average transaction size less than the 25th percentile value	Superagent database (MTN and OM)
ActivityExposure	Average transaction size of MM agent (total amount of transactions divided by total number of transactions) in 2021	Superagent database (MTN and OM)
LowActivityExposure	Dummy variable equal to 1 for MM agents whose average transaction size in 2021 is less than CFA F10 000 (US$ 18.03) and zero otherwise	Superagent database (MTN and OM)
III. Other variables		
Yaounde	Dummy variable equal to 1 if the MM agent is located in Yaounde, and 0 if located outside Yaounde (surrounding areas, including rural areas)	Superagent database, MM agent survey results
Dedicated	Dummy variable equal to 1 if MM agent is a dedicated agent or not performing other activities/businesses parallel to MM business, and 0 otherwise	MM agent survey results
Age	Age of MM agent. Equal to 1 (15-18 y/o), 2 (19-24 y/o), 3 (25-35 y/o), 4 (36-50 y/o), or 5 (more than 50 y/o)	MM agent survey results
ActivityinLocalComml	Dummy variable equal to 1 if MM agent conducts MM business in local commercial area, and 0 if the MM agent is mobile, or conducts MM activities at home, in small kiosks, or roadside stands	MM agent survey results
FemaleAgent	Dummy variable equal to 1 if MM agent is female, and 0 if male	MM agent survey results
EconBackground	Dummy variable equal to 1 if MM agent has an educational background in economics, management, or finance, and 0 otherwise	MM agent survey results
Established	Dummy variable equal to 1 if respondent became an MM agent on or before December 2018 (3 years before MM tax), and 0 otherwise	MM agent survey results

Source: Authors' own elaboration.

Appendix 2 Statistics and empirical results

Table A2.1 Agents' commission from Nov 2021 to Mar 2022

		Pre-MM tax		Post-MM tax	
	Obs.	**Nov 2021**	**Dec 2021**	**March 2022**	**June 2022**
Yaoundé					
Average values					
Commission divided by no. of transactions	7,250	68.11	68.98	59.48	58.66
Total commission (CFA F)	7,250	44,614.72	49,486.52	39,436.88	27,810.9
Total commission (natural log)	7,250	9.878	9.951	9.712	9.333
Growth of total commission (%)		-	19.78	-6.78	-16.53
Median values					
Commission divided by no. of transactions	7,250	47.86566	49.30126	41.68723	39.01661
Total commission (CFA F)	7,250	21,048.5	22,357.97	17,744.5	12,262.5
Total commission (natural log)	7,250	9.955	10.015	9.784	9.414
Growth of total commission (%)		-	7.68	-18.85	-29.59
Outside Yaoundé					
Average values					
Commission divided by no. of transactions	2,026	53.204	53.988	47.644	48.326
Total commission (CFA F)	2,026	35,107.09	37,959.04	31,430.79	22,052.49
Total commission (natural log)	2,026	9.549047	9.623114	9.429682	9.044643
Growth of total commission (%)		-	21.51	-0.35	-16.54
Median values					
Commissions divided by no. of transactions	2,026	38.997	40.15	33.45	31.65
Total commission (CFA F)	2,026	14,073.4	14,999.5	12,858.17	8,215
Total commission (natural log)	2,026	9.552042	9.615772	9.461734	9.013717
Growth of total commission (%)		-	7.65	-15.22	-30.83

Source: Authors' own elaboration using superagents' data.

Table A2.2 Agents' monthly commission from Nov 2021 to Jun 2022, according to agents' average monthly transaction size in 2021

A. Average transaction size less than CFA F10,000 (US$ 18.03) in 2021					
		Before MM tax		**After MM tax**	
	Obs.	**Nov 2021**	**Dec 2021**	**March 2022**	**June 2022**
Average values					
Commission divided by no. of transactions	3,627	25.108	25.653	22.937	21.882
Total commission (CFA F)	3,627	13,034.43	14,141.15	12,532.88	9,272.584
Total commission (natural log)	3,627	8.894	8.975	8.821	8.5020
Growth of total commission (%)		-	23.08	3.42	-10.64
Median values					
Commission divided by no. of transactions	3,627	25.844	26.276	22.483	20.418
Total commission (CFA F)	3,627	7,352	7,754	6,856	4,975
Total commission (natural log)	3,627	8.9027	8.9560	8.8329	8.5122
Growth of total commission (%)		-	7.81	-13.22	-26.79
B. Average transaction size at least CFA F10,000 in 2021					
	Obs.	**Nov 2021**	**Dec 2021**	**March 2022**	**June 2022**
Average values					
Commission divided by no. of transactions	6,188	89.900	90.562	78.343	77.936
Total commission (CFA F)	6,188	59,233.01	65,310.51	51,676.16	35,915.64
Total commission (natural log)	6,188	10.318	10.381	10.112	9.688
Growth of total commission (%)		-	18.29	-9.64	-20.04
Median values					
Commission divided by no. of transactions	6,188	64.1599	65.366	55.3655	52.9444
Total commission (CFA F)	6,188	35,338.12	37,664	29,541.24	19,329.5
Total commission (natural log)	6,188	10.4727	10.5365	10.2935	9.8694
Growth of total commission (%)		.	7.40	-20.60	-31.73

Source: Authors' own elaboration using superagents' data.

Table A2.3 Average agent monthly commission and average transaction sizes in 2021 (Nov-Dec), by agent-specific characteristics and market structure for mobile money agents in survey

		Average transaction size in 2021 (CFA F)			Average commission in 2021 (CFA F)		
	% of agents	Mean	Median	Std Dev	Mean	Median	Std Dev
Full sample		18,910.54	14,601.76	15,512.80	75,616.79	47,699.12	84,091.43
Location							
Yaoundé	81.28	19,128.79	14,601.76	15,581.99	76,184.54	48,316.50	82,503.46
Outside Yaoundé	19.72	17,963.14	14,394.49	15,194.25	73,152.25	45,107.11	90,746.44
Mobile money activity							
Dedicated	30.00	23,556.50	19,161.47	17,203.05	101,555.60	69,410.91	104,889.00
Non-dedicated	70.00	16,919.41	12,980.03	14,280.39	64,500.17	40,191.00	70 581.75
Mobile money activity experience							
Established agent	42.55	20,520.07	15,803.82	17,952.10	80,948.62	48,156.75	95,802.23
Relatively new agents	57.45	17,718.30	13,476.97	13,307.09	71,667.29	46,462.26	74,035.27
Market structure							
Agents near commercial areas	69.57	19,940.88	15,532.43	16,535.29	79,322.77	53,752.00	86,177.29
Agents far from commercial areas	30.43	16,554.45	12,480.81	12,572.54	67,142.26	34,987.68	78,532.85
Near remittance agencies	36.60	21,925.38	16,512.07	19,547.41	82,014.18	55,204.50	92,321.57
Far from remittance agencies	63.40	17,170.43	13,681.59	12,287.12	71,924.33	44,248.13	78,756.10
Near financial institutions	45.53	21,306.50	15,708.65	18,594.65	74,892.81	49,615.97	77,693.38
Far from financial institutions	54.47	16,907.67	13,560.38	12,008.79	76,221.99	45,436.71	89,121.24
Sex							
Female agent	58.51	19,909.04	15,658.38	17,498.28	67,935.58	44,651.50	73,685.45
Male agent	41.49	17,502.40	13,684.77	12,045.57	86,449.27	53,752.00	95,895.24

Source: Authors' own elaboration using survey and superagents' data.

Table A2.4 Variables used in estimations

	Obs.	Mean	Std Dev	Min	Max
CommTrans	39,260	61.91	130.76	0.5095	12 430.17
Comm	39,260	9.63	1.42	6.21	16.44605
GrowthComm	29,445	-0.0044	0.6633	-0.9963	4.9875
DiffAvgCommTrans	9,815	-8.7209	60.8097	-589.2045	4937.569
DiffAvgComm	9,815	-12,640.58	27,429.57	-467,571	151,349.5
AvgGrowthComm	9,815	-0.1663	0.5795	-0.994	8.791
HighActivityExposure	19,552	0.4996	0.5000	0	1
ActivityExposure	39,260	9.54	0.9051	6.3394	14.0153
NegCommGrowth33	9,815	0.5721	0.4948	0	1
NegCommGrowth50	9,815	0.3680	0.4822	0	1
Yaoundé	37,104	0.7816	0.4132	0	1

Source: Authors' own elaboration using superagents' data.

Table A2.5 Agent performance pre- vs. post-MM tax of agents potentially more vs. less exposed to MM tax: subsample of agents in survey far from vs. near banks, cooperatives, and MFIs

Agents located far from banks, cooperatives, and MFIs						
	CommTrans		***Comm***		***GrowthComm***	
Post	-3.142***	74.33**	-0.144	1.078	-0.0815	1.154*
	(-3.43)	(2.58)	(-1.19)	(0.92)	(-1.00)	(1.88)
HighActivityExposure	75.01***		2.100***		-0.00489	
	(19.54)		(15.19)		(-0.05)	
ActivityExposure		47.25***		1.329***		0.0309
		(21.28)		(15.19)		(0.64)
*Post*HighActivityExposure*	-14.23***		-0.340		-0.210*	
	(-2.65)		(-1.64)		(-1.79)	
*Post*ActivityExposure*		-8.668***		-0.141		-0.148**
		(-2.82)		(-1.14)		(-2.32)
Constant	27.71***	-394.1***	9.383***	-2.096**	0.130**	-0.0885
	(44.95)	(-18.92)	(112.46)	(-2.54)	(2.16)	(-0.19)
Obs	488	1,024	488	1,024	366	768
F-stat	218.5	302.0	123.8	141.9	7.267	16.41
R-squared	0.642	0.756	0.437	0.373	0.0436	0.0490
Adj R-squared	0.639	0.755	0.433	0.371	0.0357	0.0453
Agents located near banks, cooperatives, and MFIs						
Post	-2.500**	82.23*	-0.126	0.907	-0.314*	0.558
	(-2.02)	(1.74)	(-0.79)	(0.79)	(-1.84)	(0.57)
HighActivityExposure	83.54***		1.928***		-0.160	
	(18.27)		(13.52)		(-0.96)	
ActivityExposure		49.33***		0.899***		-0.0314
		(12.96)		(10.05)		(-0.36)
*Post*HighActivityExposure*	-12.57*		-0.250		-0.106	
	(-1.88)		(-1.25)		(-0.56)	
*Post*ActivityExposure*		-9.358*		-0.120		-0.0907
		(-1.88)		(-1.00)		(-0.91)
Constant	27.85***	-412.9***	9.441***	1.929**	0.383***	0.533
	(30.35)	(-11.38)	(82.13)	(2.24)	(2.60)	(0.63)
Obs	436	856	436	856	327	642
F-stat	185.4	131.8	112.8	68.85	13.33	17.02
R-squared	0.476	0.601	0.446	0.275	0.0922	0.0799
Adj R-squared	0.472	0.600	0.442	0.273	0.0838	0.0756

Source: Authors' own elaboration using survey and superagents' data. Notes: *t* statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. *Post* is a dummy variable indicating the MM tax period. *HighActivityExposure* is a dummy variable equal to 1 for MM agents whose average transaction size in 2021 is greater than the 75th percentile value, and 0 for those with average transaction size in 2021 less than the 25th percentile value. *ActivityExposure* is the average transaction size of the MM agent in 2021. *Post*HighActivityExposure* is the interaction term between *Post* and *HighActivityExposure*. *Post*ActivityExposure* is the interaction term between *Post* and *ActivityExposure*. Agent Performance indicators: *CommTrans* is the average MM agent commission per transaction (using monthly data) calculated by dividing total commission by the number of transactions; *Comm* is the total monthly MM agent commission, expressed in natural logarithm; *GrowthComm* is the growth of commission using monthly data (November and December 2021, March and June 2022.

Table A2.6 Marginal effects of agents' potential activity exposure to MM tax on likelihood that agent experiences significant decline in their commission growth rates post-MM tax

	NegComm Growth33	*NegComm Growth50*	*NegComm Growth33*	*NegComm Growth50*
Agents located far from remittance agencies				
HighActivityExposure	0.3377***	0.0763		
	(0.0816)	(0.0763)		
ActivityExposure			0.1447***	0.0247
			(0.0445)	(0.0427)
Agents near remittance agencies				
HighActivityExposure	0.1813*	0.1442		
	(0.1029)	(0.0940)		
ActivityExposure			0.1061**	0.0877**
			(0.0503)	(0.0448)
Agents located far from banks, cooperatives, and MFIs				
HighActivityExposure	0.2967***	0.0549		
	(0.0877)	(0.0790)		
ActivityExposure			0.1186**	0.0055
			(0.0499)	(0.0462)
Agents near, cooperatives, and MFIs				
HighActivityExposure	0.2563***	0.1462*		
	(0.0946)	(0.0888)		
ActivityExposure			0.1431***	0.0971**
			(0.0454)	(0.0412)

Source: Authors' own elaboration using survey and superagents' data. Notes: Delta standard error in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Subsample of agents in survey according to their location.

Table A2.7 Agents' business strategies after MM tax

	Business expansion	Capital increase	Additional fee	Loyalty programme	Business expansion	Capital increase	Additional fee	Loyalty programme
Logistic regression results								
HighActivityExposure	0.549*	0.957**	-0.978***	0.836*				
	(1.70)	(2.26)	(-2.60)	(1.95)				
ActivityExposure					0.200	0.299*	-0.458***	0.299
					(1.35)	(1.77)	(-2.62)	(1.62)
Constant	-1.558***	-2.466***	-1.181***	-2.466***	-3.116**	-4.682***	2.754*	-4.873***
	(-6.32)	(-7.09)	(-5.36)	(-7.09)	(-2.18)	(-2.85)	(1.66)	(-2.72)
Obs	231	231	231	231	470	470	470	470
Chi-squared	2.875*	5.102**	6.737***	3.792*	1.834	3.131*	6.859**	2.639
Pseudo R-squared	0.0121	0.0310	0.0346	0.0237	0.00300	0.00607	0.0144	0.00589
Calculated marginal effects								
HighActivityExposure	0.0933*	0.1028**	-0.131***	0.0855**				
	(0.0543)	(0.0437)	(0.0487)	(0.0426)				
ActivityExposure					0.0358	0.0364*	-0.063***	0.0318
					(0.0264)	(0.0207)	(0.0239)	(0.0197)

Source: Authors' own elaboration using survey and superagents' data. Notes: *t* statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Description of variables: *BusinessExpansion* is a dummy variable equal to 1 if MM agent indicated that it expanded its MM business since MM tax, and 0 otherwise; *CapitalIncrease* is a dummy variable equal to 1 if MM agent has expanded its business by increasing capital since MM tax, and 0 otherwise; *AdditionalFee* is a dummy variable equal to 1 if MM agent charges additional (non-regulatory) fees per transaction since MM tax, and 0 otherwise; *LoyaltyProgramme* is a dummy variable equal to 1 if MM agent implemented a loyalty programme from its clients since MM tax, and 0 otherwise.

Table A2.8 Marginal effects of agent potential activity exposure to MM tax on likelihood that agents adopt specific business strategies after MM tax, subsample of agents in Yaoundé vs. outside Yaoundé

	Business expansion	Capital increase	Additional fee	Loyalty programme	Business expansion	Capital increase	Additional fee	Loyalty programme
Yaoundé								
HighActivityExposure	0.1020*	0.1020**	-0.1361**	0.0561				
	(0.0580)	(0.0476)	(0.0558)	(0.0505)				
ActivityExposure					0.0303	0.0269	-0.0667**	0.0222
					(0.0289)	(0.0233)	(0.0279)	(0.0240)
Outside Yaoundé								
HighActivityExposure	0.1308	0.1254	-0.1147					
	(0.1407)	(0.1126)	(0.1066)					
ActivityExposure					0.0563	0.0646	-0.0420	0.0529**
					(0.0621)	(0.0464)	(0.0467)	(0.0312)

Source: Authors' own elaboration using survey and superagents' data. Notes: Delta standard error in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. For subsample of agents located outside Yaoundé (peripheral communities including rural areas in the Centre Region), equation 1(b) on LoyaltyProgramme using the variable *HighActivityExposure* could not be estimated, and thus no results are reported.

Robustness checks

Table A2.9 Agent performance using alternative specification, pre- vs. post-MM tax

	DiffAvg CommTrans	*DiffAvg Comm*	*AvgGrowth Comm*	*DiffAvg CommTrans*	*DiffAvg Comm*	*AvgGrowth Comm*
HighActivityExposure	-16.68***	-25004.4***	-0.200***			
	(-6.91)	(-28.29)	(-11.62)			
ActivityExposure				-6.799**	-10236.1***	-0.0784***
				(-2.32)	(-19.95)	(-10.53)
Constant	-2.114***	-1575.9***	-0.0375***	56.14**	85006.6***	0.581***
	(-9.12)	(-12.98)	(-2.81)	(2.05)	(18.04)	(8.09)
Obs	4,888	4,888	4,888	9,815	9,815	9,815
F-stat	47.80	800.0	135.1	5.365	397.9	111.0
R^2	0.00970	0.141	0.0269	0.0102	0.114	0.0150
Adj R^2	0.00950	0.141	0.0267	0.0101	0.114	0.0149

Source: Authors' own elaboration using superagents' data. Notes: *t* statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Description of variables. *DiffAvgCommTrans* is the difference in agents' average monthly commission per transaction in 2021 (November and December) and 2022 (March and June); *DiffAvgComm* is the difference in agents' average monthly commission in 2021 and 2022; *AvgGrowthComm* is the growth rate of agents' average monthly commission in 2021 and 2022. *HighActivityExposure* is a dummy variable equal to 1 for MM agents whose average transaction size in 2021 is greater than the 75th percentile value, and 0 for those with average transaction size less than the 25th percentile value; *ActivityExposure* is the MM agents' average transaction size in 2021.

Table A2.10 MTN agents' performance using different definitions of pre- and post-tax periods

	Pre: January and March 2021 Post: January and March 2022			Pre: May and July 2021 Post: January and March 2022			Pre: July and Nov 2021 Post: January and February 2022		
	CommTrans	***Comm***	***GrowthComm***	***CommTrans***	***Comm***	***GrowthComm***	***CommTrans***	***Comm***	***GrowthComm***
Post	1.454***	0.0448	-0.0469	2.026***	0.0158	-0.0868***	-0.170	-0.089***	-0.315***
	(3.92)	(1.42)	(-1.59)	(8.35)	(0.56)	(-3.37)	(-0.80)	(-3.49)	(-11.91)
HighActivityExposure	116.4***	1.800***	0.0320	119.1***	1.839***	0.00214	144.4***	1.858***	-0.103***
	(67.50)	(55.68)	(0.99)	(71.13)	(61.41)	(0.08)	(78.31)	(67.49)	(-3.35)
*Post*HighActivityExposure*	-7.981***	-0.225***	-0.201***	-4.418*	-0.194***	-0.132***	-15.55***	-0.201***	-0.00121
	(-3.29)	(-4.58)	(-5.07)	(-1.80)	(-4.33)	(-3.84)	(-6.08)	(-4.95)	(-0.04)
Constant	19.63***	8.688***	0.288***	17.37***	8.652***	0.272***	18.59***	8.610***	0.374***
	(123.64)	(426.50)	(12.40)	(128.78)	(463.70)	(13.01)	(137.86)	(493.64)	(15.64)
Obs	9,992	9,992	7,494	11,892	11,892	8,919	13,968	13,968	10,476
F-stat	2915.4	1638.0	42.65	3082.1	2069.3	45.67	3810.9	2571.7	136.2
R-squared	0.456	0.321	0.0146	0.432	0.338	0.0137	0.451	0.352	0.0444
Adj R-squared	0.456	0.321	0.0142	0.432	0.338	0.0133	0.451	0.352	0.0441
Post	57.81***	0.819***	0.736***	35.40***	0.757***	0.532***	71.08***	0.634***	-0.361***
	(4.36)	(4.07)	(4.72)	(2.70)	(4.32)	(4.01)	(5.61)	(4.21)	(-2.89)
ActivityExposure	56.78***	0.732***	0.0254*	56.35***	0.723***	0.0159	64.41***	0.687***	-0.0397***
	(54.48)	(52.12)	(1.90)	(57.64)	(58.04)	(1.40)	(65.96)	(63.31)	(-3.45)
*Post*ActivityExposure*	-6.126***	-0.094***	-0.0914***	-3.606**	-0.089***	-0.0705***	-7.920***	-0.087***	0.00313
	(-4.29)	(-4.39)	(-5.64)	(-2.53)	(-4.73)	(-5.08)	(-5.80)	(-5.40)	(0.24)
Constant	-478.9***	2.820***	0.0254	-472.9***	2.958***	0.0941	-545.6***	3.244***	0.699***
	(-49.34)	(21.45)	(0.20)	(-52.40)	(25.58)	(0.87)	(-60.15)	(31.84)	(6.25)
Obs	20,196	20,196	15,147	23,900	23,900	17,925	28,012	28,012	21,009
F-stat	1892.8	1422.9	61.99	1968.9	1797.8	68.88	2654.2	2246.0	293.5
R-squared	0.591	0.197	0.0115	0.590	0.210	0.0113	0.614	0.212	0.0511
Adj R-squared	0.591	0.197	0.0113	0.590	0.210	0.0112	0.614	0.212	0.0510

Source: Authors' own elaboration using MTN superagents' data. Notes: *t* statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. *Post* is a dummy variable indicating the MM tax period. *HighActivityExposure* is a dummy variable equal to 1 for MM agents whose average transaction size in 2021 is greater than the 75th percentile value, and 0 for those with average transaction size in 2021 less than the 25th percentile value. *ActivityExposure* is the average transaction size of the MM agent in 2021. *Post*HighActivityExposure* is the interaction term between *Post* and *HighActivityExposure*. *Post*ActivityExposure* is the interaction term between *Post* and

ActivityExposure. Agent Profitability indicators: *CommTrans* is average MM agent commission per transaction (using monthly data) calculated by dividing total commission by number of transactions; *Comm* is the total monthly MM agent commission, expressed in natural logarithm; *GrowthComm* is the growth of commission using monthly data (November and December 2021, March and June 2022).

Table A2.11 Marginal effects of agents' potential activity exposure to MM tax on likelihood that agents experience significant decline in their commission growth rates post-MM tax using different definitions of pre- and post- MM tax period

	Pre: January and March 2021 Post: January and March 2022		**Pre: May and July 2021 Post: January and March 2022**		**Pre: July and Nov 2021 Post: January and February 2022**	
	(Alt Period I)		**(Alt Period II)**		**(Alt Period III)**	
	NegGrowth Comm33	***NegGrowth Comm50***	***NegGrowth Comm33***	***NegGrowth Comm50***	***NegGrowth Comm33***	***NegGrowth Comm50***
HighActivityExposure	0.02	0.0089	0.0162	0.0016	0.0319**	-0.0011
	(0.019)	(0.0165)	(0.0119)	(0.0102)	(0.0160)	(0.0139)
Obs	2,498	2,498	5,946	5,946	3,492	3,492
Chi-squared	1.159	0.290	1.850	0.0252	3.941**	0.00587
ActivityExposure	0.012*	0.0090	0.013***	0.077*	0.0225***	0.0098*
	(0.007)	(0.0067)	(0.0045)	(0.004)	(0.0058)	(0.005)
Obs	5,049	5,049	11,950	11,950	7,003	7,003
Chi-squared	2.796*	1.800	8.253***	3.756*	15.08***	3.767*

Source: Authors' own elaboration using MTN superagents' data. Notes: Delta standard error in parentheses.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A2.12 MTN agents' commission for Jan and Mar 2021, Jan and Mar 2022

Variables	Agents	Jan 2021	Mar 2021	Jan 2022	Mar 2022
Monthly average values					
Commission divided by no. of transactions	5,049	61.882	64.349	62.949	61.952
Total commission (CFA F)	5,049	36,442.83	40,964.29	39,200.34	39,330.39
Total commission (natural log)	5,049	9.753	9.860	9.753	9.700
Growth of total commission (Jan to Mar, %)	5,049	-	26.83	-	9.94
Number of transactions	5,049	639.07	685.03	687.90	689.94
Amount of transactions	5,049	11,836,401	12,866,497	12,607,253	12,843,844
Growth of number of transactions (%)	5,049		18.95		9.55
Growth of amount of transactions (%)	5,049		22.71		12.57
Monthly median values					
Commission divided by no. of transactions	5,049	45	46.514	46.323	44.504
Total commission (CFA F)	5,049	18,949	21,209	19,672	18,612
Total commission (natural log)	5,049	9.85	9.962	9.887	9.832
Growth of total commission (Jan to Mar, %)	5,049	-	12.49	-	-1.4
Number of transactions	5,049	427	462	443	444
Amount of transactions (CFA F)	5,049	5,701,800	6,152,025	5,978,200	5,735,140
Growth in number of transactions (%)	5,049		8.62		3.49
Growth in amount of transactions (%)	5,049		8.69		2.95

Source: Authors' own elaboration using MTN superagents' data.

Table A2.13 Effect of MM tax on agents' performance for subsample of agents whose average monthly commission in 2021 is at least CFA F6,000 or CFA F12,000

Agents with average monthly commission in 2021 of at least CFA F6,000 (US$10.82)						
	Comm trans	***Comm***	***Growth comm***	***Comm trans***	***Comm***	***Growth comm***
Post	-3.442***	-0.379***	-0.308***	57.21	0.218	-0.0587
	(-11.65)	(-20.34)	(-18.33)	(0.67)	(1.34)	(-0.55)
HighActivityExposure	133.8***	1.234***	-0.0144			
	(37.24)	(58.08)	(-0.74)			
*Post*HighActivityExposure*	-16.63***	-0.147***	-0.0519**			
	(-2.65)	(-4.39)	(-2.22)			
ActivityExposure				81.15***	0.503***	0.00612
				(16.58)	(45.58)	(0.68)
*Post*ActivityExposure*				-6.923	-0.0693***	-0.0278**
				(-0.78)	(-4.06)	(-2.54)
Constant	27.17***	9.627***	0.183***	-713.8***	5.479***	0.103
	(218.17)	(862.24)	(13.14)	(-15.26)	(52.27)	(1.18)
Obs	15,268	15,268	11,451	30,540	30,540	22,905
F-stat	677.1	1892.2	283.2	302.1	1498.4	606.3
R-squared	0.0962	0.267	0.0705	0.195	0.155	0.0743
Adj R-squared	0.0960	0.267	0.0703	0.195	0.154	0.0742

Agents with average monthly commission in 2021 of at least CFA F12,000 (US$21.64)						
	Comm trans	***Comm***	***Growth comm***	***Comm trans***	***Comm***	***Growth comm***
Post	-4.441***	-0.413***	-0.329***	53.78	0.248	-0.0535
	(-13.06)	(-22.43)	(-22.03)	(0.47)	(1.40)	(-0.47)
HighActivityExposure	138.0***	0.955***	-0.00884	91.17***	0.416***	0.0104
	(31.41)	(47.17)	(-0.48)	(13.94)	(36.48)	(1.08)
*Post*HighActivityExposure*	-16.34**	-0.134***	-0.0364			
	(-2.12)	(-4.05)	(-1.63)			
ActivityExposure						
*Post*ActivityExposure*				-6.582	-0.0735***	-0.0291**
				(-0.55)	(-4.00)	(-2.50)
Constant	31.58***	10.13***	0.163***	-814.9***	6.606***	0.0462
	(222.23)	(959.97)	(13.41)	(-12.88)	(60.17)	(0.49)
Obs	12,268	12,268	9,201	24,540	24,540	18,405
F-stat	505.5	1297.7	328.0	253.3	1138.8	660.1
R-squared	0.0859	0.233	0.0968	0.188	0.144	0.0979
Adj R-squared	0.0857	0.233	0.0965	0.188	0.144	0.0977

Source: Authors' own elaboration using superagents' data. Notes: *t* statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A2.14 Marginal effects of MM tax on agent revenue sustainability for subsample of agents whose average monthly commission in 2021 is at least CFA F6,000 and CFA F12,000

Agents with average monthly commission in 2021 at least CFA F6,000(US$ 10.82)				
	NegGrowth Comm33	***NegGrowth Comm50***	***NegGrowth Comm33***	***NegGrowth Comm50***
HighActivityExposure	0.1355***	0.0655***		
	(0.0175)	(0.0175)		
ActivityExposure			0.0521***	0.0399***
			(0.0070)	(0.0067)
Obs	3,422	3,422	7,635	7,635
Chi-squared	60.96***	13.72***	54.50***	34.80***
Pseudo R-squared	0.0136	0.0030	0.0057	0.0035
Agents with average monthly commission in 2021 at least CFA F12,000 (US$21.64)				
HighActivityExposure	0.1483***	0.0920***		
	(0.0227)	(0.0222)		
ActivityExposure			0.0571***	0.0510***
			(0.0082)	(0.0078)
Obs	2,595	2,595	6,135	6,135
Chi-squared	44.99***	16.18***	46.74***	41.67***
Pseudo R-squared	0.0134	0.0047	0.0063	0.0052

Source: Authors' own elaboration using superagents' data. Notes: Delta standard error in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A2.15 Estimation results using subsample of dedicated and non-dedicated agents

	Dedicated agents		**Non-dedicated agents**	
Equation 1(a') – AgentPerformance				
	Post x HighActivityExposure	***Post x Activity Exposure***	***Post x HighActivityExposure***	***Post x Activity Exposure***
CommTrans	N.S.	N.S.	-13.85***	-10.63***
Comm	N.S.	N.S.	N.S.	N.S.
GrowthComm	N.S.	-0.218*	N.S.	N.S.
Equation 1(b) - AgentRevSustainability				
	HighActivityExposure	***ActivityExposure***	***HighActivityExposure***	***Activity Exposure***
NegCommGrowth33	0.4110***	0.2115***	0.2158***	0.0887***
NegCommGrowth50	N.S.	0.1016*	N.S.	0.0300*
Effect on agents' business strategies				
	HighActivityExposure	***ActivityExposure***	***HighActivityExposure***	***Activity Exposure***
Business Expansion	N.S.	N.S.	N.S.	N.S.
Capital Increase	N.S.	N.S.	0.1080**	N.S.
Additional Fee	N.S.	-0.0691*	-0.1189**	-0.0714**
Loyalty Policy	0.1420**	N.S.	N.S.	N.S.

Source: Authors' own elaboration using survey and superagents' data. Notes: N.S. indicates no significant result.

Table A2.16 Impact of MM tax on agent profitability on subsample of agents survey in survey, with control variables

	CommTrans	*Comm*	*GrowthComm*	*CommTrans*	*Comm*	*GrowthComm*
HighActivityExposure	74.01***	1.903***	-0.0612			
	(27.19)	(18.37)	(-0.67)			
*Post*HighActivityExposure*	-13.21***	-0.288**	-0.190*			
	(-3.24)	(-2.13)	(-1.84)			
ActivityExposure				45.99***	1.149***	-0.0149
				(22.58)	(19.01)	(-0.29)
*Post*HighActivityExposure*				-8.928***	-0.127	-0.121**
				(-3.10)	(-1.60)	(-2.04)
Yaounde	17.31***	0.0712	-0.0171	3.271*	-0.0773	-0.00907
	(5.81)	(0.50)	(-0.21)	(1.84)	(-0.86)	(-0.15)
Dedicated	8.710***	0.295***	0.113*	3.486***	0.158***	0.0583
	(3.16)	(3.56)	(1.78)	(2.79)	(2.85)	(1.35)
ActivityLocalComml	14.89***	0.0867	-0.00854	6.324***	-0.228***	0.00272
	(6.50)	(1.11)	(-0.16)	(5.46)	(-4.04)	(0.07)
Age	0.200	0.0366	-0.0265	1.396**	0.00451	-0.0129
	(0.14)	(0.61)	(-0.52)	(2.14)	(0.12)	(-0.40)
FemaleAgent	4.541**	-0.383***	-0.0445	0.971	-0.315***	-0.0331
	(2.14)	(-5.28)	(-0.94)	(0.83)	(-6.59)	(-1.01)
Established	-0.614	-0.0342	-0.0116	0.428	-0.0401	0.0139
	(-0.27)	(-0.47)	(-0.23)	(0.41)	(-0.79)	(0.42)
EconBackground	-3.907	0.165	0.0220	-0.677	0.0472	0.0459
	(-1.39)	(1.56)	(0.38)	(-0.46)	(0.69)	(0.93)
Interviewer effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	55.44**	8.813***	0.429	-357.3***	-1.594**	0.533
	(2.26)	(23.84)	(1.22)	(-18.36)	(-2.33)	(0.89)
Obs	924	924	693	1,880	1,880	1410
F-stat	81.83	42.03	3.666	80.06	39.07	5.980
R-squared	0.624	0.494	0.0918	0.686	0.383	0.0799
Adj R-squared	0.613	0.478	0.0549	0.681	0.374	0.0619

Source: Authors' own elaboration using survey and superagents' data. Notes: *t* statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. *Post* is a dummy variable indicating the MM tax period. *HighActivityExposure* is a dummy variable equal to 1 for MM agents whose average transaction size in 2021 is greater than the 75th percentile value, and 0 for those with average transaction size in 2021 less than the 25th percentile value. *ActivityExposure* is the average transaction size of the MM agent in 2021. *Post*HighActivityExposure* is the interaction term between *Post* and *HighActivityExposure*. *Post*ActivityExposure* is the interaction term between *Post* and *ActivityExposure*. Control variables: agent's location (*Yaounde*), agent's involvement in the MM business (*Dedicated*), age (*Age*), place of MM business (*ActivityinLocalComml*), sex (*FemaleAgent*), MM activity duration (Established), and background in business, management or economics (*EconBackground*).

Table A2.17 Impact of tax on agent performance using alternative specification on agents in survey, with control variables

	DiffAvg CommTrans	*DiffAvg Comm*	*AvgGrowth Comm*	*DiffAvg CommTrans*	*DiffAvg Comm*	*AvgGrowth Comm*
HighActivityExposure	-12.39***	-34340.2***	-0.347***			
	(-3.71)	(-6.82)	(-2.86)			
ActivityExposure				-8.724***	-20983.0***	-0.189***
				(-3.83)	(-7.32)	(-3.28)
Yaounde	-1.952	-3796.2	-0.0559	1.597	-3167.4	0.0431
	(-0.61)	(-0.58)	(-0.41)	(0.77)	(-0.69)	(0.37)
Dedicated	1.726	-18769.8**	0.232	1.515	-9902.6**	0.130
	(0.47)	(-2.53)	(1.36)	(0.73)	(-2.43)	(1.28)
ActivityLocalComml	1.562	-8860.4	-0.0357	1.340	-3538.0	-0.00120
	(0.46)	(-1.35)	(-0.50)	(0.62)	(-0.89)	(-0.02)
Age	2.503	3410.6	0.00329	1.213	-1282.9	-0.00394
	(1.10)	(0.57)	(0.05)	(1.03)	(-0.38)	(-0.07)
FemaleAgent	-0.894	9657.0**	-0.169	-0.254	5932.7**	-0.0873
	(-0.33)	(2.10)	(-1.41)	(-0.15)	(1.97)	(-1.26)
Established	-2.665	3093.0	-0.0972	-1.453	442.4	-0.0243
	(-0.76)	(0.72)	(-1.11)	(-0.82)	(0.17)	(-0.41)
EconBackground	2.274	-594.9	0.215	2.472	2132.1	0.227*
	(0.85)	(-0.10)	(1.19)	(1.23)	(0.52)	(1.68)
Interviewer effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-58.76	4835.6	0.457	83.62***	184082.7***	1.618***
	(-1.07)	(0.19)	(0.93)	(3.32)	(4.77)	(2.76)
Obs	231	231	231	470	470	470
F-stat	3.346	4.970	1.225	2.767	4.597	1.306
R^2	0.196	0.360	0.181	0.185	0.252	0.0924
Adj R^2	0.0978	0.282	0.0814	0.139	0.210	0.0413

Source: Authors' own elaboration using survey and superagents' data. Notes: *t* statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Description of variables: *DiffAvgCommTrans* is difference in agent's average monthly commission per transaction in 2021 (November and December) and 2022 (March and June); *DiffAvgComm* is difference in agents' average monthly commission in 2021 and 2022; *AvgGrowthComm* is growth rate of agents' average monthly commission in 2021 and 2022. *HighActivityExposure* is a dummy variable equal to 1 for MM agents whose average transaction size in 2021 is greater than 75th percentile value, and 0 for those with average transaction size less than 25th percentile value; *ActivityExposure* is average transaction size of MM agent in 2021. Control variables: agent's location (*Yaounde*), agent's involvement in the MM business (*Dedicated*), age (*Age*), place of MM business (*ActivityinLocalComml*), sex (*FemaleAgent*), MM activity duration (Established), and background in business, management or economics (*EconBackground*).

Table A2.18 Agent performance pre- vs. post-MM tax using alternative mobile money activity exposure variable, *LowActivityExposure*

	Full sample			Full sample			Yaoundé			Outside Yaoundé		
	Comm trans	**Comm**	**Growth comm**	**Comm trans**	**Comm**	**Growth comm**	**Comm trans**	**Comm**	**Growth comm**	**Comm trans**	**Comm**	**Growth comm**
	Equation 1(a)			*Equation 1(a')*			*Equation 1(a')*			*Equation 1(a')*		
Post	-8.721***	-0.385***	-0.308***	-12.09***	-0.450***	-0.331***	-12.82***	-0.456***	-0.346***	-7.777	-0.412***	-0.296***
	(-6.78)	(-30.35)	(-38.06)	(-5.94)	(-26.71)	(-34.73)	(-6.03)	(-24.16)	(-32.78)	(-1.18)	(-9.87)	(-12.54)
LowActivityExposure	-60.29***	-1.326***	0.0908***	-64.85***	-1.415***	0.0480***	-64.67***	-1.437***	0.0417**	-55.16***	-1.309***	0.0623**
	(-58.89)	(-105.39)	(11.20)	(-53.68)	(-82.04)	(3.33)	(-45.97)	(-71.61)	(2.46)	(-20.76)	(-33.89)	(2.03)
Post x LowActivityExposure				9.120***	0.177***	0.0643***	9.742***	0.188***	0.0915***	4.640	0.136**	-0.00680
				(4.46)	(7.03)	(3.69)	(4.54)	(6.41)	(4.48)	(0.70)	(2.43)	(-0.18)
Constant	88.55***	10.32***	0.167***	90.23***	10.35***	0.183***	90.75***	10.41***	0.183***	79.35***	10.20***	0.186***
	(86.18)	(1008.41)	(23.67)	(75.00)	(902.07)	(23.27)	(64.80)	(813.64)	(20.85)	(29.98)	(354.42)	(9.90)
Obs	39,260	39,260	29,445	39,260	39,260	29,445	29,000	29,000	21,750	8,104	8,104	6,078
F-stat	2055.3	6084.0	781.4	1397.9	4085.6	554.3	1118.4	3093.8	472.2	199.8	714.4	90.53
R-squared	0.0506	0.221	0.0521	0.0509	0.222	0.0526	0.0555	0.224	0.0594	0.0273	0.204	0.0437
Adj R-squared	0.0506	0.221	0.0521	0.0509	0.222	0.0525	0.0554	0.224	0.0593	0.0269	0.204	0.0432

Source: Authors' own elaboration using survey and superagents' data. Notes: *t* statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. *LowActivityExposure* is a dummy variable equal to 1 for mobile money agents whose average transaction size in 2021 is less than XAF 10,000 (US$18.03), and 0 otherwise. *Post* is a dummy variable indicating the MM tax period. *Post*LowActivityExposure* is the interaction term between *Post* and *LowActivityExposure*.

Table A2.19 Distribution of respondents' main and second reason for becoming inactive: agents who stopped mobile money operations before and after MM tax

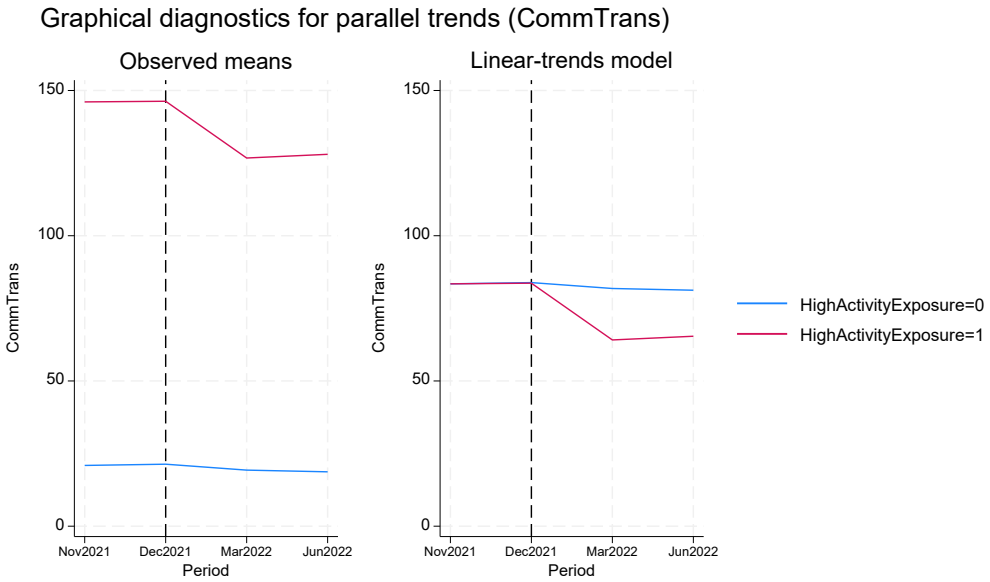
	Agents who stopped operating after MM tax (after 2022) 92 total inactive agents	Agents who stopped operating before MM tax (before 2022) 58 total inactive agents
Main reason for becoming inactive		
Not enough commission	30 (32.61%)	11 (18.97%)
Focus on main activity	6 (6.52%)	5 (8.62%)
Introduction of MM tax	5 (5.43%)	
Lost interest in mobile money activity	2 (2.17%)	3 (5.17%)
Other business perspectives	5 (5.43%)	7 (12.07%)
Career shift	2 (2.17%)	7 (12.07%)
Pursue studies	6 (6.52%)	4 (6.90%)
To go abroad		1 (1.72%)
Household shocks (accident, birth, etc.)	14 (15.22%)	9 (15.52%)
Others	22 (23.91%)	11 (18.97%)
- some reasons given	Network related problems, scams, attacks, theft	Covid-19, loss, theft
Second main reason for becoming inactive, if any (optional to answer)		
Number of agents	58	45
Not enough commission	14 (24.14%)	12 (26.67%)
Focus on main activity	10 (17.24%)	7 (15.56%)
Introduction of MM tax	9 (15.52%)	1 (2.22%)
Lost interest in mobile money activity	8 (13.79%)	6 (13.33%)
Other business perspectives	6 (10.34%)	3 (6.67%)
Career shift	2 (3.45%)	3 (6.67%)
Pursue studies		3 (6.67%)
To go abroad		2 (4.44%)
Household shocks (accident, birth, etc.)	1 (1.72%)	1 (2.22%)
Others	8 (13.79%)	7 (15.56%)
- reasons given	Lack of capital and financial problems	Decline in clients, theft, lack of stability

Source: Authors' own elaboration using survey data on inactive agents.

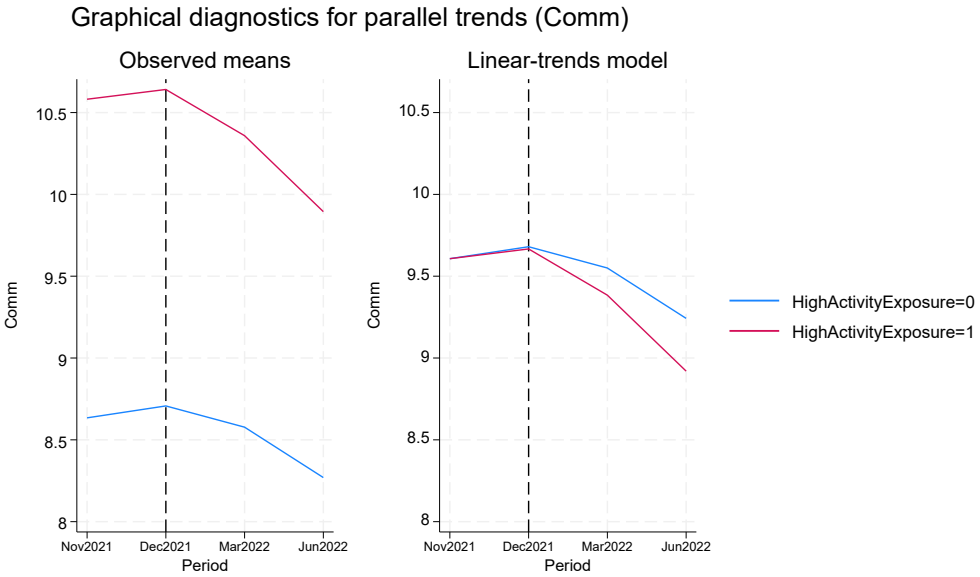
Appendix 3 Figures

Figure A3.1 Parallel trend diagnostics of *CommTrans* and *Comm* for agents with high vs. low activity exposure to the tax due to operator's pricing structure

(a)

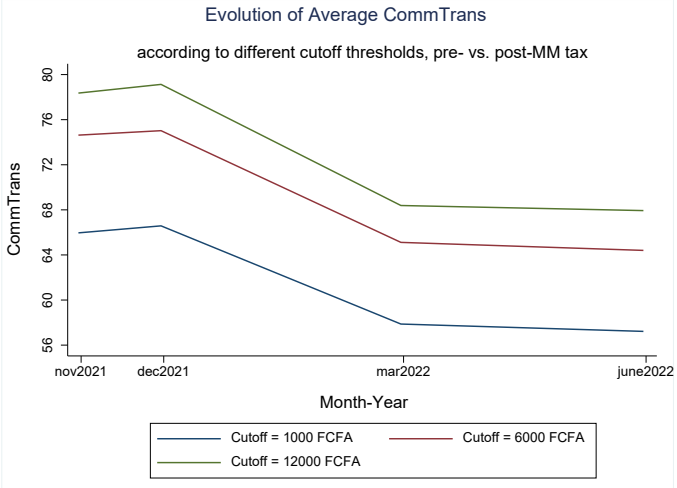


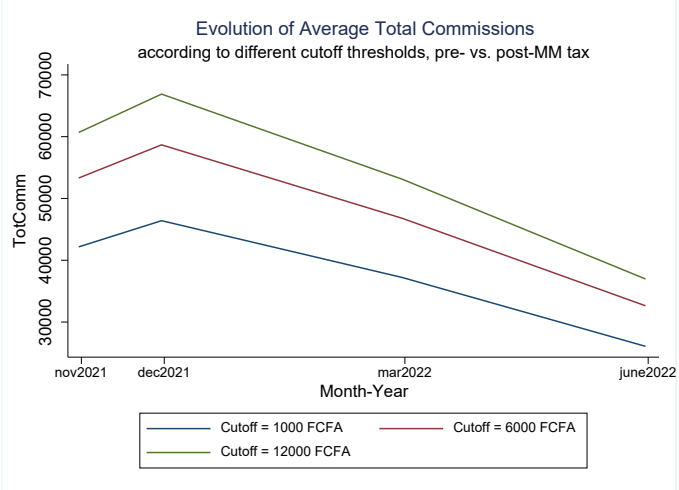
(b)

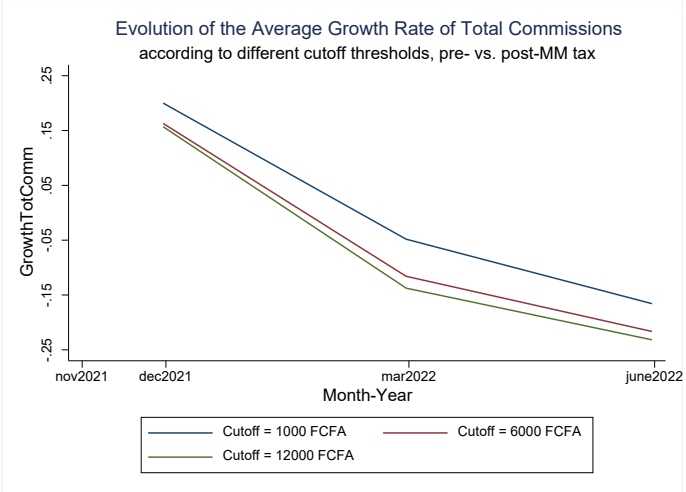


Source: Authors' own elaboration using superagents' data.

Figure A3.2 Evolution of commission indicators for subsample of agents with higher average monthly commission in 2021







Source: Authors' own elaboration using superagents' data.

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