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To File or Not To File? Another Dimension of Non-Compliance: The Eswatini Taxpayer Survey

Fabrizio Santoro, Edward Groening, Winnie Mdluli and Mbongeni Shongwe

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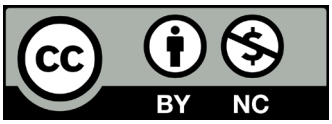

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Summary

Non-filing refers to taxpayers who fail to submit a tax declaration, thus becoming ghosts in the eyes of tax authorities. It is a widespread phenomenon in sub-Saharan Africa, and has a number of detrimental fiscal effects. Non-filing has been largely unexplored in the literature, which focusses more on active filers. The overall aim of this paper is to shed light on the determinants of non-filing, building on neoclassical and behavioural theories, as well as to contribute to the methodological discussion on how to measure tax compliance. Focusing on Eswatini, the analysis combines survey data from a thousand entrepreneurs with their tax returns and filing history 2013-2018. We show that economic deterrence, compliance costs and moral factors, such as intrinsic motivation and peer pressure, are strongly correlated with actual filing. We also study how our key factors change when controlling for the persistence of filing behaviour in past years, or using a self-reported measure of compliance. We argue that tax knowledge plays a major role in understanding the decision to file. In terms of policy, results show that the tax authority could improve filing rates by adopting both a deterrent and an assistance-related approach, and also by triggering the role of social norms.

Keywords: taxpayer compliance; tax administration; administrative data; survey data.

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Acronyms

CIT	Corporate income tax
CRRA	Coefficient of relative risk aversion
DB	Doing Business
LPM	Linear Probability Model
MSE	Mean squared errors
PIT	Personal income tax
SDG	Sustainable development goal
SRA	Eswatini Revenue Authority
SSA	Sub-Saharan Africa
TCMP	Taxpayer compliance measurement program
TIN	Taxpayer identification number

Introduction

Tax compliance can be considered as the sequential achievement of three main actions: filing a return, accurately reporting and paying the tax owed (Slemrod et al. 2001). This study looks at the first step of compliance, which is a necessary condition for the other two actions to take place. In contrast with tax filers who may decide to under-declare their income, non-filers choose the extreme compliance shortcut of not filing a return at all. Non-filing has a number of important implications. First, especially in low-income countries, non-filing significantly erodes the tax base of already budget-constrained economies, with detrimental fiscal effects.[1] Second, a non-filer eventually becomes a *ghost* in the eyes of the tax agency, as they are missing from the tax records and fail to share valuable information with the authority. Third, non-filing creates economic inefficiencies and horizontal inequalities, since the effective tax rate faced by filers and non-filers of the same business size evidently differs. Fourth, non-filing goes against the law, generates unfairness, lowers the moral fibre of a society and ultimately delegitimises the government.

A growing evidence has been produced on the extent of non-filers in sub-Saharan Africa (SSA). In Rwanda, over three-quarters of individuals supposed to file a personal income tax (PIT) return for fiscal year 2018, and half the companies liable to file a corporate income tax (CIT), failed to do so. Figures from Uganda are even higher, with the average rate of PIT non-filing being 86 per cent over the period 2014-2018.[2] In Malawi, almost 50 per cent of income tax payers have filed no tax returns and/or made no tax payments over the period 2014-2016 (Ligomeka 2019a). Moore (forthcoming) notes that in 2016 the Nigerian federal revenue authorities declared the following proportions of non-filing taxpayers: 98 per cent for PIT; 94 per cent for CIT; and 95 per cent for VAT. Additional descriptive evidence from Kenya shows that only 3.5 million of the more than 9 million registered taxpayers filed their 2018 returns.[3] Eswatini, the country under study, is no exception: more than half (57%) of PIT returns are missing each year on average over the period 2013-2018; figures for CIT are lower (43%), but still alarming.

Despite the relevance of non-filers in SSA, non-filing is a neglected area of research, with most of the tax literature being cast on positive tax filers and their reporting behaviour (Erard et al. 2018). Addressing tax non-filing requires some understanding of the factors underlying the taxpayer's decision whether to file a return or not. It is fair to assume that the factors behind the decision to file a return are substantially different from those based on how much to declare, after deciding to file a return. In this paper, we focus on non-filing of PIT, a progressive tax on income generated by non-incorporated traders, and seek to answer two interrelated questions: (i) Which economic and behavioural factors explain the decision to file a return in a given year?; and (ii) Do these factors differently impact the persistence of non-filing behaviour over time? A third crucial question naturally arises: Are the same factors explaining *self-reported* compliance? Note, however, that this study is of a descriptive nature. Due to the non-experimental set-up, our results point to strong correlations, and cannot be interpreted in a causal way.

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1 In the last decades, revenue authorities in sub-Saharan Africa (SSA) have made impressive progress, increasing tax collection with respect to other low-income countries (Moore et al. 2018). Yet, mobilised domestic revenue is clearly not sufficient to finance development (Bird and Gendron 2007). According to the International Monetary Fund, on average SSA will need additional resources amounting to 15.4% of GDP to finance the Sustainable Development Goals (SDGs) in education, health, roads, electricity and water by 2030 (IMF 2019). The IMF target does not seem to be realistically achievable: on average, the tax-to-GDP ratio in SSA has risen by 2 to 3 percentage points of GDP in the past two decades, and there are still 10 SSA countries with a tax-to-GDP ratio still below 15%, most of them fragile states (Akitoby et al. 2019).

2 Figures from Rwanda and Uganda have been computed by the authors in parallel studies on tax compliance, drawing on detailed tax returns data.

3 See https://www.businessdailyafrica.com/lifestyle/profiles/what-to-expect-file-nil-return/4258438--5232858-oiqmom/index.html, accessed on 10 June 2020.

To shed light on these issues, we combine a detailed taxpayer's perception survey of over a thousand taxpayers – the first data collection effort of this type ever carried out in the country – with rich administrative data provided by the Eswatini Revenue Authority. To the best of our knowledge, tax return data from Eswatini has not been studied yet. The merging of survey and tax data is achieved through the use of uniquely identifying Taxpayer Identification Numbers (TINs). Thanks to the TINs we are able to link, for each taxpayer in the sample, tax attitudes and perceptions with their filing history in a quite novel way. With the administrative data available we identify two main categories: active taxpayers who file their returns for the 2018 tax year, and non-filers who fail to do so. We are able to track the filing behaviour of PIT payers, and define *perpetual* (or *persistent*) active/non-filers as those taxpayers who consistently file/fail to file every year in the period 2013-2018. We consider it to be important to account for past filing behaviour, since it is commonly believed that once a filer enters the income tax system, they are likely to remain in the system (Erard et al. 2018). In addition, survey data enables us to capture the key factors likely to correlate with compliance, as derived from the relevant literature on the behavioural drives of tax compliance. These factors are organised in six groups: (i) economic deterrence and pecuniary incentives, (ii) compliance costs when filing a return, (iii) trust in the authority and political legitimacy, (iv) fiscal exchange, or the idea that taxpayers contribute to the public purse to get in return public services of adequate quantity and quality, (v) social norms against or in favour of tax evasion, and (vi) intrinsic motivation to comply. Furthermore, we are able to test the relevance of a set of ancillary factors, such as risk aversion, tax knowledge, demographics and business-related characteristics. These factors are used to dig deeper into the main results and explore the possible mechanisms in place.

Our findings suggest that some key factors are highly correlated with compliance, while others are not. More specifically, four out of the six theoretical motivations are able to discriminate between active and non-filers, statistically significantly. First, the perception of audit risk is positively related to active filing. Taxpayers who are above the median of the perceived audit risk distribution are 12 per cent and 11 per cent more likely to file last year and being perpetually active, respectively. Second, compliance costs are also important and account for a reduction of 16 per cent in the probability of being active, and 15 per cent in the probability of being perpetually so. Third, social norms also seem to affect compliance: adhesion to a social norm seems to explain a fifth to a third of last year's and perpetual compliance, respectively. Lastly, having a high tax morale implies an increase of 21 per cent and 12.5 per cent of the probability to file last year or persistently so, respectively. In contrast with conventional wisdom, we find that neither trust nor reciprocity motivations covary with compliance. All results are robust to dimension reduction through principal component analysis and best subset selection with statistical learning methods, as well as the choice of the econometric model and the inclusion of context-specific fixed effects.

Also, as a second set of results, we compare the evidence above with the results from a regression in which the self-reported willingness to comply is the dependent variable. This is to show how this self-reported measure, often used as a proxy for compliance in similar survey studies, is in reality driven by different factors. Our results mean that, while compliance costs and fiscal exchange correlate with actual and self-reported compliance in the same way, other key factors, such as social norms and deterrence, show different, if not opposite, patterns.

Lastly, we find that lack of tax knowledge, as a component of compliance costs, is strongly correlated with filing compliance. One extra question answered correctly in the tax quiz is associated with an increase of 14 per cent and 9 per cent in the probability of filing last year's tax return and being persistently active, respectively. Linked to that, background characteristics, such as employing a tax accountant and having a more mature business, are also crucial in understanding compliance.

This paper aims to contribute to three main strands of literature. First, it tests whether the theory-based formulations on the drivers of tax compliance are practically relevant in Eswatini. There are two main branches of theories used to understand and explain tax compliance – neoclassical and behavioural theories. These two macro-areas are highly interconnected, and in most cases more recent formulations build on pre-existing ones.[4] More specifically, six separate motivations are considered, which are however highly intertwined in practice.[5]

i. Economic deterrence is considered as stemming from the neoclassical standard theory of utility maximisation of Allingham and Sandmo (1972), according to whom the key drivers of taxpayers' decisions are pecuniary factors, such as the size of the penalty and the probability of getting caught. Evidence from developing countries reinforces the assumption that fines matter in some cases,[6] and not in others.[7]
ii. Compliance costs are considered, which can make taxpayers fail to comply or mistakenly leave money on the table (Benzarti 2015; Abeler and Jager 2015). Despite the growing descriptive evidence on the very low level of tax knowledge in Africa (Aiko and Logan 2014; Fjeldstad et al. 2012; Isbell 2017), and the large number of educational initiatives implemented by African tax authorities (Mascagni and Santoro 2018), more robust evidence on the role of such costs is non-existent, with the exception of Mascagni et al. (2019).
iii. The fiscal exchange theory is studied. Fiscal exchange builds on the concept of reciprocity between citizens and the State. In this setting, tax compliance is encouraged if the State is perceived to be using taxpayer's money in a transparent and just way, providing public services in sufficient quantity and quality (Cowell and Gordon 1988; Falkinger 1988; Levi 1989; Moore 2013). This theory has been abundantly developed theoretically and recently tested in low-income countries (Fjeldstad and Semboja 2001; D'Arcy 2011; Bodea and Lebas 2016; Blimpo et al. 2018). Empirical evidence to support the theory is, however, ambiguous.[8]
iv. Closely related to the fiscal exchange theory, the quality and role of the institutions matter for compliance (Levi 1989). More specifically, individuals' attitudes towards the State are crucial in deciding whether to abide by the law or not (Torgler et al. 2010). Individuals who have a negative perception of the quality of the government and the level of fairness in the tax system tend to comply less, both in the laboratory (Webley 1991) and in the real world (Pommerehne and Weck-Hannemann 1996). In this setting, the combination of fairness, equity, reciprocity and accountability produces trust in the government and foster quasi-voluntary compliance, as recently summarised in Prichard et al. (2019). The aspect of taxpayers' trust is of paramount importance in the context of SSA, where citizens tend to trust more informal institutions such as religious and traditional leaders than tax officials (Bratton and Gyimah-Boadi, 2016) and perceive corruption in tax agencies as rampant (Isbell 2017).
v. A taxpayer's behaviour may be shaped by their peers' behaviour and social norms surrounding tax evasion. Theoretical elaborations formulate that the cost of evading is an increasing function of the proportion of taxpayers who comply (Myles and Naylor 1996;

[4] Testable hypotheses are formulated for each theoretical category, and are summarised in Appendix Table A1.

[5] The tax compliance literature is extensive, and we do not attempt to review it all in detail here. For more extensive reviews, see Alm (2012); Mascagni (2018); Slemrod (2019).

[6] Ortega and Scartascini (2016) in Venezuela, Shimeles et al. (2017) in Ethiopia, Bergolo et al. (2019) in Uruguay, Brockmeyer et al. (2019) in Costa Rica, McCulloch et al. (2020) in Nigeria, and Fjeldstad et al. (2020) in Tanzania.

[7] Del Carpio (2014) in Peru; Carrillo et al. (2017) in Ecuador; Mascagni et al. (2017) in Rwanda.

[8] Fjeldstad (2004) finds no evidence in favour of the fiscal exchange theory in his analysis of survey data in South Africa. Likewise, D'Arcy (2011) provides limited support for fiscal exchange using cross-country Afrobarometer data. Investigating a different wave of the same Afrobarometer data, Sacks (2012) finds that citizens who are satisfied with their government's provision of services and goods are more likely to defer to the tax authority. In a similar fashion, the nudging exercise of Mascagni and Santoro (2018) proved to be effective in raising revenue in Rwanda, by stressing the link between tax compliance and better public services.

Kim 2003; Fortin et al. 2007). Therefore, it is relevant to consider a given taxpayer's decision as not happening in a vacuum, but rather as taking place in the reference group in which the taxpayer lives. Peer pressure and social comparison have also been observed empirically in developing countries, with interesting results.[9]

vi. It has been established that some people never evade, even when the evasion gamble is better than fair (Baldry 1986). These taxpayers can be categorised as honest or intrinsically motivated, since they always believe that evading taxes is the wrong thing to do. The notion of morality in compliance is also loosely captured by the term 'tax morale' (Luttmer and Singhal 2014). A plethora of empirical studies have attempted to influence tax compliance through appeals to morality. However, most of these studies have failed to find any significant results.[10]

On top of these main factors, we also focus on risk preferences, of which very little is known empirically when it comes to tax evasion,[11] and explore more in depth the role of demographics (Hofmann et al. 2017), contributing to the growing evidence from low-income countries showing that tax systems in Africa can be severely biased against women, who in turn may have worse feelings about taxes (van den Boogaard et al. 2018; Siebert and Mbise 2018; Ligomeka 2019b; Akpan and Sempere 2019).

Second, this paper contributes to the ongoing debate surrounding the measurement of tax compliance. By merging survey and administrative data, this study adds an element of novelty to existing evidence, and promotes a third way of collecting data to measure tax evasion. The technical considerations surrounding this issue are discussed more in depth in Section 2.

Third, this paper adds to the specific literature on non-filers. A common starting point is provided by Erard and Ho (2001), who extend the neoclassical model of tax evasion to account for the existence of non-filers. The authors then test their model on tax audit data of both filers and non-filers of US federal income tax returns. Consistent with what is found in this paper, the main determinants of non-filing in the US are the probability of getting caught, and the tax burden or compliance costs to file. Several papers have studied the drivers of filing experimentally, through tax nudges, both in high- (Guyton et al. 2017; Meiselman 2018; De Neve et al. 2019) and middle-income countries (Kettle et al. 2016; Brockmeyer et al. 2019). Apart from some considerations in Mascagni et al. (2019) in the context of Rwanda, no robust study on non-filing has been produced on the African continent.

These results are not only of academic interest, but directly relevant to policy debates within tax authorities on effective strategies to address poor tax compliance in low-income countries. Especially in SSA, the reality seems to be that tax policy, as written in books, is often very different from tax administration on the ground. While it is true that international advice is gearing towards simplification of tax systems in SSA, still very little is known about the practical considerations of African taxpayers. Therefore, it is of paramount importance for revenue authorities in SSA to extract knowledge on how taxpayers perceive the tax system, and how perceptions ultimately influence compliance, in order to implement more successful and realistic policies. In this way, informed evidence-based tax policies are more likely to be compatible both with what taxpayers really believe, and the actual capacity and resources

[9] In Peru, disclosing information on the level of compliance in the subjects' reference group had a large positive impact on compliance (Del Carpio 2014). In Guatemala, Kettle et al. (2016) show that nudging taxpayers with a social norms message successfully impacted compliance with profit tax. The message referred to the (rather low share of) 64.5 per cent of taxpayers that had already paid this tax and invited non-compliers to join the status quo.

[10] Among the many: Blumenthal et al. (2001) in the USA; Torgler (2004) in Switzerland; Fellner et al. (2013) in Austria; Pomeranz (2015) and Bergolo et al. (2019) in Latin America. Few exceptions can be found in Bott et al. (2014) for Norway, and Mascagni and Santoro (2018) for Rwanda.

[11] In some instances, risk aversion is questionably proxied by the taxpayer's perceived possibility of being caught evading tax on unreported income (Yücedoğru and Hasseldine 2016).

available within revenue authorities. This survey study attempts to stress that more systematic and robust collection of primary data on SSA taxpayers constitutes an important direction for research on tax issues in the region.

The rest of this paper proceeds as follows. Section 2 reviews the methods to measure tax compliance. Section 3 describes the institutional context. The methodological approach is addressed in Section 4. Section 5 presents the results, the robustness of which is dealt with in Section 6. Section 7 summarises and concludes the paper.

2 Measuring tax compliance: empirical approaches

The literature so far has produced different definitions of tax compliance, which can be considered a spectrum of often hard-to-measure actions, especially when it comes to the grey area between tax evasion and avoidance (Slemrod 2007). For the sake of this study, a relevant dichotomy arises when considering the extensive (failure to file) or the intensive (income understatement) margin of evasion. Following the categorisation in Halla (2010), we summarise below the methods of measurement of (any definition of) tax compliance as direct or indirect. We also add a third approach, which is believed to be more robust, and is the one adopted in this paper.

Direct approaches. Direct approaches of measuring (non-)compliance are manifold. A first example is provided by administrative data, such as data on audits. Assuming that the agency is capable of unveiling all hidden income through an audit, such an approach would directly capture the extent of evasion. The most reliable source of data from tax audits is given by the US Taxpayer Compliance Measurement Program (TCMP). Importantly, the TCMP implemented *random* in-depth audits from 1963 to 1988. Despite the robustness of this method (Advani et al. 2019), it is inapplicable to contexts of limited investment in fiscal capacity such as tax authorities in low-income countries. Apart from data on audits, tax returns data is used more and more as a direct approach of measuring evasion. The main advantages and disadvantages of this approach are addressed at the end of this section.

A second direct approach consists of measuring individual-level tax compliance in a laboratory, with early applications dating back to Friedland et al. (1978), Spicer and Thomas (1982) and Alm et al. (1992). Most notably, pre- and post-survey data is collected to enrich the analysis (Bosco and Mittone 1997; Torgler et al. 2010). Lab experiments have been criticised for their lack of external validity (Levitt and List 2007). The debate is ongoing, and results supporting the comparability of lab and real subjects have also been produced (Alm et al. 2015). The third, and most widely adopted, direct approach refers to capturing compliance through survey techniques. With this method, researchers ask the respondent directly whether they fail to comply, or, in a more preferable scenario, find reasonable approximations of non-compliance through less direct questions. This tool has gained relevance in low-income countries (see Fjeldstad et al. (2012) for a review on tax surveys in Africa), also given the challenges in following the two other methods described above. Relevant examples of tax surveys are grouped in two categories: (i) cross-country

international business[12] or citizen-level[13] surveys, and (ii) ad-hoc surveys implemented by researchers in a single country.[14]
Despite being expensive, surveys still represent the most powerful tool to capture relevant information, such as tax attitudes and perceptions, which cannot be extracted otherwise. Further, survey data allows for in-depth descriptive analysis, which often sheds light on new behavioural patterns and provides the basis for more experimental studies. Lastly, policymakers are interested in understanding the views of citizens and embedding survey evidence in policy decisions and future strategies.

At the same time, tax surveys present weaknesses and inconsistencies. The first point of criticism states that it is difficult to get honest answers about dishonest behaviour when respondents are motivated to present themselves in a positive light (Ajzen 1991). Andreoni et al. (1998) suggest that taxpayers might overstate their degree of compliance in self-reports, and those who have evaded might want to excuse their behaviour by declaring a higher tax attitude. Relatedly, response rates can diverge by income groups and undermine the sample representativeness: it is more difficult to survey wealthy people and detect their levels of evasion (Alvaredo and Atkinson 2010; Higgins and Lustig 2013). The second main critique refers to the operationalisation of the key dependent variable – tax compliance. It is true that asking for the willingness to pay taxes is less blunt than enquiring about an illicit behaviour, and researchers follow this strategy to get higher degrees of honesty. At the same time, scholars often claim to be measuring tax compliance when they are just capturing an attitude. The relationship between attitudes towards compliance and actual behaviour has been abundantly questioned in the literature, as reviewed by Onu and Oats (2016). For example, Elffers et al. (1987) find that there are significant differences between actual tax evasion, as derived from tax audits of 700 Dutch taxpayers, and survey responses. Likewise, Hessing et al. (1988) find no correlation at all between self-reports and documented compliance status with the Dutch tax authorities. Also, it is unclear whether all respondents perceive the concept of *compliance* in an unequivocal way and this can undermine the internal validity of the survey instruments.

In addition, even if pretending that attitudes are consistent with behaviour, the way in which tax compliance is usually defined in surveys is not necessarily specific to the behaviour under study. Many examples can be provided in this regard. D'Arcy (2011) uses as dependent variable answers to the Afrobarometer question: 'For each of the following statements, please tell me whether you disagree or agree: The tax department always has the right to make people pay taxes'. This does not necessarily means that a taxpayer is compliant, rather whether they believe that the State has the authority to collect taxes. Using another round of Afrobarometer data, both Levi et al. (2009) and Sacks (2012) adopt the same dependent variable to study the willingness to comply. Blimpo et al. (2018) create an index of tax morale to proxy tax compliance, in which the same question on government authority is included, together with one on trust in tax officials. In contrast, McCulloch et al. (2020) prefer to use the question 'Which of the following options is closest to what you think about people not paying taxes on income?', where the options are: not wrong at all; wrong but understandable; and wrong and punishable. In sum, there exists a lot of confusion in the operationalisation of survey items, and greater consensus is needed in order to improve the reliability and comparability of empirical tax research (Fjeldstad et al. 2012).

[12] The most comprehensive of these is the Doing Business (DB) survey conducted by the International Finance Corporation of the World Bank. DB surveys are run every year worldwide and in most African countries. DB produces world rankings on the ease of doing business and a number of different sub-areas. Importantly, a specific module of DB focuses on the ease of paying taxes. Another example is given by the World Bank Enterprise Surveys, firm-level surveys of a representative sample of a country's private sector.

[13] The main examples are provided by Afrobarometer and World Values Surveys.

[14] Notable examples from low- and middle-income countries are provided by Gauthier and Reinikka (2001) in Uganda; Fjeldstad and Semboja (2001) and Fjeldstad et al. (2020) in Tanzania; Fjeldstad (2004) and Coolidge and Ilic (2009) in South Africa; Bodea and Lebas (2016) and McCulloch et al. (2020) in Nigeria.

Indirect approaches. Indirect approaches aim to provide macro-level estimates on tax evasion by inference from key observable indicators, such as currency demand or national income and product accounts. These observable indicators are what Slemrod (2019) defines *traces-of-income*. If performed correctly, indirect approaches can provide approximation of tax evasion cross-country and for a reasonably long period of time. The pioneering work of Pissarides and Weber (1989) uses food consumption as a proxy for income, and ends up inferring that self-employed individuals understate their income more than employees. Other examples of indicators are given by hoarding of high-value currency (Feige 1990), the ratio of currency to money (Tanzi 1980) and electricity consumption. However, as explained in Slemrod and Yitzhaki (2002), indirect approaches are questionable in their methodology, both in terms of the difficulty in estimating key parameters, such as currency demand, and the inconsistent definitions of income for tax purposes and for national accounts.

The third way: surveys and administrative data. The third solution consists of merging survey and tax returns data. While tax surveys have been implemented for decades, tax authorities of low-income countries have only recently inaugurated a collaboration with researchers in which a wealth of administrative data is shared and analysed (Mascagni et al. 2016). This collaboration has been fuelled by the impressive evolution of IT within revenue authorities, which produces a massive amount of tax data every day. Gathering and understanding such data has become a priority for making informed tax policy decisions. There is a lot that can be learned from administrative data (Mascagni et al. 2016). First, it captures actual filing behaviour, as opposed to biased survey self-reports. Second, the availability of tax returns across many years offers the opportunity to study trends in compliance over time, and to have a more comprehensive view of compliance patterns. Third, collaboration with international researchers builds technical capacity within the tax agencies themselves, with the ultimate goal of improving internal processes.

Based on tax data, rigorous experiments and impact studies from SSA and the developing world have recently been published.[15] It is also fair to stress that administrative data comes with its own drawbacks. First, and linking back to the introduction to this section, income data from tax returns only captures the information that taxpayers decide to disclose to the revenue authority. All income derived from informal activity is therefore excluded. Second, administrative data, despite being anonymised before being shared, is highly confidential and often accessed by a small group of academics only, so reducing possibility of replication. Third, administrative data is only available for those who are registered in the first place, thus does not cover the informal sector. Survey data can address this concern by framing the sample to include non-registered taxpayers. Lastly, as Slemrod (2019) points out, results that provide an unfavourable picture of the way in which a tax authority operates are more likely to encounter resistance from senior management and eventually not be published.

This study represents one of the few examples of tax research which combines alternative data sources.[16] The merging takes place based on the taxpayer identification number (TIN), a unique identifier assigned to each taxpayer at the time of registration.

[15] See Mascagni (2018) for a comprehensive review. Relevant studies from Africa include Eissa and Zeitlin (2014), Mascagni and Mengistu (2016), Mascagni et al. (2017), Almunia et al. (2017), Mascagni et al. (2019), Santoro and Mdluli (2019) and Mascagni et al. (2020). Field experiments from other developing contexts include: VAT payments in Chile (Pomeranz 2015), individual municipal taxes in Argentina (Castro and Scartascini 2013), firm taxes in Ecuador (Carrillo et al. 2017) and corporate income tax in Uruguay (Bergolo et al. 2019).

[16] Other studies include Mascagni et al. (2019) for Rwanda, Del Carpio (2014) in Peru and Bergolo et al. (2019) in Uruguay. When considering high-income countries, it is worth mentioning Lefebvre et al. (2015) in France, Belgium and the Netherlands, Fellner et al. (2013) in Austria and De Neve et al. (2019) in Belgium.

3 Institutional context

Tax system. This study is implemented in the Kingdom of Eswatini, for which a general overview is provided in Appendix Section A.1. The Eswatini Revenue Authority (SRA) is a semi-autonomous institution established by the Revenue Authority Act in 2008, officially taking over the function of revenue collection on 1 January 2011. The SRA collects both direct taxes, representing about 57 per cent of tax revenue in 2017/18, and indirect taxes, amounting to 43 per cent of revenue (SRA 2018). The main direct income taxes are taxes on companies (16% of total revenue) and taxes on individuals (36%), which are labelled here as personal income tax (PIT). The main indirect taxes are VAT (30%) and fuel taxes (12%). Concerning the focus of this study, PIT is a tax on income generated by individuals, and has a progressive structure – a maximum marginal rate of 33 per cent, and exemptions for income below SZL41,000 (USD2,848).[17] Three main categories of individuals are targeted by PIT: non-business employees taxed at source (PAYE), directors of companies and sole traders, with the latter being the focus of this study. From the analysis of PIT returns 2012-2017, the relevance of the three categories in terms of number of returns lodged is as follows: PAYE (41%), sole traders (37%) and director of companies (21.5%).

In terms of filing obligations and deadlines, income tax returns must be submitted according to a staggered timeline. Small and medium, non-VAT registered, PIT payers have to file by 30 November, while large individuals who are registered for VAT must submit their returns by 31 December. The tax year ends on 30 June. Importantly for this study, the law mandates that every registered taxpayer is required to file their return regardless of whether they are operative during the year. Strict sanctions are imposed by law for non-filing and for false assessment. Anyone who fails to furnish a return within the stipulated period may be liable on conviction to a fine of SZL10,000 (USD719) and/or imprisonment for a period of up to one year. Those making false assessments with an intention to evade are liable to a fine of SZL50,000 (USD3,591) or imprisonment up to five years. These amounts are discouraging, given that the average monthly turnover (total sales) of the taxpayers in the sample is about SZL32,500. However, lack of human resources means that audit probability is likely to be low for small taxpayers, and high for the most profitable cases. According to ATAF (2017), auditors account for 6.5 per cent of total tax administration staff, well below the SSA average of 12 per cent and the 30 per cent international benchmark (Gallagher 2004).[18]

Tax performance. Revenue collection has continued to show a steady increase year on year since the inception of the SRA. A growth of 8 per cent was recorded in 2017/18, compared to an average of 13 per cent over the past five years, as indicated in Appendix Figure 3 (SRA 2018). The country registered a positive trend in terms of tax-to-GDP ratio from 12.3 per cent in 2011/12 to 14.7 per cent in 2017/18 – this is still far from the OECD's 25 per cent.

Appendix Table A2 reports key fiscal and governance indicators for Eswatini and Southern Africa. According to ATAF (2017), the 2015 tax-to-GDP ratio in Eswatini is about half that of Southern Africa. Eswatini scores worse in terms of governance outcomes, both when considering the Corruption Perception Index and World Bank Governance indicators. For the latter, Eswatini underperforms in terms of voice and accountability, political stability, government effectiveness, regulatory quality and corruption – all institutional factors

[17] At the time of the experiment (November 2019) USD1 = SZL15.02.

[18] This finding is somewhat balanced by the fact that, due to a sparser population, Eswatini has a low ratio of labour force to tax administration staff, less than 500:1 (ATAF 2017) - compared to the SSA average of 3,600:1. This could suggest that, on one hand, the SRA is adequately staffed overall, while, on the other, the number of tax auditors is still not sufficient.

presumably linked to voluntary tax compliance.[19] In much the same fashion, scores for government integrity and judicial effectiveness are worse than the regional average, while the tax burden is higher. The World Bank Doing Business indicators depict a context more in line with the rest of the region. However, Eswatini ranks 122nd in the world for ease of doing business; Eswatini performs slightly better when considering ease of paying taxes, being 77th in the world. Less than a third of adults in the labour force have a bank account, vs 42 per cent in the region.

SRA (2018) reports 53,208 registered taxpayers in 2017/2018. Taxpayers registered for income tax account for 83 per cent of the total. The positive trend in registrations reflects the efforts of SRA to foster formality, as well as other service-oriented initiatives.[20] However, the informal sector still represents about 41 per cent of Eswatini national income, compared to 32 per cent in Southern Africa (Table A2).

When it comes to revenue from income taxes, Appendix Figure 4 shows the trend of PIT and CIT collection over time. While CIT collection reported a 14 per cent below-target gap in 2017/2018, individual income tax performed fairly well, being 13 per cent above target. However, this performance was underpinned by higher PAYE collection mainly due to an increase in employee numbers in the public administration and manufacturing sectors (SRA 2018). It is fair to assume that compliance of individual businessmen was not the key driver of this positive trend.[21] Hence, studying the drivers of individual businesses' compliance assumes an important value for tax policy as well.

Initial evidence on personal income tax compliance gaps can be gathered from SRA administrative data. We have access to the universe of 31,414 PIT payers registered up to December 2017 and the PIT returns for the period 2013-2018, lodged by about 24,000 individuals. As explained in the introduction, we focus our attention on the two main compliance categories: active taxpayers and non-filers. The data shows:

- *Active taxpayers*: conditional on filing, the 6-year average of active (non-nil) returns is 74 per cent.[22] Perpetually active taxpayers amount to 61 per cent of the filing population (or 14,637 units). Relevant to this study, sole traders are below the average rate of active return at 70 per cent.
- *Non-filers*: the 6-year average of missing returns is 57 per cent, 54 per cent for sole traders. This implies that more than half of PIT payers (24,386) who were supposed to file a return in a given year failed to do so. In the last tax year, 72 per cent of the taxpayers expected to file failed to do so. Considering the persistence of this behaviour over time, as many as 10,035 are persistent non-filers, meaning that they never filed a return after registration. In other words, about a third of all registered PIT payers never lodged a tax return.

In conclusion, taxpayers' compliance with personal income tax is far from optimal: every year, about half the returns are missing. Remarkably, non-filers outnumber active taxpayers every single tax year. This study attempts to explain why.

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19 According to the World Bank Enterprise Surveys, in 2016 18% of firms in Eswatini indicated corruption as the biggest obstacle to their daily operations, making it the first ranked obstacle from 15 areas of the business environment. This figure stood at only 5% in 2006.

20 A noteworthy example of this approach is *Operation Bakhumbute*. This was a door-to-door compliance campaign, which aimed to increase the taxpayer base and remind taxpayers of their tax obligations. The operation was carried out on 733 businesses in the Lubombo, Shiselweni and Manzini districts. About 20% of the businesses visited were found not to have registered with SRA for tax purposes. These businesses were educated on their compliance obligations, furnished with registration forms and advised on the registration process. Following initial engagement with these businesses, follow-up visits ensured that they actually registered.

21 This view is also shared by SRA, as emerged from preliminary discussions with senior management.

22 The remaining returns are nil, lodged by the so-called nil-filers (Santoro and Mdluli 2019). They are excluded from the analysis.

4 Research design

4.1 Data

Administrative data. Access to administrative data has been granted by SRA, with whom we signed a confidentiality agreement. More specifically, we have access to the taxpayers' registry, which contains information on the universe of taxpayers registered with the SRA for any tax type, and the PIT returns for the period 2013-2018, which provide information on the filing behaviour of the study population. Each taxpayer is assigned a taxpayer identification number (TIN), which is consistent across all SRA datasets and used to merge the registry and tax returns.

Administrative data serves two main purposes. First, it is needed to identify and locate the taxpayers to be targeted. Second, it assists in the unequivocal categorisation of taxpayers into the two main mutually-exclusive categories, active vs non-filers. The filing behaviour is classified by looking at the most recent tax year, 2018. This means that an active taxpayer positively filed the 2018 tax return, while a non-filer failed to do so in the same year. More specifically, the population of non-filers for a given year is a moving target, as non-filers are potential filers who have not yet filed. Therefore, the categorisation into non-filing depends on the specific time at which the data is observed, in this case the end of July 2019, or nine months after the filing deadline of 30 November 2018. Relatedly, we are able to observe the filing behaviour over a six-year period and create the *perpetual* sub-category – taxpayers who keep filing in the same way every year. As discussed in Section 2, administrative data is more effective than survey data in capturing tax compliance accurately. In this case, filing behaviour is measured exclusively from tax returns.

Survey data. First-hand survey data has been collected by the authors over a one-month period, with fieldwork starting on 7 November and ending on 8 December 2019. The survey has been programmed to be run on tablets through SurveyCTO software. The survey team consisted of ten enumerators and one team leader. Interviews were administered in person, with the enumerators first contacting the potential respondents on phone numbers extracted from SRA administrative records. The survey protocol was strictly followed; taxpayers had to provide informed consent before starting the interview, and were free to quit at any time. The average duration of the questionnaire was about 40 minutes. Data collection and entry followed back-checks and other validation processes consistent with academic best practice.

The content of the questionnaire was produced by the authors with the support of SRA. The final questionnaire consisted of nine modules, summarised in Appendix Table A3 and described more in detail in Section 4.3.2. After the pre-interview module 1 and the consent form in module 2, relevant background information was collected both at the taxpayer (module 3) and business level (module 4). Module 5 focused on attitudes towards risk, both through a self-reported measure of riskiness and an experimental measure for risk aversion. After that, module 6 collected other important information on key factors linked to compliance: tax knowledge (through a mini-quiz on tax of 5 questions) and compliance costs, enforcement likelihood, perceived corruption, moral attitudes towards compliance and perceptions on fairness, fiscal exchange and peers' behaviour. Module 7 explored satisfaction with public services, while module 8 captured past interactions with the revenue authority.[23] In some instances, the survey script replicated standard questions from well-established international surveys, such as the Afrobarometer, the World Values Survey and

[23] To reduce errors of recall, questions on business activity and interactions with SRA refers to the last 12 months only, i.e. from October 2018 up to the time of the survey.

the International Social Survey Programme.[24] At the same time, questions on tax knowledge, an aspect which is usually neglected in existing international surveys, have been mostly derived from the tax quiz used in the tax training study in Rwanda (Mascagni et al. 2019), where it proved to effectively capture (lack of) tax literacy. Overall the quality of the data is good: 95 per cent of interviews are classified by the enumerator as having gone 'somewhat well' (26%) or 'very well' (69%).

4.2 Sample selection

The final sample consists of 1,009 PIT-registered taxpayers. The sample was supposed to equally represent active and non-filers, even if non-filers in 2018 amounted to 70 per cent of the population. In order to increase the power of within-category analysis, active have been overrepresented. The target of equal split has been successfully reached in the field, despite the fact that non-filers are harder to reach: the final sample contains 513 active (51%) and 491 non-filers (49%). About 60 per cent (613 taxpayers) are persistent in their behaviour: 76 per cent of active (395) and 44 per cent of non-filers (218) have been filing in the same way every time.

The sample has been randomly extracted from the taxpayer registry as at July 2019. Inclusion criteria include: (i) phone number is available so that the respondent could be contacted by the survey team and a meeting could be arranged,[25] (ii) to be registered any time before January 2018, so to be liable to file a tax return for the tax year 2018 and therefore be categorised as active or non-filer,[26] (iii) to be located in Eswatini,[27] (iv) to be required to file for income tax,[28] and (v) the type of business. In relation to the latter point, all taxpayers in the sample fall in the category of *sole traders*, meaning that they are entrepreneurs running a business. Other categories, such as non-business employees, high-net worth individuals and directors of companies, even if liable to remit PIT, have been disregarded as it can be assumed that their tax compliance decision is affected by different motivations and constraints. Instead, sole traders are fully responsible for their own compliance behaviour, and are the ones who decide whether to declare or not, and, if yes, how much. Moreover, it is fair to believe that their own perceptions and attitudes towards taxation have an immediate effect on their compliance behaviour. Therefore, studying sole traders is more interesting both from a research and a policy perspective.

The sample contains both urban and rural taxpayers. All four districts in Eswatini have been covered, and the sample is geographically representative – at least at district level.[29] Appendix Figure 5 reports the location of each respondent, using different colours for the two compliance types. The main agglomeration of respondents refers to the main cities, Mbabane, Manzini and Lobamba, while more rural areas spread across the four corners of the country.

[24] e.g. questions on trust towards the authority and transparency in government spending are derived from the Afrobarometer series.

[25] Less than 3% do not have any phone number available and therefore have been excluded.

[26] About 4.8% of the population registered after December 2017, and have therefore dropped from the sampling.

[27] For less than 1% of the taxpayers in the registry, the location is not available or is from outside the country, mostly South Africa.

[28] Exempted entities are very few in Eswatini - only 57. All of them are corporate taxpayers (mostly churches, NGOs, etc).

[29] The coverage of each district is as follows: (i) Hhohho 37%, (ii) Lubombo 16%, (iii) Manzini 38%, and (iv) Shiselweni 9%. These shares are very similar to those of the overall population of PIT payers: 38%, 15%, 39%, 8%, respectively. Therefore, no sampling weights will be used throughout the analysis.

4.3 Estimation strategy

4.3.1 Main specification

Results are estimated through a linear probability model, according to the following OLS specification:[30]

$$Y_i = \alpha_i + \beta_i Z_i + X_i \Gamma + \epsilon_i \quad (1)$$

Where the outcome Y is the compliance behaviour of taxpayer i – a dummy for active filing status. As already stated in Section 4.1, two compliance outcomes are considered: (i) whether the taxpayers actively filed in the most recent year, and (ii) whether they are a perpetually active or a perpetually non-filing taxpayer. With outcome (ii), we intend to run a robustness check in order to control for endogeneity issues such as reverse causality: it could well be that the fact of being active last year has affected the explanatory variables (even if the survey took place about ten months after the most recent filing deadline), and, by focusing on the perpetual sample only, it is fair to assume that the outcome variable is constant over time. Additionally, we aim to compare the determinants of the extensive margin of compliance with those of self-reported compliance. The latter is built from answers to the question on whether tax evasion is justifiable (see Section 4.3.2). The vector Z_i refers to the set of key explanatory factors under study. These factors are grouped following the theoretical formulations on tax evasion (Table 1): (i) deterrence, (ii) compliance costs, (iii) trust and political legitimacy, (iv) fiscal exchange and reciprocity, (v) social norms, and (vi) intrinsic motivation. The control vector X_i includes both taxpayer-level and business-level characteristics. The operationalisation of these factors is explained more in detail in Section 4.3.2. For the sake of this study, the coefficients of interest are given by the β_i. Each explanatory factor Z_i will be used with and without controls and both alone, in a bivariate regression setting, and together with all the other factors, in a multivariate regression setting. In this way, we control for the bias caused by the potential interactions between the right-hand-side (RHS) variables. The lack of significance that we could find for a factor, say trust, may be driven either that there is truly no relationship taking place, or by the fact that trust is also correlated and explained by a number of other RHS variables, such as reciprocity, accountability, fairness and social norms. This would be a case of bad controls (Angrist and Pischke 2009). If bivariate and multivariate coefficients do not differ much, as happens in this case, it is a sign that such a bias is not undermining our results. Finally, the option of robust standard errors is used to control for heteroscedasticity.

In the same fashion, a probit specification will be run and marginal effects computed. As shown in Section 5.3, results do not change when a probit model is used.

4.3.2 Independent variables

Deterrence. Deterrence is captured in multiple ways. First, the perceived risk (as a percentage) of being audited is measured. We have information on both an individual's likelihood of being audited, and the likelihood of a peer, or a business like the respondent's one. Dummy variables indicating a perceived risk audit higher than the median are created to

[30] The linear probability model provides easier interpretations for the marginal effects on the probability of actively filing, compared to probit and logit. While the assumption of homoscedascity does not hold in an LPM, calculating *robust* standard errors controls for that (Angrist and Pischke 2009). Moreover, LPM does not restrict predicted values within the 0-1 interval, but the share of such values is not high, ranging from a minimum of 0% to a maximum of 10% of the sample. The section on robustness show that, as a matter of fact, our results do not change (quantitatively or qualitatively) if we use a probit model.

ease the interpretation of results.[31] Second, survey module 8 enquires about interactions with SRA. Indicators such as distance from SRA, ever having been audited (and number of audits), ever having been fined (and number of fines), ever having interacted with the authority (number of interactions), will be used as alternative predictors.

Compliance costs. As a measure of compliance costs, we adopt two survey items. First, perceptions on compliance costs are gathered through answers to questions on how difficult it is to file, and how difficult it is to get in touch with SRA to get tax-related information. Second, in order to further probe the role of complexity perceptions, we consider tax knowledge as a specific proxy for compliance costs. While perceptions of complexity are somehow subjective, the answers to a tax quiz can provide a more objective measure of tax ignorance and compliance costs. In order to capture the quality of tax knowledge, both a raw index and a standardised index (Kling et al. 2007) are created from the five-item quiz on tax. Additionally, background characteristics on taxpayers' practice, such as having a tax accountant and the time spent on tax in a month, are used as further indicators of compliance costs in the Section 6 on mechanisms.

Fiscal exchange. A specific survey module captures the respondents' satisfaction with the government's provision of six public services.[32] The first component from a principal component analysis is gathered as an overall satisfaction index. Further, (lack of) fiscal exchange is also captured by two other survey items: (i) disagreement with the fact that the government can decide to make people pay more taxes in order to increase spending on public health care, and (ii) feeling of not getting anything in return from paying taxes.

Trust and political legitimacy. We use a number of variables in order to capture political legitimacy. First, we measure trust in the revenue authority as a rank response for the extent of mistrust towards the SRA. Second, perceptions on corruption are captured by individuals' agreement with the fact that businessmen are sometimes required to make gifts or unofficial payments to get things done with regard to taxes. We also collect a more quantitative variable, as the share of total annual sales that businesses pay in informal payments or gifts to public officials for tax purposes. Third, we ask how fair the respondent feels the amount of income taxes they remit is. Fourth, to proxy for transparency in the governance, we measure how easy it is for the respondent to find out how the government uses the revenue from people's taxes.

Peer pressure. We use perception of other people's tax compliance as proxy to measure the influence of other people's behaviour on tax compliance. Specifically, we use two measures: (i) a more quantitative one, asking for the perceived share of businesses in the respondent's area understating their income, and (ii) a more qualitative one, enquiring about the level of agreement with the statement: 'If my neighbours do not pay taxes, it is fair for me not to pay them either'.

Individual morality. As a measure of the intrinsic motivation to comply, we capture the level of disagreement with the following statement: 'It is right for some people not to pay the taxes they owe on their income'. This variable is often used as a proxy for compliance. For this reason, we also use it as a dependent variable to test whether the factors impacting actual compliance differ when it comes to self-reports.

[31] The median, rather than the average, is usually chosen as threshold to create two groups of similar sizes and control for skewed distributions. However, the data at hand is not extremely skewed, and median and average are often very similar. In the case of audit likelihood, the median is 60% while the average is 62%.

[32] Primary schools, tertiary education, infrastructure, electricity, healthcare and security.

Risk aversion. Survey module 5 captures risks aversion both through a self-reported attitude towards a risky situation on a 1-10 scale and a more experimental measure.[33] The experimental exercise is also known as multiple price list (MPL), previously used by Holt and Laury (2002) and Harrison et al. (2007), among others. This measure has rarely been used in relation to tax compliance (see Section 2.3), and is discussed more in detail in the Appendix Section A.2. In this study, risk propensity is used as a factor in an exploratory regression, in order to probe further into the role of deterrence found in the main set of results.

Demographics and business characteristics. A large number of background characteristics are collected, which serve as controls: (i) demographics, such as gender, age, education and country of origin; (ii) business background information on being currently in operation, having run a previous business, location, sector, level of competition (both with formal and informal businesses), change in the size of the business in the last year, and total sales in a given period;[34] (iii) taxpayers' related practices on bookkeeping, having a bank account, using emails to communicate with clients and suppliers. While these factors are used as controls in the main specifications (Section 4.3), they are also explicitly studied in Section 6.

5 Results

5.1 Anatomy of survey sample

Response rates and attrition. Implementing face-to-face interviews with small entrepreneurs, whose opportunity cost of giving up their time for a 40-minute survey is presumably high, is challenging. A large group of replacements is allocated to each enumerator in order to swiftly address non-responses. Importantly, the replacement order is randomised by the survey software. This means that taxpayers in the replacement group are comparable to those in the main sample. In many instances, enumerators had to replace hard-to-reach respondents. At the end of data collection, about a third (31%) of taxpayers in the main sample were successfully reached, while the remaining two-thirds (69%) were randomly picked from replacements. Appendix Table A5 shows that the group of taxpayers consenting to be surveyed is comparable to those who refused, except for minor deviations: consenting taxpayers show slightly fewer years of filing, look smaller in terms of log tax declared and are 4 percentage points less likely to be perpetual non-filers. On the other hand, the geographical distribution is nicely balanced. This evidence is supportive of the fact that heterogenous attrition is not a main threat to the analysis.

Summary statistics. Before enquiring the regression tables, it is worth exploring the sample descriptively. Appendix Tables A6 to A9 report summary statistics for the survey items observed in this study. As derived from Table A6, the average taxpayer in the sample is a married male (60%), aged between 41-50, a Swazi national, without higher education. While the majority in the sample employs tax accountants (57%), keeps at least some form of records (65%) and has a business-related bank account (58%), only a fifth of the sample uses email to communicate with clients or suppliers (20%).

When it comes to business-level characteristics, it is striking to realise that the vast majority of the sample reports to be in operation in the last year (74%). This is true for non-filers as

[33] The 1-10 quantitative variable is transformed in a dummy for self-reported riskiness above median. Again, median (5) and average (5.1) are very similar in magnitude.

[34] From Anderson et al. (2019), we first ask the respondent to choose a reference period: week, month or year. Then we enquire about the total sales in an typical period, meaning not the best and not the worst.

well, 56 per cent of whom state they have had at least one business transaction in the last year (compared to 90% of active). This may already hint to the fact that non-filers are indeed operative but not declaring to the fiscus as requested by the tax code (Section 3). This is also suggested by data on reported monthly sales, with non-filers reporting an average of $1,028 USD ($ 1,180 USD excluding nil-filers). While this amount is significantly lower than actives' ($ 3,130 USD or $ 3,474 USD excluding nil-filers), the fact that non-filers are openly disclosing this information raises the question of whether they are just unaware of their filing responsibility. Appendix Figure 6 reports the distribution of reported sales by group, indicating the group averages with vertical lines. Also, the average business is about six years old, working in the wholesale/retail trading sector (56%) and, in most cases (80%), competing with informal businesses.[35] Relatedly, a striking majority (74%) suffer from high competition, both from formal and informal activities, and half of the sample saw a reduction in business profits in the last year. The geographical distribution is the one already shown in Figure 5, and reflects the higher economic relevance of the two main business districts in the country, Hhohho and Manzini. Lastly, it is interesting to see which reasons push our traders to register with the authority, and spot any difference between active and non-filers. Appendix Figure 7 displays the results. While it seems that actives perceive a stronger sense of State legitimacy and feel more scared of breaking the law, non-filers seems to have registered out of a hope of growth opportunities, as well as to access government services and attract more clients.

For risk preferences (Table A7), the negligible levels of indifference and inconsistency represent a positive assessment of the quality of the lottery data. The sample is on average slightly risk averse, with a coefficient of relative risk aversion (CRRA) of 0.17.[36] About 40 per cent of the sample still opts for the safest choice A in the last lottery round, in which option B is far more convenient (see Table A4). Furthermore, Table A8 reports the level of interactions with the authority. About 15 per cent had been audited since registration, while a higher share received a fine (25%). At the same time, as many as 40 per cent of the sample have had other types of interaction in the last year, with more than two interactions on average. Table A9 summarises the key explanatory factors of the study. It is worth noting that the perceived audit probability is high in general, and much higher when referring to other businesses (83%) than when referring to the taxpayer himself (62%), as also displayed in Figure 9. This is likely to suggest the existence of computational biases from bounded rationality, as framed in detail by the prospect theory (Kahneman and Tversky 1979; Dhami and al Nowaihi 2007). Also, compliance costs seem to be higher, with the average number of correct answers in the tax quiz being 1.6 out of a maximum of 5, and as many as two-thirds of the sample reporting difficulty to file. As another dimension of the compliance costs, for a sizeable 40 per cent of the sample it is difficult to get in touch with the authority to get assistance. At the same time, indicators of trust and political legitimacy depict a situation in which the majority (55%) think that businesses are bribing tax officials, about half the sample sees the tax system as unfair, and 74 per cent believe that government processes are not transparent. This evidence somehow confirms the poor scoring at the international level from Table A2. This is also reflected in the relatively high level of mistrust towards the revenue authority, with an average score of 2.5 out of 4. Relatedly, about 58 per cent of the sample disagree with the fact that taxes can be increased to finance health care. In much the same vein, half the sample believe they get nothing in return from contributing to the public purse. Social norms also seem to point towards a context in which tax evasion is present, with the perceived average frequency of businesses evading being 40 per cent. However, when it comes to measuring peer pressure and the effect of neighbours, just 12 per cent believe that it is fair to emulate a neighbour who is cheating on taxes. Finally, despite this initial evidence on deteriorated tax attitudes and perceptions, the vast majority of the sample (82%) report a

[35] When using the questionnaire, enumerators made sure to explicitly refer to those businesses who are not registered with the SRA and therefore remitting no formal taxes.

[36] See Appendix Section A.2 for more information on the CRRA.

surprisingly high intrinsic motivation, believing that tax evasion is not the right thing to do. This factor will also be used as a dependent variable when exploring how the behavioural determinants differ across actual and self-reported compliance.

5.2 Regression results

In this section, we report the results from the model discussed in Section 4.3. In the regression tables below, the columns *All* refer to last year's filing behaviour, while the columns *Perpetual* consider the persistent filing behaviour.

Which factors explain actual tax compliance? Table 1 below shows the results from our main specification. Columns 1 and 2 do not control for any background variables, while columns 3 and 4 control for both demographic and business level features. Standard errors are shown in parentheses. Also, Appendix Figure 8 plots the coefficients from columns 5-6 to ease comparisons across groups. Some statistically significant patterns emerge from the table. First, perceptions of the general audit probability are negatively related to the probability to file, both with and without controls: being below the median of the perceived audit probability distribution is associated with a reduction in the filing probability by 6-7 percentage points when all controls are added (col. 3-4), significantly so at the 5 per cent level. This translates in a reduction of the probability of being active last year of 12 per cent, and of being perpetually active of 11 per cent.

As a second set of results, compliance costs play a major role. Taxpayers who think that filing a tax return is somewhat or very difficult are 8-9 percentage points less likely to file. The coefficients are always significant at the 1 per cent level and are meaningful in magnitude: compliance costs account for a reduction of 16 per cent in the probability of being active and of 15 per cent in the probability of being perpetually so. Relatedly, the difficulty in getting assistance from the SRA is weakly associated with the failure to file for last year's return, while it turns insignificant for the persistent behaviour.

Third, social norms seem to covary with compliance: while the perceived share of evaders in the community is not significant, the consideration of peers' behaviour seems to be positively correlated with filing, with coefficients highly statistically significant and doubling for persistent filers. Therefore, it seems that it is not so much the perceived incidence of evasion in the community that matters for compliance, but rather the moral adherence given to the existing norms surrounding compliance. The magnitude is also strikingly sizeable: adhesion to a social norm seems to represent a fifth (col. 3) to a third (col. 4) of last year's and perpetual compliance, respectively.

Finally, the intrinsic motivation to comply also explains a non-negligible share of the filing probability. Having a high tax morale implies an increase of 11 percentage points in filing probability, falling to 8 percentage points for persistent taxpayers.

Besides these significant results, the importance of factors related to trust and political legitimacy, as well as to fiscal exchange, is not confirmed in this exercise. Perceived corruption, lack of transparency and mistrust towards the agency do not play any role in explaining compliance. The only exception is with perceived unfairness, which implies a noticeable reduction in filing probability (6-8 percentage points, or about 12-13%) for last year's compliance only (col. 1-3), but is never significant for perpetuals. More in general, perpetuals are arguably not moved by any consideration on trust and legitimacy when complying with the law. Also, fiscal exchange motivations perform poorly. Neither satisfaction with public services nor feelings of reciprocity show a significant coefficient. If anything, expecting nothing in return from paying taxes is positively correlated with being a persistently

active taxpayer. The immediate consideration would be that perpetuals are intrinsically motivated up to the point in which they: (i) are not affected by corruption, unfairness, lack of trust/transparency in the system, and (ii) do not expect to receive anything back from their contribution.

Table 1 Determinants of active filing behaviour

	(1)	(2)	(3)	(4)
	All	**Perpetuals**	**All**	**Perpetuals**
Deterrence				
Risk audit below median	-0.11***	-0.14***	-0.06**	-0.07**
	(0.03)	(0.04)	(0.03)	(0.03)
Compliance costs				
Difficult to file	-0.10***	-0.10**	-0.08***	-0.09***
	(0.03)	(0.04)	(0.03)	(0.03)
Difficult to get in touch	-0.07**	-0.06	-0.05*	-0.02
	(0.03)	(0.04)	(0.03)	(0.03)
Trust and political legitimacy				
Bribing above median	0.02	-0.03	0.01	-0.05
	(0.05)	(0.07)	(0.05)	(0.05)
Unfairness	-0.08**	-0.06	-0.06**	-0.04
	(0.03)	(0.04)	(0.03)	(0.03)
No transparency	0.02	0.04	-0.01	0.02
	(0.04)	(0.05)	(0.03)	(0.04)
No trust above median	0.01	-0.00	0.01	-0.02
	(0.03)	(0.04)	(0.03)	(0.03)
Fiscal exchange and reciprocity				
Services	-0.02	-0.02	-0.02	-0.02
	(0.02)	(0.02)	(0.01)	(0.02)
No fiscal exchange	0.00	-0.01	-0.02	-0.05
	(0.03)	(0.04)	(0.03)	(0.03)
Nothing in return	0.01	-0.00	0.04	0.06*
	(0.03)	(0.04)	(0.03)	(0.03)
Social norms				
Evaders % above median	0.01	0.06	-0.01	0.04
	(0.05)	(0.06)	(0.05)	(0.05)
Peer pressure	0.11**	0.23***	0.10**	0.20***
	(0.05)	(0.06)	(0.04)	(0.04)
Intrinsic motivation				
High tax morale	0.15***	0.12**	0.11***	0.08*
	(0.04)	(0.06)	(0.04)	(0.05)
Demographics	No	No	Yes	Yes
Business char.	No	No	Yes	Yes
Mean of Y	0.513	0.644	0.513	0.644
R-sq.	0.057	0.077	0.326	0.486
Observations	1009	613	1009	613

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Authors' own

What about the drivers of self-reported compliance? After the analysis on actual compliance, it is prudent to see if the key factors motivating it are also explaining self-reported compliance. In the first instance, it is worth mentioning that 82 per cent of the sample never or almost never justify evasion. In most survey studies studying tax behaviour, this subsample is mistakenly considered as compliant. However, also non-filers, who are non-compliant in practice and may want to excuse their behaviour by declaring a high tax attitude (Andreoni et al. 1998), seem to never justify evasion: 77 per cent of them think so, vs 86 per cent of active taxpayers.

Table 2 studies the impact on the high tax morale dummy, the indicator used as a proxy for self-reported compliance (see Section 4.3), of the same factors explored in Table 1.[37] Column 1 reports LPM coefficients without controls, while column 2 adds taxpayer-level and business-level background characteristics. Interestingly, some of the explanatory factors from Table 1 remain statistically significant: compliance costs and peer pressure strongly influence the probability of having a higher tax morale. Those who believe that it is difficult to file are 7 percentage points less likely to have a high tax morale (col. 2), hinting at the fact that a complex tax system often frustrates taxpayers, discouraging them from complying.[38] In addition, difficulty in getting in touch with SRA contributes to hampering compliance. While communication issues only weakly correlate with actual filing (Table 1), probably due to other major constraints with compliance, they strongly covary with the (un-)willingness to contribute and add up to the negative relation expressed by the difficulty to file. At the same time, peer pressure is strongly negatively correlated with self-reported compliance: those who feel the pressure of their peers are 35 percentage points (or 43%) less likely to be compliant. It results that, while peer pressure is pushing taxpayers to file their return (see Table 1), it produces a totally opposite impact on intrinsic motivation. The reason could be that tax morale and peer pressure are substitutes, and, while they both explain actual compliance, they offset each other when it comes to self-reports.

Consistently, variables on trust still remain not significant, with the exception of the lack of trust – which appears to have a weak negative relation. Relatedly, the absence of reciprocity mechanism positively affects tax morale by 6 percentage points (col. 2), in much the same vein as the results for actual compliance (Table 1). This evidence suggests that the fiscal exchange theory does not find confirmation in the Eswatini context. Maybe due to cultural or historical reasons, the reciprocal link between contributions and public services does not seem to hold in this setting.

As a last consideration, the deterrence indicator shows no association with tax morale, in line with the evidence on the crowding out effect of pecuniary incentives, such as penalties and fines, on intrinsic motivations (Frey and Feld 2002).

Results remain consistent when considering as *self-reportedly compliant* only the 69 per cent of the sample who have a very strong willingness to comply.[39] Likewise, results do not change if we remove the share (77%) of non-filers who self-report positive attitudes towards compliance, since this mismatching could probably bias the direction of impacts.[40] If

[37] Given that there is no trend over time for tax morale, no perpetual category exists.

[38] Similar results have been produced in developed economies, mostly in lab settings (Roberts et al. 1994; Knut Eriksen 1996).

[39] Tables omitted for brevity. In the words of Onu and Oats (2016: 12): 'If a taxpayer feels very strongly that being fully compliant is the right thing to do, then it is likely that her attitudes will predict behaviour more than someone who feels equally favourable towards compliance, but does not have an equally strong attitude'. To corroborate this line of reasoning, we focus on taxpayers with a very strong attitude. However, despite the evidence that the strength of attitudes is valuable information to consider (Sparks et al. 1992), coefficients from the new regression remain highly consistent with those in Table 2. The only change is that the (lack of) fiscal exchange mechanism loses significance, while the perception of bribing turns to be significant at the 5% level and reduces the tax attitude by 10 percentage points. This could suggest a slight change in motivation when the strength of the self-reported attitude increases.

[40] Tables omitted for brevity - available upon request.

anything, the significant coefficients from Table 2 get even larger, while the non-significant factors remain so. This exercise confirms that considering survey-based measures as a proxy for compliance can often be misleading. In the case of Eswatini, while compliance costs and reciprocity motives impact actual and reported compliance in the same way, other key factors, such as peer pressure and perceptions on deterrence, have different, if not opposite, effects on the two outcomes.

Table 2 Determinants of self-reported compliance

	(1)	(2)
Deterrence		
Risk audit below median	0.01	0.01
	(0.02)	(0.02)
Compliance costs		
Difficult to file	-0.07***	-0.07***
	(0.02)	(0.02)
Difficult to get in touch	-0.10***	-0.08***
	(0.03)	(0.02)
Trust and political legitimacy		
Bribing above median	-0.05	-0.03
	(0.03)	(0.03)
Unfairness	0.00	0.02
	(0.02)	(0.02)
No transparency	0.00	0.02
	(0.03)	(0.03)
No trust above median	-0.07***	-0.04*
	(0.02)	(0.02)
Fiscal exchange and reciprocity		
Services	0.00	0.01
	(0.01)	(0.01)
No fiscal exchange	0.07***	0.06**
	(0.02)	(0.02)
Nothing in return	-0.04	-0.04
	(0.02)	(0.03)
Social norms		
Evaders % above median	-0.06*	-0.05
	(0.03)	(0.03)
Peer pressure	-0.41***	-0.35***
	(0.05)	(0.05)
Demographics	No	Yes
Business char.	No	Yes
Mean of Y	0.817	0.817
R-sq.	0.199	0.295
Observations	1009	1009

Standard errors in parentheses
$*$ p < 0.10, $**$ p < 0.05, $***$ p < 0.01

Source: Authors' own

5.3 Robustness checks

Dimension reduction and best subset selection. In an attempt to check for the robustness of the main results, Table 3 reports coefficients when all above factors are included in the same specifications, grouped by conceptual indexes through Principal Component Analysis (PCA). The first component is retained as it explains most of the variance in the model (see Appendix Table A10). In this model, demographics and business-related characteristics are explicitly presented, thus adding a new layer of information to what shown in Table 1. Also, the role of such background characteristics will be explored more in detail in Section 6.3. Some clear patterns emerge from Table 3, which closely mirror those in Table 1. While demographics play a role (more on this in Section 6.3), the high deterrence index is again strongly significant, together with the index representing less compliance costs. Consistently, both the strong social norm and high tax morale indexes are again significantly affecting filing behaviour. In line with Table 1, fiscal exchange and trust indexes do not show any significant relation.

Table 3 Active vs non-filers - indexes

	(1)	(2)	(3)	(4)	(5)	(6)
	All	**Perpetuals**	**All**	**Perpetuals**	**All**	**Perpetuals**
Demographics	0.03*	0.05***			0.02	0.05**
	(0.02)	(0.02)			(0.02)	(0.02)
Business char.	0.04***	0.04***			0.02*	0.02
	(0.01)	(0.02)			(0.01)	(0.02)
Profitable business	-0.02	-0.01			-0.03*	-0.02
	(0.02)	(0.02)			(0.02)	(0.02)
High deterrence			0.12***	0.10***	0.12***	0.10***
			(0.02)	(0.02)	(0.02)	(0.02)
Less compliance costs			0.07***	0.09***	0.06***	0.09***
			(0.02)	(0.02)	(0.02)	(0.02)
Fiscal exchange			0.02	0.04*	0.02	0.04**
			(0.02)	(0.02)	(0.02)	(0.02)
Less trust			0.01	-0.02	0.01	-0.02
			(0.01)	(0.02)	(0.01)	(0.02)
Strong social norm			0.04**	0.04**	0.03*	0.04*
			(0.02)	(0.02)	(0.02)	(0.02)
High tax morale			0.15***	0.08	0.15***	0.09*
			(0.04)	(0.05)	(0.04)	(0.05)
Mean of Y	0.513	0.644	0.513	0.644	0.513	0.644
R-sq.	0.016	0.025	0.091	0.097	0.098	0.111
Observations	1009	613	1009	613	1009	613

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Authors' own

As an additional robustness exercise, we recur to statistical learning methods for selecting the best subset of predictors (Friedman et al. 2001). The methods are discussed in Appendix Section C.1. Results remain highly consistent with those from Table 1.

Alternatives to LPM. As an additional robustness check, we re-run the main specification using alternative econometric models. Appendix Table A12 reports the coefficients from a probit regression. The specifications in each column have the same structure as those in Table 1. For the sake of better interpretation, we report marginal effects evaluated at the

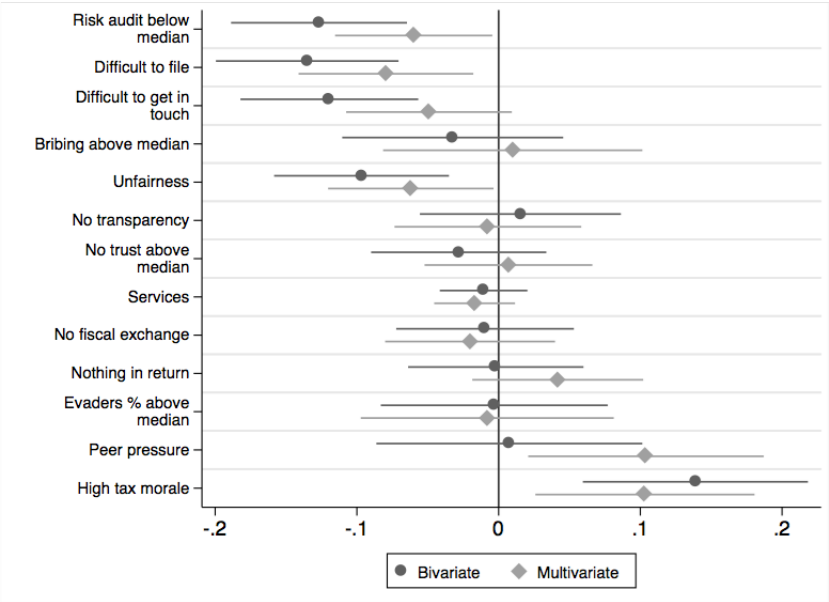
mean of the regressors. In this fashion, coefficients can be seen as percentage change in the outcome variable. As shown in the table, results remain consistent both in the level of significance and magnitude. Again, factors such as perceived risk, difficulty in filing, peer pressure and tax morale are significantly covarying with the probability to comply. Remaining factors such as trust and reciprocity, on the other hand, show no significant impact.

The same specifications have been run using a logit model. Results remain consistent and the table is omitted for brevity.

Controlling for enumerators' ability and the context of the interview. The data collection has been carried out by a team of ten enumerators. Despite being adequately trained, the survey team may differ in intrinsic motivations and skills. Heterogeneity in enumerators' performance can have an impact on the estimates discussed above, biasing them upwards or downwards. For this reason, we re-run the specifications from Table 1 including enumerators' fixed effects, thus controlling for such heterogeneity. Results are shown in Appendix Table A13. When enumerators' effects are kept constant, coefficients are largely consistent, both in terms of significance and magnitude. This finding confirms that differences in enumerators' ability are not likely to be driving the results. A similar check has been run by controlling for the day of the week on which the survey took place. This exercise is run in order to address the fact that, as shown in Kahneman et al. (2004), the context of the interview itself can cause a bias. Results do not change, and the corresponding table is available upon demand.

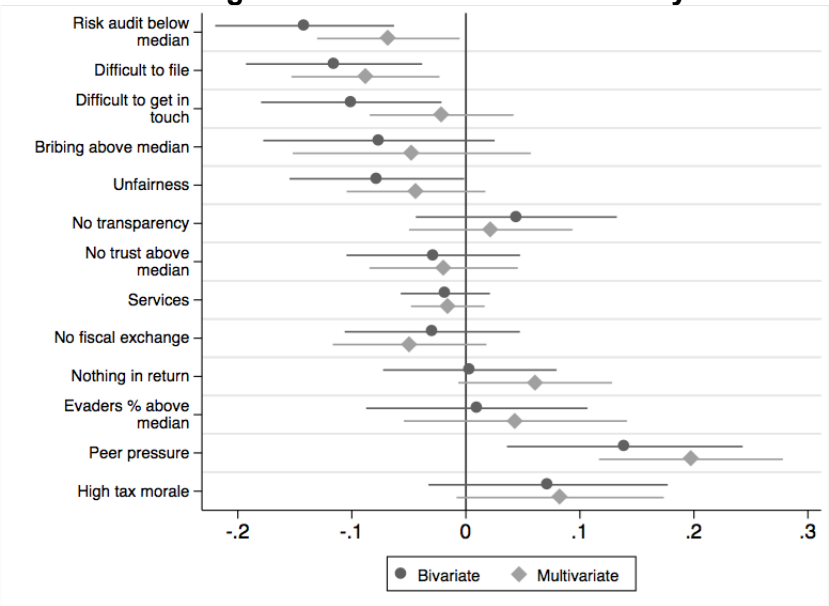
Bivariate vs multivariate analysis. As mentioned in Section 4.3, the key explanatory factors are included both separately and jointly to partially address concerns of bad controls (Angrist and Pischke 2009). While the main results in Table 1 refer to a multivariate regression analysis, it is useful to consider also the stand-alone correlation of factors taken separately. Figures 1 and 2 compare the coefficients of regressors in bivariate and multivariate specifications, for both last year's filings and perpetuals, respectively. It is reassuring to see that coefficients from multivariate analysis do not differ much from those in bivariate regressions. If anything, the multivariate coefficients are slightly reduced in size with respect to their standalone counterparts. The only factor which exhibits a significant jump in magnitude is peer pressure. A future avenue of research could focus on why the relevance of social norm is enhanced when considered together with alternative behavioural factors.

Figure 1 Last year's filing - bivariate vs multivariate analysis



Source: Authors' own

Figure 2 Persistent active filing - bivariate vs multivariate analysis



Source: Authors' own

6 Mechanisms

6.1 More on deterrence and risk preferences

One of the main findings from Table 1 refers to the role played by deterrence. In the attempt to explore this result further, we consider here two sets of additional variables. We first focus on the level of taxpayers' interactions with the revenue authority, and, second, look at risk preferences. In Appendix Table A14, we regress the active filing dummy over a set of variables indicating the extent and intensity of taxpayers' interactions with the SRA. Results are not always consistent across specifications, but some considerations can be derived. First, the fact of filing a return increases the likelihood of doing it again, in line with the recent evidence on paying taxes as a habit (Dunning et al. 2017; Mascagni et al. 2019).[41] Also, deterrence factors such as the fact of being audited and the number of audits positively explain active filing, even if only for last year's returns. Given the low number of auditors in the authority (see Section 3), this could suggest that more resources could be channelled to audits. The experience of being fined has a positive impact, while it seems that the frequency of pecuniary sanctions eventually backfires. Lastly, it seems that taxpayers are not benefitting much from interacting with the authority. Interestingly, those taxpayers that receive information on tax matters from SRA officials are less likely to file.[42] This adds up to the negative impact on filing of the difficulty of getting in touch with the authority, as displayed in Table 1, and calls for improvements in the way the SRA communicates with its clients.

When it comes to risk preferences, Appendix Table A15 shows that neither the experimental risk measure or the self-reported risk attitude seem to play any role in motivating compliance. It is true that, descriptively, CRRA risk-averse taxpayers are more likely to perceive a higher probability of audit, 65 per cent, than risk-loving taxpayers, 58 per cent. However, the model

[41] This finding is confirmed further by looking at filing behaviour for tax year 2019, after the survey. 90% of taxpayers filing in 2018 filed again in 2019, while just 20% of non-filers did the same. When considering perpetual taxpayers, this difference is exacerbated even more, with 91% of persistent active and 12% of persistent non-filers filing in 2019.

[42] About 28% of the sample report getting tax-related information either formally or informally from SRA officials.

in Table A15 rejects any significant impact. Results are similar when we substitute the CRRA with a dummy for risk aversion.

6.2 The role of tax knowledge

One of the main findings of this study is that compliance costs matter. Ease of filing a return is a key predictor of the probability of actually doing so. It is interesting to dig deeper to understand the role of such costs and consider one important component of them, such as tax knowledge. Tax knowledge is included in the (highly significant) compliance costs principal component used in Table 3, and it is therefore important to consider its stand-alone impact. Higher tax knowledge seems also to be correlated with better perceptions on the ease of filing, as depicted in Figure 10: taxpayers who believe it is somewhat or very easy to file report a 20 per cent higher knowledge score than those who think it is somewhat or very difficult, with the difference being significant at the 1 per cent level. As explained in Section 4.1, the survey data contains answers to a quiz on tax, from which a tax knowledge index is formed. In Table 4, we study the impact on filing of either the raw knowledge score, ranging from 0 to 5 (col. 1-4) or the standardised score (Kling et al. 2007), expressed in terms of standard deviations (col. 5-8).

Table 4 Active vs non-filers - tax knowledge

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All	**Perpetuals**	**All**	**Perpetuals**	**All**	**Perpetuals**	**All**	**Perpetuals**
Knowledge score 0-5	0.13***	0.15***	0.07***	0.06***				
	(0.02)	(0.02)	(0.02)	(0.02)				
Standardised score					0.19***	0.22***	0.09***	0.07**
					(0.03)	(0.04)	(0.03)	(0.04)
Demographics	No	No	Yes	Yes	No	No	Yes	Yes
Business char.	No	No	Yes	Yes	No	No	Yes	Yes
Mean of Y	0.513	0.644	0.513	0.644	0.513	0.644	0.513	0.644
R-sq.	0.059	0.090	0.313	0.456	0.042	0.061	0.309	0.452
Observations	1009	613	1009	613	1009	613	1009	613

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Authors' own

Most notably, Table 4 shows that the indicator of tax knowledge is always statistically significant in explaining compliance, from the least to the most complete specification (col. 1-4). One extra question answered correctly in the tax quiz is associated with an increase in the probability of filing last year's tax return of 7 percentage points (or 14%) when all controls are added (col. 3). The same figure is of 6 percentage points (or 9%) for perpetuals (col. 4). Consistently, a standard deviation increase in the Kling index implies an increase in filing of a similar magnitude (col. 7-8).

As an additional investigation, we also run the main specification using as regressors each of the five tax knowledge questions composing the score. This can help shed light on the awareness of which aspect of the system is more critical in order to comply. Results are displayed in Appendix Table A16, both without (Panel A) and with controls (Panel B). Results are quite informative, as answering correctly to some specific questions strongly predicts filing behaviour, while it does not for others. Namely, question 1 (inactive should file anyway), 4 (filing deadline) and 5 (tax type the taxpayer is registered for) are always statistically significant. On the other hand, questions on the size of the penalty for missing a declaration (Q2) and income understatement (Q3) are never significant. This evidence is illuminating in the sense that it seems that non-filers are not aware of very basic tax-related rules, such as

the requirement to always file or even their own tax type, while possibly more complex concepts such as the penalty amounts do not discriminate between them and active. The fact that knowledge of the penalty structure does not affect compliance is due to the extremely low level of knowledge of the main penalty amounts across all taxpayers. Only 2.6 per cent and 1.5 per cent of the sample are aware of the penalty amounts for failing to file and false declarations, respectively. Evidence of under- or over-estimation of penalty amounts is almost inexistent, since the vast majority just answer that they do not know (88% and 94%), rather than providing an estimate. This means that deterrence is shaping compliance more through the perceived audit probability (as in Table 1) than through the penalty structure. In turn, audit probability is probably overestimated given the limited resources available to the authority (Section 3).

Lastly, a note of concern of the possibility of reverse causality being at play here. For example, if intrinsic motivation in paying taxes is a significant predictor of compliance – as is the case here – this might lead to acquiring more knowledge about the tax system. However, the data contradicts this hypothesis. The 83 per cent of the sample with a high intrinsic motivation show, if anything, a lower tax knowledge score (1.54) than those with a low motivation (1.62). Another concern could come from the fact of being in the system for a longer period, which could in turn affect tax knowledge. Also, this concern is not reflected in the data. First, the coefficients of tax knowledge in Table 4 are not consistently higher when restricting the analysis to perpetuals. If anything, magnitudes get smaller when controls are added. Second, the 15 per cent of the sample who had a previous business before the current one report slightly lower scores (1.53) than those who are on their first experience (1.56). Third, even if it is true that years since registration and tax knowledge have a positive correlation, the magnitude of it is quite small, 0.11, and in any case a variable indicating years since registration is included as a control in our model.

6.3 The relevance of background characteristics

As a last set of supplementary results, we study the importance of two sets of background characteristics: (i) demographic and individual tax practice related covariates, and (ii) business-level covariates. Based on the R^2 of the regression tables above, demographics and business characteristics appear to explain a lot of the variability in the model, even more than the variables of interest. For this reason, it is important to understand how they correlate with active filing, as this would be valuable information for risk management and audit strategies.

Table A17 reports the coefficients of taxpayer-level features in columns 1-2, business-level features in columns 3-4, and both groups together in columns 5-6.[43] Among the first set of variables, demographics in columns 1-2 seem to play a key role in affecting compliance. As expected, age is positively related to filing behaviour, as well as having higher education, even if they lose significance in the more complete models of columns 5-6. Also, being married seems to positively affect filing behaviour, but for last year's declaration only. Gender and nationality do not have any strong impact, even if the sign of the coefficient seems to suggest that females and Swazi nationals are less likely to comply, unexpectedly. Furthermore, individual tax-related practices decisively influence the outcome: the factor *has tax accountant* remains highly significant across all different specifications. It results that having a tax accountant increases the probability of being active by 16 percentage points when considering last year's filing (col. 5), and 21 percentage points when considering persistent behaviour (col. 6). These coefficients are sizeable, and among the largest found across all sets of results: having a tax accountant translates into being 31 per cent more likely to file in a given year, and 33 per cent more likely to be persistently active. This finding

[43] In order to avoid multicollinearity some variables, such as using email, bookkeeping and suffering from competition with informal businesses, have been removed since they are highly correlated with the variables used in this exercise.

is in line with the strong impact of the perception on the difficulty to file from Table 1, as well as with the corresponding principal component index from Table 3. Unsurprisingly, the time spent on tax matters is positively correlated with actively filing, even if weakly so. The same is true for having a bank account for the business.
Furthermore, when considering business-level characteristics, being operative has a sizeable impact on filing of about 31-32 percentage points (col. 5-6), or 61 per cent for last year's filing and 50 per cent for persistent filing. The coefficient of being operative is the largest in magnitude among all those observed in this study, and points to the fact that taxpayers file their taxes only when operative, contrarily to what the law prescribes. From the role of the corresponding tax knowledge question in Table A16, it can be assumed that inoperative businesses do not file partly because they are not aware that it is required by the law. Again, high compliance costs seem to matter in the filing decision.

7 Conclusions and policy recommendations

In this paper we have explored the factors that correlate with taxpayers' compliance in Eswatini, building on rich attitude and perception data from a national representative sample of 1,000 sole traders. The data collection represents the first wave of such work ever carried out in the country. Since self-reported compliance is likely to be inaccurate, we link the survey data to tax returns data from the Eswatini Revenue Authority, which enables us to identify compliant (active) and non-compliant (non-filing) taxpayers. To the best of our knowledge, tax data from Eswatini has never been explored in the literature. Also, we compare the relevance of theoretically founded motivations to actually file a return with those explaining self-reported compliance and the intensive margin of compliance. As a robustness check, we employ dimension reduction and best subset selection methods and a discrete probit model, as well as control for enumerators' ability.

The results provide a complex and nuanced picture of tax compliance in Eswatini that can be summarised in the following points. First, standard deterrence motives are at work, with higher perceptions of audit probability being strongly associated with active filing. Interestingly, a stronger sense of state legitimacy and fear of getting caught is more prevalent in active vis-à-vis non-filers when it comes to the reasons for which they registered with the authority in the first place (Figure 7). Second, other non-standard determinants are also crucial in shaping taxpayers' compliance. In particular, compliance costs, social norms and intrinsic tax morale positively covary with filing behaviour. Third, some important non-pecuniary factors, such as trust in the authority, political legitimacy of the State and fiscal exchange, which have proved to be essential in similar studies, do not seem to be important in Eswatini. Fourth, self-reported tax compliance is driven by partly different factors than actual tax compliance. While this is true for Eswatini, this finding may also suggest that, more in general, researchers should be cautious in using self-reports as a proxy for actual compliance.

The limitations of this study need to be acknowledged. First, we cannot be completely confident that we are capturing causal relationships. Despite the extensive use of fine controls, the robustness to alternative estimation methods, and the restriction on persistent filing behaviour to address unobserved variability over time, we cannot rule out the possibility that other unobservables may be linked to both the explanatory factors and the outcome variable. Second, mostly due to time constraints in implementing the survey, some additional background information is missing, such as the extent to which taxpayers in our sample also pay local fees or informal contributions to non-state actors, information on political engagement and pro-social behaviour in the community, or a more refined measure of risk preferences. Related to the latter point, the fact that the coefficient of risk aversion as derived

from the lottery is not significantly explaining compliance may be linked, for example, to the absence of real-stake lottery decisions. Third, mostly due to budget constraints, the main focus of this study is on the extensive margin of compliance only – the probability of filing a return, while we cannot explore the drivers of the intensive margin of compliance – income underreporting. Extensive and intensive compliance are likely to be explained by a different set of motivations, and we leave this to future research. At least descriptively, we are able to link the survey data with tax returns for the tax year 2019, lodged after the survey. We then compare the self-reported business income as extracted with the questionnaire (see Figure 6) with what is actually declared in the tax return. Surprisingly, (i) the vast majority of taxpayers in the sample, 79 per cent, report a lower income than what was declared in the survey; (ii) a minority of 7 per cent and 14 per cent declare the same or a higher income, respectively; (iii) non-filers are more likely (85%) to under-declare than active (74%) but both figures remain high; (iv) the gap is increased when comparing persistent non-filers (88%) with persistent active (73%); (v) the average underreporting is higher for active (USD31,000) than non-filers (USD9,500). This initial evidence calls for further research on such discrepancies: while evasion can surely be part of the story, additional explanations, such as poor record-keeping and computational constraints, might affect these results. On a different note, our study focusses on registered taxpayers only, and we do not study informal traders. Determinants motivating the compliance of registered taxpayers may be different than, for example, those pushing informal traders to register. At the same time, it could be argued that non-filers in our sample resemble informal traders in the fact that the majority of them (56%) report being in operation despite not sharing any information with the authority. Future research could be devoted to study how registered and non-registered entities differ.

Despite the weaknesses, this study points to some important policy recommendations. First, it shows the revenue authority that enforcement is important. The SRA should continue stressing its role as a monitoring agency. A wiser use of the limited resources would imply that increased auditing efforts can be directed towards non-filers, who can be automatically detected on the database and contacted by tax officials. The system could automatically trigger follow-up messages or reminders to non-filers, signalling that the authority is aware of their failure to file, and has the technical resources to track their behaviour.

Second, the authority should focus more on improving taxpayers' awareness and knowledge. Educational initiatives could be tailored to non-filers more specifically, given that they lack knowledge of very basic concepts. The survey data shows lack of knowledge is an important obstacle to filing for 89 per cent of non-filers, while the same figure for active payers is 72 per cent. Consistently, knowledge of the tax system (46%) and how to file a return (30%) are the most urgent aspects for which taxpayers would like to receive assistance from the authority. This can happen through a variety of options. In the sample under study, while fewer taxpayers use online tools (12%), more rely on direct relations with tax officials (29%) and the majority use more traditional methods, such as radio/TV (57%), as the main channel for getting tax-related information. While this evidence highlights the importance of radio/TV and direct interactions with taxpayers, it is important to target resources carefully towards channels that are likely to have the biggest impact – especially in the context of typically under-resourced taxpayer education departments. More experimental studies, such as randomised controlled trials, can better test the effectiveness of alternative strategies, such as one-to-one coaching vs radio programmes (Mascagni et al. 2019). This shift towards a service-based paradigm should also affect the way the SRA provides information to taxpayers, as it seems that currently getting information from the authority is not correlated with active filing. This is also linked to the fact that non-filers, when they interact with SRA officials, are less likely to discuss filing a return (25%) than active taxpayers (35%). Overall, 40 per cent of the sample find it difficult to get in touch with the authority to receive assistance. Similarly, communication with taxpayers (46%) is the most frequently mentioned area in which taxpayers believe the authority is underperforming. This calls for an improvement in the communication strategy: as shown in Table 1, non-persistent taxpayers

are negatively affected by communication issues, meaning that they may easily turn to non-filing if not promptly reached by the authority.

Third, another possible avenue of intervention would imply a major focus on the social norms of compliance. The SRA could exploit the fact that filing taxes seems to be motivated by adhesion to a social norm, and could adopt a new way of communication that stresses this aspect.

Fourth, while it seems that trust, transparency and reciprocity motives are not important, the authority should not neglect them, and possibly find better ways of emphasising these concepts in its communication strategy.

Fifth, the tax administration itself could adapt its strategies to the fact that a gap exists between self-reported intentions and actual filing behaviour. Knowing what drives willingness to comply is as important as knowing what motivates the decision to file. From the results in Table 2 it seems that, once again, assisting taxpayers with effective educational and communication strategies might increase their intrinsic motivation to comply.

In conclusion, this paper will hopefully encourage more researchers to engage in primary data collection in relation to tax and development. Eswatini is a small country and it is an open question whether these lessons can be applied to other contexts. Cross-country comparisons will surely be beneficial in gaining a better understanding of what drives compliance in Africa. At the same time, this paper makes the point for a stronger reliance on tax administrative data, which revenue authorities in SSA produce every day. An important future direction for research is to exploit the combined potential of survey and administrative data, to gain direct knowledge of the practical life of taxation in low- and middle-income countries, and eventually inform more realistic and successful tax policies.

Appendices

A Research background

Table A1 Theoretical background

Explanatory category	Hypotheses tested
Deterrence	1. Taxpayers who perceive a higher probability of getting caught, are more likely to file 2. Taxpayers who have been audited or fined, are more likely to file 3. Taxpayers who have had more interactions with the authority, are more likely to file
Compliance costs	1. Taxpayers with more tax knowledge, are more likely to file 2. Taxpayers who perceive it as easier to file, are more likely to file 3. Taxpayers with a tax accountant/bookkeeping/more time on tax, are more likely to file
Risk aversion	1. Taxpayers who self-report to be more risk averse, are more likely to file 2. Taxpayers with a higher CRRA measure, are more likely to file
Fiscal exchange	1. Taxpayers who are more satisfied of the quality of public services, are more likely to file 2. Taxpayers who think they are getting something in return, are more likely to file 3. Taxpayers who think taxes can be raised to fund better healthcare, are more likely to file
Trust and political legitimacy	1. Taxpayers who think bribing is less common, are more likely to file 2. Taxpayers who think the tax system is fair, are more likely to file 3. Taxpayers who think the tax system is transparent, are more likely to file
Social norms	1. Taxpayers who would not imitate their peers' evasion decision, are more likely to file
Intrinsic motivation	1. Taxpayers who believe that evading is always wrong, are more likely to file
Demographics	1. Female taxpayers are more likely to file 2. Older taxpayers are more likely to file 3. More educated taxpayers can be more or less likely to file 4. Swazi-national taxpayers can be more or less likely to file

A.1 Country overview

The Kingdom of Eswatini[44] is a landlocked country in Southern Africa, bordered by Mozambique to the north-east and South Africa to the north, west and south. Eswatini is classified as a lower-middle income country with a GDP per capita of $4,146 (World Bank 2018). Its main local trading partner is South Africa, and the country's currency, the Lilangeni (SZL), is pegged to the South African Rand. Economic growth is estimated to have slightly risen to 2.3 per cent in 2018 from 2 per cent in 2017 (World Bank 2018). However, the country faces major development challenges. Based on the international poverty line of $1.90 a day, and the lower-middle income poverty line of $3.20 a day, it is estimated that 38 per cent of the Swazi population live in extreme poverty, and a total of 60.4 per cent are poor

[44] Formerly known as Swaziland. The name change took place in April 2018. While in most places the paper reflects this change, several documents and reports issued prior to this change still make reference to Swaziland. The revenue authority is called Eswatini Revenue Authority, but its acronym is still SRA.

overall. This is accompanied by an unemployment rate of 23 per cent in 2018. Health issues are difficult to address, with HIV/AIDS and tuberculosis widespread in the country. As of 2018, Eswatini has the twelfth lowest life expectancy in the world, at 58 years. The population growth rate is 1.2 per cent, with a total population of 1.2 million in 2018 (World Bank 2018).

Table A2 Governance and country indicators

	Eswatini	Southern Africa	Year
Tax-to-GDP ratio[a]	12.1%	22.3%	2015
Tax revenue per capita (USD)[a]	444	949	2015
Informality (% national income)[b]	40.7	32.3	1999-2007
CPI[c]	39	47	2017
Governance indicators[d]			
Control of corruption	-0.44	0.18	2016
Rule of law	-0.32	0.10	2016
Regulatory quality	-0.58	-0.07	2016
Government effectiveness	-0.56	-0.08	2016
Political stability	-0.49	0.19	2016
Voice and accountability	-1.42	0.06	2016
Index of economic freedom[e]	55.9	60.2	2018
Tax burden	74.8	64.9	2018
Government integrity	27	41.4	2018
Judicial effectiveness	35.3	52.6	2018
Business freedom	61.1	63.2	2018
Doing business indicator[f]	59.5	62.3	2018
Starting a business	77.2	79	2018
Registering property	60.8	57	2018
Paying taxes	77.1	76.2	2018
Bank account ownership[h]	29%	42%	2017

Southern Africa: Botswana, Lesotho, Namibia, South Africa and Eswatini.
a African Tax Administration Forum (2017).
b Schneider et al. (2013).
c Transparency International Corruption Perceptions Index. Range: 0-100.
d World Bank (2018). Range: -2.5 (weak) to 2.5 (strong).
e The Heritage Foundation. Range: 0-100.
f World Bank (2018). Range: 0-100.
h World Bank (2017). Adults (+15 yo) in labour force. Burundi excluded.

Table A3 Taxpayers' perception survey

No.	Module	# Questions
1	Pre-interview identifying information	5
2	Consent form	4
3	Respondent's demographics	4
4	Business' characteristics	23
5	Risk preferences	9
6	Tax attitudes and perceptions	28
7	Satisfaction with public services	6
8	Interactions with revenue authority	12
9	Post-interview quality assessment	4

Modules 1 and 9 were filled by the enumerator, without involving the respondent.

A.2 Risk preferences

In the Multiple Price List experiment, each respondent is presented with a choice between two lotteries, A or B. Appendix Table A4 shows the payoffs structure implied in the experiment. Notably, the last four columns of the table were not shown to the respondent. At the beginning of the experiment, the two lotteries have a relatively large difference in expected values, such as SZL3,000 in lottery 1. As one proceeds down the matrix, the expected value of lottery A stays the same, while that of B increases, so that the difference in payoff is now in favour of B. The logic behind the test is that only risk-loving subjects would take lottery B in the first and second row, and only risk-averse subjects would take lottery A in the last three rows. A risk-neutral respondent should switch from choosing A to B when the difference between the two payoffs is about zero, so they would choose A for the first two/three rows and B thereafter. In line with the relevant literature, risk attitude is operationalised with the coefficient of relative risk aversion (CRRA), which is calculated for each lottery choice, as shown in Table A4.[45]

Table A4 Lottery choices and risk aversion classification

Lottery A			Lottery B					Risk profile	
Prob.	Payoff	Prob.	Payoff	Prob.	Payoff	Diff.	CRRA interval	CRRA est.	Risk category
1	11000	0.5	16000	0.5	0	3000	$r < -0.85$	-1.23	very risk loving
1	9500	0.5	16000	0.5	0	1500	$-0.85 < r < -0.33$	-0.59	risk loving
1	8000	0.5	16000	0.5	0	0	$-0.33 < r < 0$	-0.16	slightly loving to neutral
1	6500	0.5	16000	0.5	0	-1500	$0 < r < 0.23$	0.16	neutral to slightly averse
1	5000	0.5	16000	0.5	0	-3000	$0.23 < r < 0.40$	0.31	risk averse
1	3500	0.5	16000	0.5	0	-4500	$0.40 < r < 0.54$	0.47	very risk averse
1	2000	0.5	16000	0.5	0	-6000	$0.54 < r < 0.67$	0.60	highly risk averse

All currency units are Swazi Lilangeni (SZL). At the time of the experiment USD1 = SZL15.02. The last three columns in this table, showing the difference in expected values of the lotteries and the implied CRRA intervals, were not shown to subjects. Based on expected utility theory and assuming constant relative risk aversion, the CRRA parameter r refers to a utility function $U(x) = x^{1-r}(1-r)^{-1}$. The CRRA intervals refer to the choice of switching to lottery B. In case the subject never switches to lottery B, their CRRA interval is 0.67 to infinity. CRRA estimates are approximated as midpoints of the closed CRRA intervals.

[45] The CRRA utility is defined as $U(y) = (y^{1-r})(1-r)$, where r is the CRRA coefficient. With this parameterisation, $r = 0$ denotes risk-neutral behaviour, $r > 0$ denotes risk aversion, and $r < 0$ denotes risk loving. When $r = 1$, $U(m) = ln(m)$. More details in Harrison et al. (2005).

B Results

Table A5 Mean differences by consent to the survey

	Refuse		Consent		
	Mean	Obs.	Mean	Obs.	Difference
Perpetual active	0.74	984	0.76	518	-0.02
Perpetual non-filer	0.49	1481	0.44	491	0.04*
Hhohho	0.34	2465	0.37	1009	-0.02
Lubombo	0.14	2465	0.16	1009	-0.02
Manzini	0.41	2465	0.38	1009	0.03
Shiselweni	0.11	2465	0.09	1009	0.02
# Years filing 2014-2018	4.39	2465	4.30	1009	0.09**
VAT registered	0.01	2465	0.02	1009	-0.01
Log Tax declared	5.00	984	3.63	518	1.36***
N	3,474				

Table A6 Summary statistics - background variables

	N	Mean	SD	Min	Max
Taxpayer-level					
Female	1009	0.40	0.49	0.00	1.00
Age group max=7	1009	4.27	1.24	0.00	7.00
Higher education	1009	0.35	0.48	0.00	1.00
Swazi national	1006	0.95	0.21	0.00	1.00
Married	576	0.63	0.48	0.00	1.00
Has tax accountant	1009	0.57	0.49	0.00	1.00
Days spent on tax	1009	4.72	6.27	0.00	31.00
Time on tax > median	815	0.39	0.49	0.00	1.00
Bookkeeping	1009	0.65	0.48	0.00	1.00
Email for business	1009	0.20	0.40	0.00	1.00
Bank account	1009	0.58	0.49	0.00	1.00
Business-level					
Operative	1009	0.74	0.44	0.00	1.00
Years since registration	1009	6.33	3.31	0.00	12.00
Had a previous business	1009	0.15	0.35	0.00	1.00
Log(USD turnover)	1009	1.77	1.36	0.00	5.12
Hhohho	1009	0.37	0.48	0.00	1.00
Lubombo	1009	0.16	0.37	0.00	1.00
Manzini	1009	0.38	0.49	0.00	1.00
Shiselweni	1009	0.09	0.29	0.00	1.00
Wholsale/retail trade	1009	0.56	0.50	0.00	1.00
Compete with informals	871	0.80	0.40	0.00	1.00
High competition	1009	0.74	0.44	0.00	1.00
Less business	958	0.52	0.50	0.00	1.00

Table A7 Summary statistics - risk preferences

	N	Mean	SD	Min	Max
Self-reported riskiness	1009	5.12	2.66	1.00	10.00
CRRA	903	0.17	0.84	-1.23	0.98
Risk averse	990	0.70	0.46	0.00	1.00
Switch-point to risky lottery	903	4.02	2.78	0.00	7.00
% A for choice 1	920	0.79	0.41	0.00	1.00
% A for choice 2	915	0.74	0.44	0.00	1.00
% A for choice 3	913	0.67	0.47	0.00	1.00
% A for choice 4	907	0.57	0.50	0.00	1.00
% A for choice 5	904	0.47	0.50	0.00	1.00
% A for choice 6	899	0.42	0.49	0.00	1.00
% A for choice 7	900	0.39	0.49	0.00	1.00
Indifference	1009	0.09	0.28	0.00	1.00
Inconsistency	1009	0.02	0.14	0.00	1.00

Table A8 Summary statistics - interactions with SRA

	N	Mean	SD	Min	Max
# Years filing 2014-2018	1009	4.30	1.22	1.00	5.00
Distance to SRA (km)	1009	40.41	34.27	0.43	129.45
Ever audited	957	0.15	0.36	0.00	1.00
# audits	78	1.50	0.66	1.00	3.00
Ever fined	960	0.25	0.43	0.00	1.00
# fines	171	1.70	2.05	1.00	16.00
Interacted with SRA	968	0.40	0.49	0.00	1.00
# interactions	326	2.28	2.94	1.00	30.00
N	1009				

C Robustness checks

Table A9 Summary statistics - key factors

	N	Mean	SD	Min	Max
Deterrence					
Risk audit below median	988	0.43	0.50	0.00	1.00
Audit % general	988	83.05	25.03	0.00	100.00
Own audit %	988	61.94	33.58	0.00	100.00
# fined businesses	986	1.43	2.83	0.00	20.00
Compliance costs					
Knowledge score max=5	1009	1.56	0.95	0.00	5.00
Standardised score	1009	-0.00	0.54	-0.75	3.52
Difficult to file	1009	0.65	0.47	0.00	1.00
Difficult to get in touch	1009	0.40	0.49	0.00	1.00
Trust and political legitimacy					
Bribing	649	0.55	0.49	0.00	1.00
% bribe over sales	413	13.43	19.85	0.00	100.00
Unfairness	1009	0.47	0.50	0.00	1.00
No transparency	1009	0.74	0.44	0.00	1.00
Poor SRA performance	933	2.51	1.18	1.00	5.00
No trust max=4	961	2.51	1.07	1.00	4.00
Fiscal exchange and reciprocity					
Primary schools	1009	3.07	1.34	1.00	5.00
Tertiary education	1009	2.57	1.28	1.00	5.00
Roads/bridges	1009	2.35	1.33	1.00	5.00
Electricity	1009	2.54	1.39	1.00	5.00
Healthcare	1009	2.77	1.34	1.00	5.00
Security/police	1009	2.79	1.34	1.00	5.00
No fiscal exchange	1009	0.58	0.49	0.00	1.00
Nothing in return	1009	0.48	0.50	0.00	1.00
Social norms					
% neighbours evading	401	39.73	31.98	0.00	100.00
Peer pressure	1009	0.12	0.33	0.00	1.00
Intrinsic motivation					
High tax morale	1009	0.82	0.39	0.00	1.00

Table A10 PCA indexes - first components

Demo	Business fixed	Doing business	Deterrence	Compliance costs	FE	Trust	Social norms	Morale
			Variables and coefficients					
Siswati 0.56	Business age -0.13	Operative 0.58	Audit Y/N 0.43	Knowledge 0.48	No FE 0.57	Bribing Y/N 0.31	Non-filers 0.69	High morale 1
Educ. - 0.68	Years filing -0.11	Low comp. 0.02	# audits 0.37	Easy to file 0.32	Nothing back 0.58	Bribe % 0.14	Nilfilers 0.69	
Age 0.21	Previous -0.07	Increasing 0.13	Fine Y/N 0.43	Accountant 0.29	Satisf. -0.59	No trust 0.54	Evaders % -0.08	
Female 0.42	Trade 0.13	Turnover 0.51	# fines 0.40	Time on tax 0.32		No transp. 0.26	Neighbours 0.20	
	Dist. SRA 0.57	Bank 0.61	Interact Y/N 0.38	Books 0.54		Unfairness 0.51		
	Hhohho -0.63		# interactions 0.35	Email 0.35		Poor SRA 0.51		
	Lubombo 0.36		Own audit 0.13					
	Manzini 0.19		Others' audit 0.09					
	Shiselweni 0.27		# peers 0.23					
				Eigenvalues				
1.55	1.56	1.81	2.24	3.31	2.50	2.01	1.85	-
				Variance explained				
0.26	0.26	0.36	0.28	0.28	0.31	0.34	0.23	1

C.1 Statistical learning methods

The exercise consists in running a number of different subset selection methods on a randomly selected training set (half of the sample) and validating the results on a test set (the remaining half of the sample). Models with lower test mean squared errors (MSE) are preferred (James et al. 2013). Once the best model is chosen, the most relevant predictors are retained and then applied in the original linear probability model (see Section 4.3). Appendix Table A11 shows the result of this exercise as applied to the probability of being an active filer in the last return. Column 1 reports the original model from Table 1. Column 2 shows the results from running a linear probability model on the training set. Columns 3 to 8 report the estimation from a number of statistical learning methods, in which only the relevant predictors are kept, while the others are dropped. These methods are backward stepwise selection (James et al. 2015) in col. 3 and lasso (Tibshirani 1996) in col. 4 to 8. The different lasso models differ by the way in which the optimal penalisation term (lambda) is chosen.[46] All such methods are run on the same training set and validated over the same test set. The lowest value of the test MSE is reached with the cross-validation lasso, which therefore is the preferred method to select the best subset of predictors. Using this subset, the specification in column 9 shows the impact on the probability to file. The main result of this exercise is that all the significant factors from the original model are retained: deterrence, compliance costs, unfairness, peer pressure and tax morale. Two out of three factors related to fiscal exchange are kept, but they do not exert any significance impact. Other factors related to corruption, transparency and distrust are all dropped.

We repeat the same exercise for being a perpetual active (tables omitted for brevity). In this case, the same factors as in the previous exercise are selected, with the main difference that now unfairness loses its significance, in much the same vein as what is seen in Table 1.

[46] In col. 4, lambda optimal is derived from cross-validation over the whole sample; the Akaike Information Criteria in col. 5 (Akaike 1974), the AICc (Sugiura 1978; Hurvich and Tsai 1989) in col. 6; the Bayesian Information Criteria (Schwarz 1978) in col. 7; and the EBIC (Chen and Chen 2008) in col. 8.

Table A11 Active vs non-filers - statistical learning results - last year's behaviour

	(1) Original LPM	(2) LPM	(3) Stepwise	(4) CV Lasso	(5) AIC	(6) AICC	(7) BIC	(8) EBIC	(9) New LPM
Deterrence									
Risk audit below median	-0.06**	-0.13***	-0.12***	-0.05	-0.09	-0.09	-0.07	-0.07	-0.06**
	(0.03)	(0.04)	(0.04)						(0.03)
Compliance costs									
Difficult to file	-0.08***	-0.11**	-0.09**	-0.07	-0.06	-0.06	-0.04	-0.04	-0.09***
	(0.03)	(0.05)	(0.04)						(0.03)
Difficult to get in touch	-0.05*	-0.05		-0.01					
	(0.01)	(0.02)							
Trust and political legitimacy									
Bribing above median	0.01	0.06							
	(0.05)	(0.07)							
Unfairness	-0.06**	-0.07*		-0.04	-0.03	-0.03			-0.07**
	(0.03)	(0.04)							(0.03)
No transparency	-0.01	0.02							
	(0.03)	(0.05)							
No trust above median	0.01	0.05							
	(0.03)	(0.04)							
Fiscal exchange and reciprocity									
Services	-0.02	-0.03		-0.01	-0.01	-0.01			-0.02
	(0.01)	(0.02)							(0.01)
No fiscal exchange	-0.02	0.02							
	(0.03)	(0.04)							
Nothing in return	0.06*	-0.03		0.01					0.03
	(0.03)	(0.04)							(0.03)
Social norms									
Evaders % above median	-0.01	0.01							
	(0.05)	(0.06)							
Peer pressure	0.10**	0.06		0.06					0.10**
	(0.04)	(0.06)						(0.04)	
Intrinsic motivation									
High tax morale	0.11***	0.10*	0.10**	0.07	0.06	0.06	0.03	0.03	0.11***
	(0.04)	(0.06)	(0.05)						(0.04)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Business char.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1009	505	505	1009	505	505	505	505	1009
RMSE out	-	0.44	0.43	0.41	0.43	0.43	0.43	0.43	-
RMSE in	-	0.40	0.41	0.42	0.42	0.43	0.43	0.43	-

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A12 Determinants of active filing behaviour - probit model

	(1)	(2)	(3)	(4)
	All	**Perpetuals**	**All**	**Perpetuals**
Deterrence				
Risk audit below median	-0.12***	-0.14***	-0.07*	-0.10*
	(0.03)	(0.04)	(0.04)	(0.06)
Compliance costs				
Difficult to file	-0.11***	-0.11**	-0.10**	-0.14**
	(0.04)	(0.04)	(0.04)	(0.06)
Difficult to get in touch	-0.06**	-0.03	-0.06*	-0.02
	(0.03)	(0.04)	(0.03)	(0.03)
Trust and political legitimacy				
Bribing above median	0.02	-0.03	0.02	-0.07
	(0.05)	(0.07)	(0.06)	(0.09)
Unfairness	-0.09**	-0.06	-0.09**	-0.06
	(0.04)	(0.04)	(0.04)	(0.06)
No transparency	0.02	0.04	-0.02	-0.00
	(0.04)	(0.05)	(0.05)	(0.06)
No trust above median	0.01	-0.00	0.01	-0.01
	(0.04)	(0.04)	(0.04)	(0.06)
Fiscal exchange and reciprocity				
Services	-0.03	-0.02	-0.02	-0.03
	(0.02)	(0.02)	(0.02)	(0.03)
No fiscal exchange	0.00	-0.01	-0.03	-0.09
	(0.03)	(0.04)	(0.04)	(0.06)
Nothing in return	0.01	0.00	0.06	0.09
	(0.04)	(0.04)	(0.04)	(0.06)
Social norms				
Evaders % above median	0.01	0.06	-0.02	0.10
	(0.05)	(0.06)	(0.06)	(0.08)
No peer pressure	0.11**	0.25***	0.13**	0.34***
	(0.05)	(0.07)	(0.06)	(0.08)
Intrinsic motivation				
High tax morale	0.16***	0.13**	0.15***	0.15*
	(0.05)	(0.06)	(0.05)	(0.08)
Demographics	No	No	Yes	Yes
Business char.	No	No	Yes	Yes
Mean of Y	0.513	0.644	0.513	0.644
Observations	1009	613	936	547

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A13 Active vs non-filers - tax perceptions - enumerators fixed effects

	(1)	(2)	(3)	(4)
	All	Perpetuals	All	Perpetuals
Deterrence				
Risk audit below median	-0.13***	-0.16***	-0.08***	-0.09***
	(0.03)	(0.04)	(0.03)	(0.03)
Compliance costs				
Difficult to file	-0.08**	-0.08*	-0.08***	-0.08**
	(0.04)	(0.04)	(0.03)	(0.03)
Difficult to get in touch	-0.07*	-0.05	-0.05*	-0.02
	(0.04)	(0.04)	(0.03)	(0.03)
Trust and political legitimacy				
Bribing above median	0.02	-0.02	0.00	-0.06
	(0.05)	(0.07)	(0.05)	(0.06)
Unfairness	-0.10***	-0.08*	-0.06**	-0.04
	(0.03)	(0.04)	(0.03)	(0.03)
No transparency	-0.00	0.01	0.00	0.04
	(0.04)	(0.05)	(0.04)	(0.04)
No trust above median	0.01	-0.01	0.00	-0.02
	(0.04)	(0.04)	(0.03)	(0.03)
Fiscal exchange and reciprocity				
Services	-0.03	-0.03	-0.02	-0.02
	(0.02)	(0.02)	(0.01)	(0.02)
No fiscal exchange	-0.00	-0.02	-0.04	-0.05
	(0.04)	(0.04)	(0.03)	(0.03)
Nothing in return	0.00	-0.01	0.03	0.05
	(0.03)	(0.04)	(0.03)	(0.03)
Social norms				
Evaders % above median	-0.01	0.05	-0.01	0.04
	(0.05)	(0.07)	(0.05)	(0.05)
Peer pressure	0.10*	0.23***	0.09**	0.19***
	(0.05)	(0.06)	(0.04)	(0.04)
Intrinsic motivation				
High tax morale	0.18***	0.17***	0.13***	0.09*
	(0.05)	(0.06)	(0.04)	(0.05)
Enumerator FE	Yes	Yes	Yes	Yes
Demographics	No	No	Yes	Yes
Business char.	No	No	Yes	Yes
Mean of Y	0.513	0.644	0.513	0.644
R-sq.	0.074	0.102	0.334	0.495
Observations	1009	613	1009	613

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

D Mechanisms

Table A14 Active vs non-filers - interactions with revenue authority

	(1)	(2)	(3)	(4)
	All	**Perpetuals**	**All**	**Perpetuals**
# Years filing 2014-2018	0.03**	0.08***	-0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.02)
Far from SRA	0.02	-0.02	0.07**	0.05
	(0.03)	(0.04)	(0.03)	(0.04)
Ever audited	0.18**	0.10	0.10	0.00
	(0.09)	(0.08)	(0.08)	(0.07)
# audits	0.07	0.07	0.10*	0.05
	(0.07)	(0.05)	(0.06)	(0.06)
# audited peers	0.03	0.05	0.00	0.01
	(0.03)	(0.04)	(0.03)	(0.03)
Ever fined	0.03	0.07	0.01	0.06
	(0.09)	(0.09)	(0.08)	(0.07)
# fines	-0.03*	-0.02	-0.03	-0.02
	(0.02)	(0.02)	(0.02)	(0.01)
Interacted with SRA	0.03	0.01	-0.02	-0.02
	(0.08)	(0.09)	(0.07)	(0.07)
# interactions	0.01	0.01	0.01	0.00
	(0.01)	(0.01)	(0.01)	(0.01)
Info from SRA staff	-0.05	-0.07*	-0.03	-0.03
	(0.03)	(0.04)	(0.03)	(0.04)
Demographics	No	No	Yes	Yes
Business char.	No	No	Yes	Yes
Mean of Y	0.513	0.644	0.513	0.644
R-sq.	0.102	0.157	0.331	0.467
Observations	1009	613	1009	613

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A15 Active vs non-filers - risk attitudes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All	**All**	**Perpetuals**	**Perpetuals**	**All**	**All**	**Perpetuals**	**Perpetuals**
CRRA Lottery	-0.02		-0.04		0.01		0.01	
	(0.02)		(0.02)		(0.02)		(0.02)	
Risk reported > median		-0.03		-0.02		-0.03		-0.04
		(0.03)		(0.04)		(0.03)		(0.03)
Demographics	No	No	No	No	Yes	Yes	Yes	Yes
Business char.	No	No	No	No	Yes	Yes	Yes	Yes
Mean of Y	0.513	0.513	0.644	0.644	0.513	0.513	0.644	0.644
R-sq.	0.002	0.001	0.006	0.000	0.300	0.301	0.447	0.448
Observations	1009	1009	613	613	1009	1009	613	613

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A16 Active vs non-filers - single tax knowledge questions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Q1 all	**Q1 perp**	**Q2 all**	**Q2 perp**	**Q3 all**	**Q3 perp**	**Q4 all**	**Q4 perp**	**Q5 all**	**Q5 perp**
Panel A: without controls										
Single question	0.22***	0.24***	0.07	0.02	0.16	0.14	0.20***	0.24***	0.16***	0.21***
	(0.04)	(0.05)	(0.10)	(0.12)	(0.12)	(0.14)	(0.04)	(0.04)	(0.03)	(0.04)
R-sq.	0.032	0.037	0.000	0.000	0.001	0.001	0.028	0.047	0.024	0.046
Panel B: with controls										
Single question	0.12***	0.09**	0.01	-0.02	0.07	0.06	0.08**	0.06*	0.08*	0.09***
	(0.03)	(0.04)	(0.09)	(0.12)	(0.12)	(0.12)	(0.03)	(0.04)	(0.03)	(0.03)
Mean of Y	0.513	0.644	0.513	0.644	0.513	0.644	0.513	0.644	0.513	0.644
R-sq.	0.309	0.451	0.300	0.447	0.300	0.447	0.304	0.449	0.305	0.453
Observations	1009	613	1009	613	1009	613	1009	613	1009	613

Standard errors in parenthesis
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

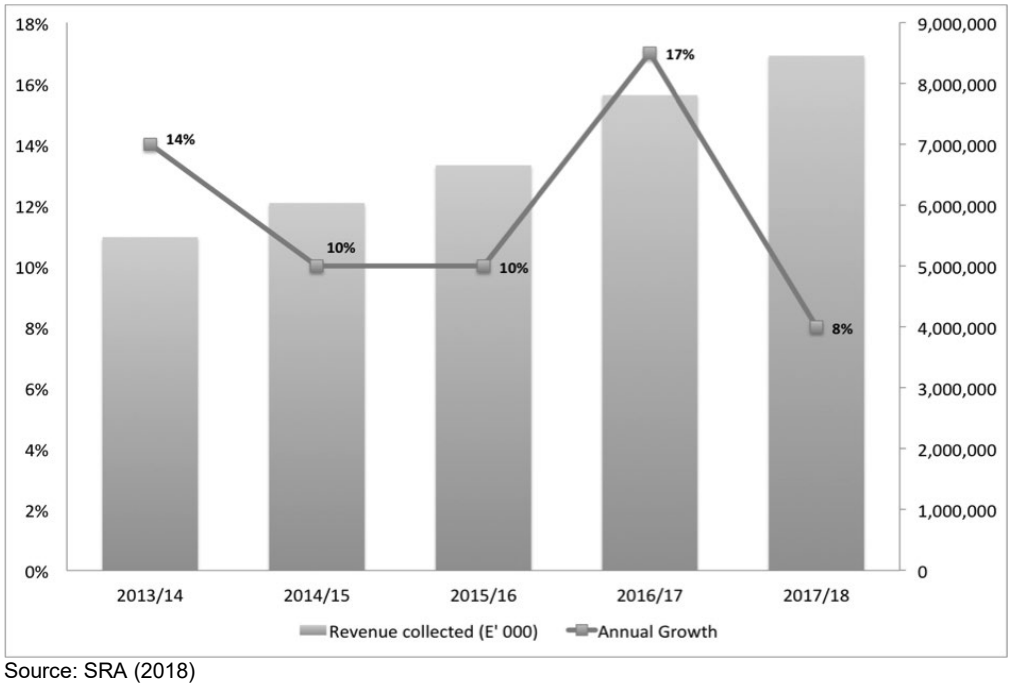
Table A17 Active vs non-filers - demographics and business characteristics

	(1)	(2)	(3)	(4)	(5)	(6)
	All	**Perpetuals**	**All**	**Perpetuals**	**All**	**Perpetuals**
Female	-0.02	-0.03			0.01	-0.00
	(0.03)	(0.04)			(0.03)	(0.03)
Age group max=7	0.03**	0.04***			0.02	0.02
	(0.01)	(0.02)			(0.01)	(0.01)
Higher education	0.03	0.07*			0.01	0.03
	(0.03)	(0.04)			(0.03)	(0.03)
Swazi national	-0.11	-0.04			-0.09	-0.00
	(0.07)	(0.07)			(0.06)	(0.06)
Married	0.09**	0.07			0.07*	0.06
	(0.04)	(0.05)			(0.04)	(0.04)
Has tax accountant	0.19***	0.24***			0.16***	0.20***
	(0.03)	(0.04)			(0.03)	(0.04)
Time on tax > median	0.02	0.04			-0.01	0.00
	(0.04)	(0.04)			(0.03)	(0.04)
Bank account	0.16***	0.20***			0.05	0.07*
	(0.03)	(0.04)			(0.03)	(0.04)
Operative			0.38***	0.44***	0.31***	0.32***
			(0.03)	(0.04)	(0.03)	(0.05)
Years since registration			0.03***	0.04***	0.02***	0.04***
			(0.01)	(0.01)	(0.01)	(0.01)
Had a previous business			0.03	0.03	0.02	0.00
			(0.04)	(0.04)	(0.04)	(0.04)
Log(USD turnover)			0.04**	0.04**	0.01	0.01
			(0.02)	(0.02)	(0.02)	(0.02)
Hhohho			0.16***	0.24***	0.17***	0.23***
			(0.04)	(0.05)	(0.04)	(0.05)
Manzini			0.08**	0.17***	0.13***	0.20***
			(0.04)	(0.05)	(0.04)	(0.05)
Wholesale/retail trade			0.04	0.02	0.06**	0.05
			(0.03)	(0.03)	(0.03)	(0.03)
High Competition			0.05	0.06	0.05	0.05
			(0.03)	(0.04)	(0.03)	(0.04)
Less business			-0.03	-0.00	-0.03	-0.01
			(0.03)	(0.03)	(0.03)	(0.03)
Mean of dep. variable	0.513	0.644	0.513	0.644	0.513	0.644
R-sq.	0.160	0.271	0.253	0.365	0.302	0.450
Observations	1009	613	1009	613	1009	613

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

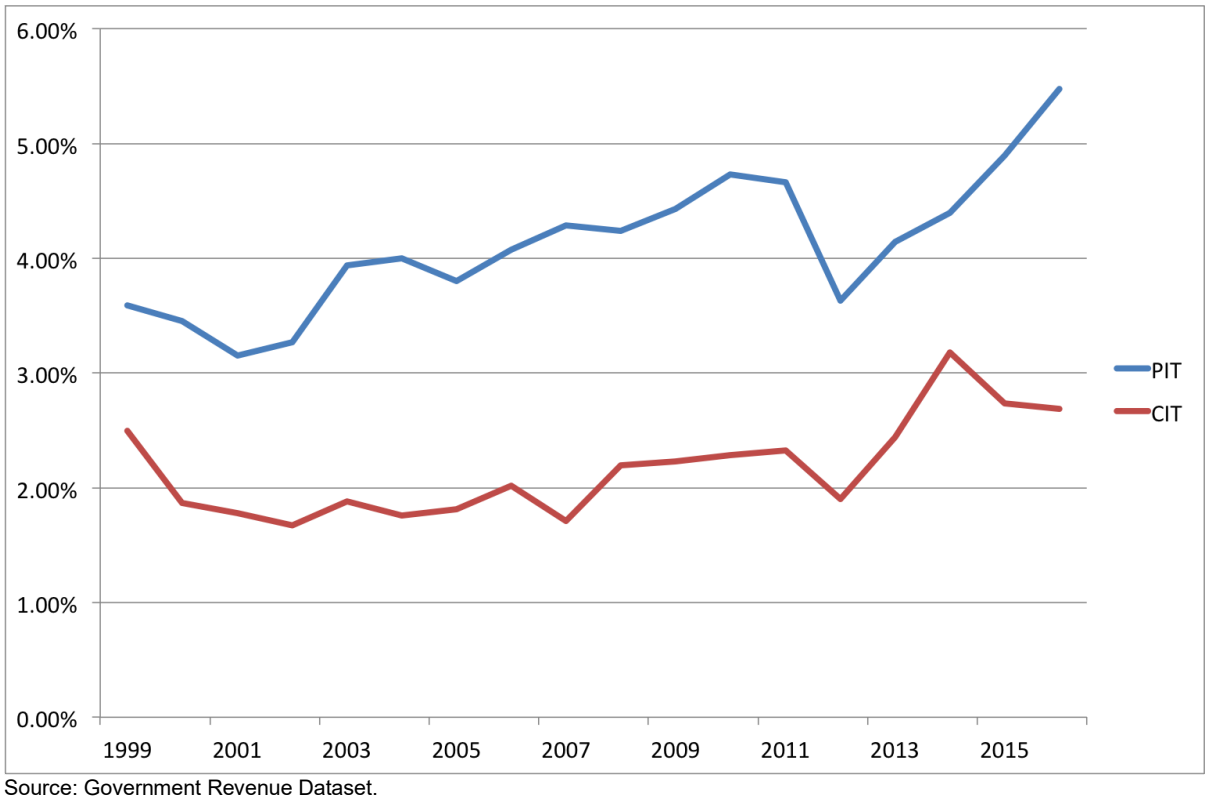
E Figures

Figure 3 Revenue collection in SZL ’000 and revenue growth



Source: SRA (2018)

Figure 4 PIT vs CIT shares over GDP



Source: Government Revenue Dataset.

Figure 5 Survey sample location

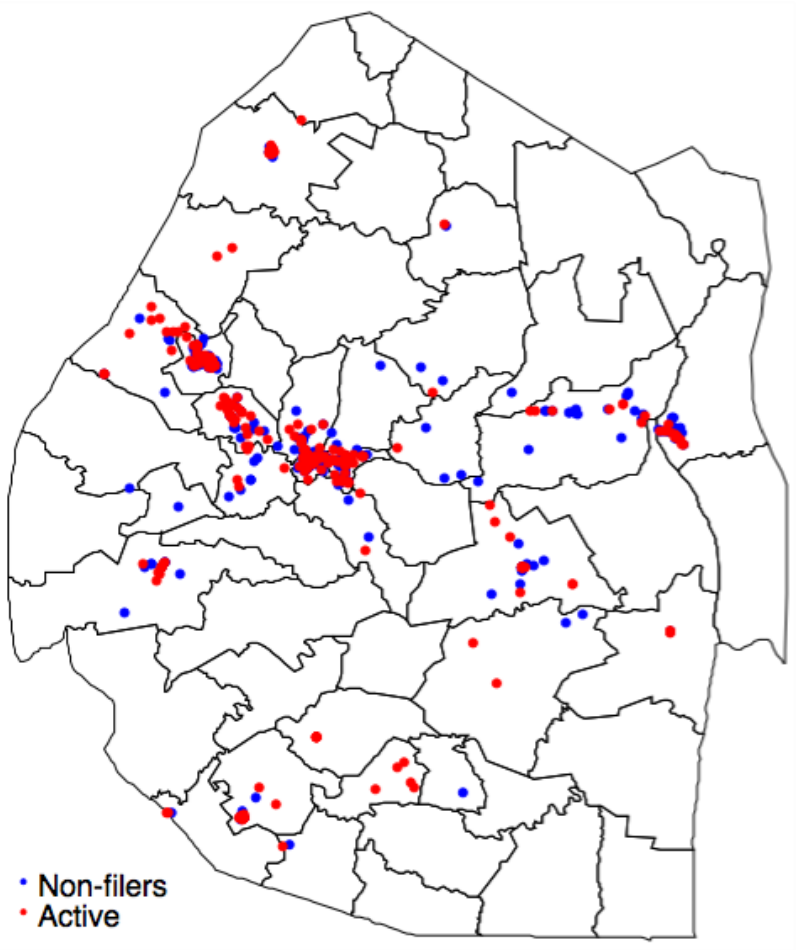


Figure 6 Self-reported monthly sales (USD) by study groups

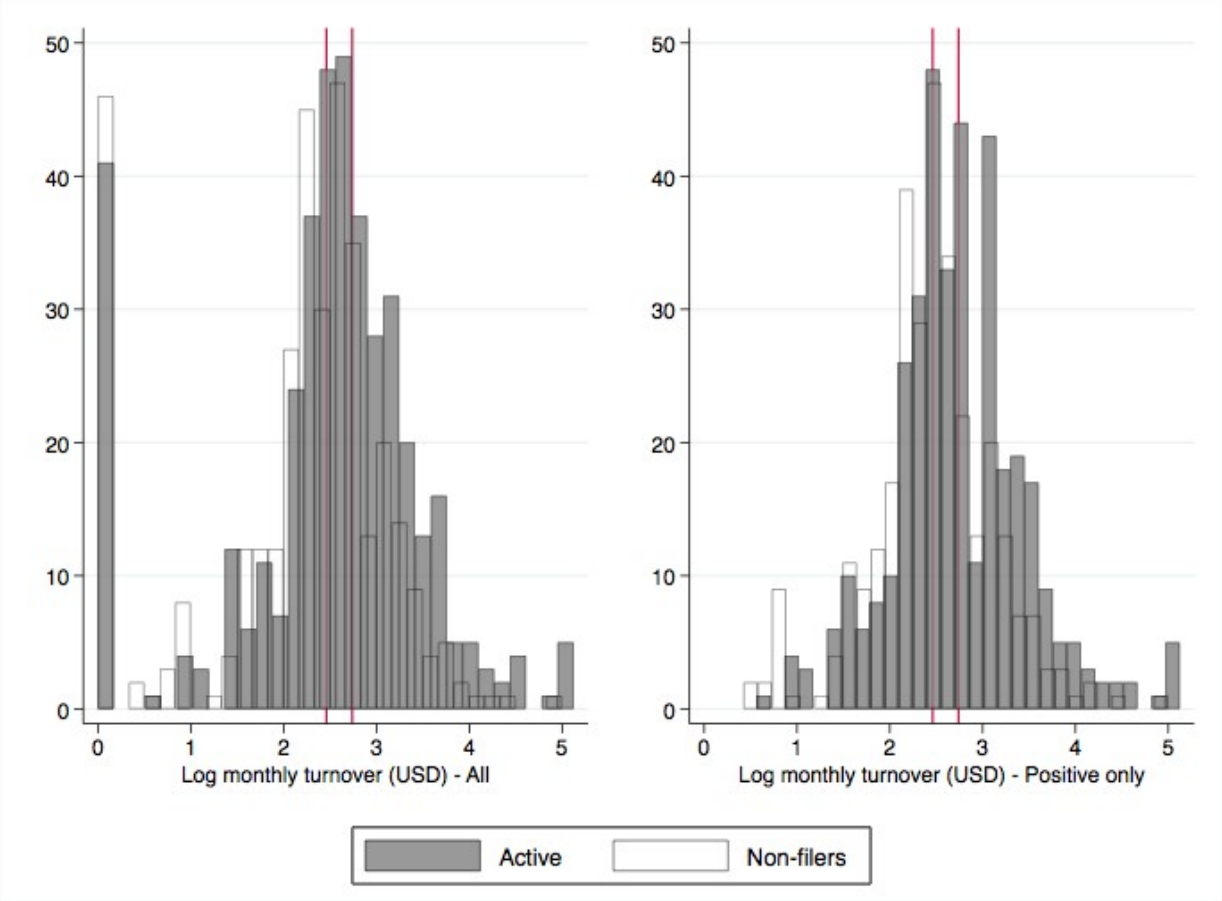


Figure 7 Reasons for registering with the authority

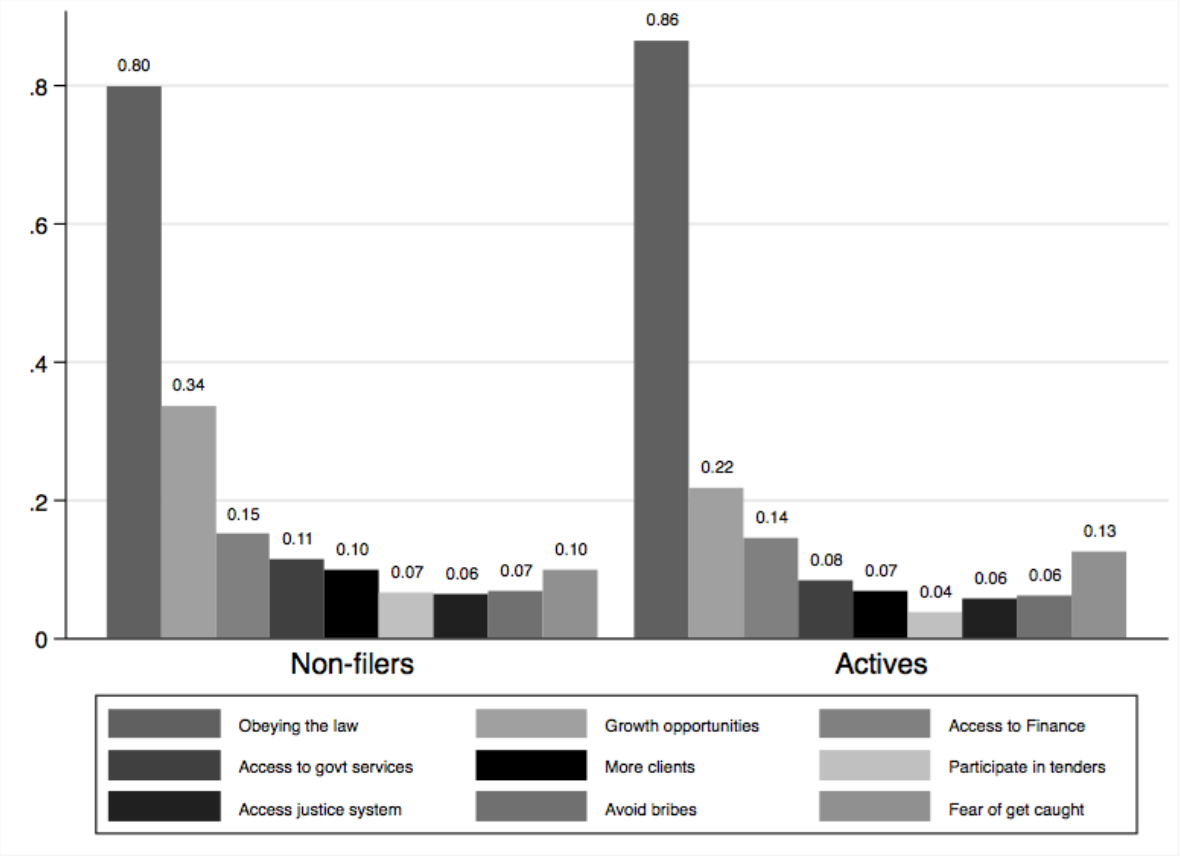


Figure 8 Determinants of actively filing a return

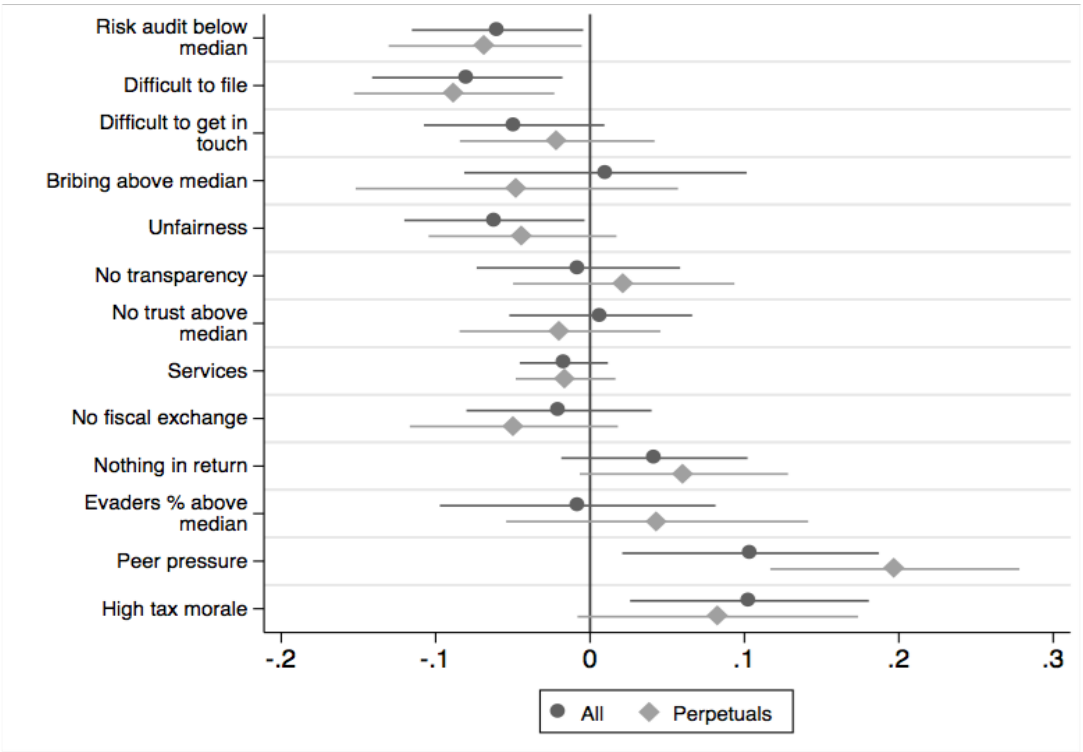


Figure 9 Perceived audit risk on respondent himself vs on other taxpayers

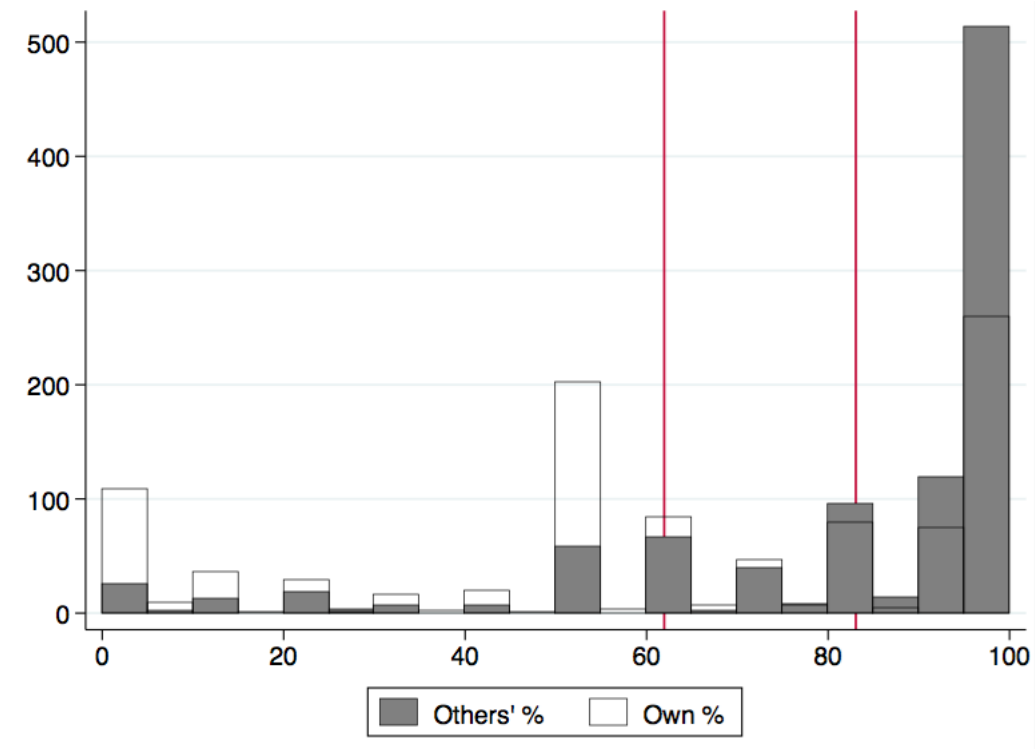


Figure 10 Actual tax knowledge and reported ease to file

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