

Essays on informal versus formal economy choices

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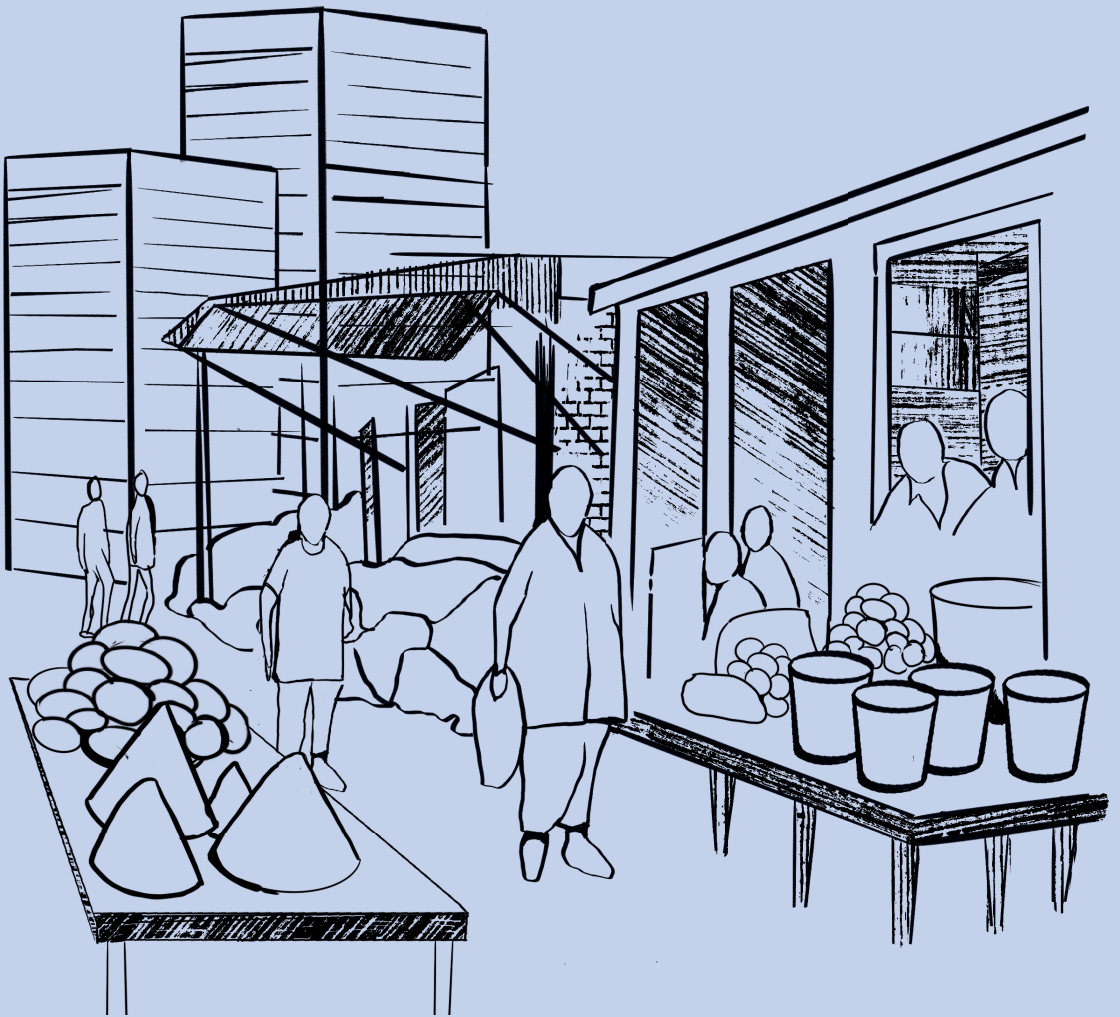
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Essays on Informal versus Formal Economy choices



Racky Balde

ESSAYS ON INFORMAL VERSUS FORMAL ECONOMY
CHOICES

RACKY BALDE

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ESSAYS ON INFORMAL VERSUS FORMAL ECONOMY
CHOICES

DISSERTATION

to obtain the degree of Doctor at Maastricht University
on the authority of the Rector Magnificus Prof. Dr. Rianne M. Letschert
in accordance with the decision of the Board of Deans
to be defended in public on Thursday, 10 June 2021 at 14:00 hours.

by
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SUMMARY

The dissertation's main objective is to examine the main determinants of the informal economy to inform policymakers on the best approach to tackle it. The informal economy is largely dominated by vulnerable and poor workers. There is also empirical and anecdotal evidence suggesting that a large informal economy negatively affects formal firms' innovation and creates a loss of resources for governments. Whereas these have led to an enormous amount of policies or reforms aimed at reducing the size of the informal economy, there is no conclusive evidence of their success. Some policies opt for a stricter stance towards informality. While emerging voices advocate for an increase in formalisation advantages. Much of the evidence in the literature is limited to South America or Asia. Sub-Saharan Africa has its specificities, and policies adopted in other regions may not entirely apply and produce similar results. Careful attention needs to be paid to the potential consequences of each approach because most of the population in Sub-Saharan Africa have their livelihoods in the informal economy.

To this end, Chapter 2 focuses on the informal economy's approach that consists of increasing the costs of informality. We particularly evaluate the effects of trading permits in the informal sector and apply a difference-in-difference approach. We use the National Income Dynamics panel dataset in South Africa. The main results provide evidence on the effectiveness of such an approach in reducing informal entrepreneurship but at a cost. The policy has equally increased unemployment and does not increase formal entrepreneurship. A heterogeneous analysis of the impact reveals that those often considered vulnerable, such as women and black individuals, are the most affected.

Chapter 3 investigates the effects of an increase in the benefits of formalisation on firms' tax compliance. More precisely, it studies the effects of a more developed financial sector on value-added tax, profit tax and local tax compliances. The analysis relies on small business survey data covering 12 African economies and adopts a trivariate probit approach. The main results reveal that financial development effectively increases tax compliance. The results highlight that an increase in the advantages of running formal activities successfully increases formalisation. Indeed, lower costs of banks increase the opportunity cost of operating informally. The results also reveal that informal finance may mitigate the effects of financial development on formalisation.

Chapter 4 investigates whether there is a public rationale for attempting to formalise small firms. It examines whether small firms benefit from formalisation. More specifically, we estimate the effects of formalisation on improved performance, export, trade credit and access to loans from banks. We again use the small business survey data that covers 12 African economies. The results show that formalisation did not improve the performance of firms and that the effects persist for firms of all sizes. Also, firms without employees are more importantly affected than firms with employees. For other outcomes such as export, access to trade credit, and loans from Banks, formalisation has a positive impact. We equally investigate whether business training and tips from incubators can mitigate the adverse effects and enhance the positive ones. The results provide evidence on the effective role of training and advice from incubators in cushioning the adverse effects and enhancing the positive impacts of formalisation for small businesses.

Chapter 5 examines whether an employment tax credit targeted at young people positively impacts formal work. We adopt a difference-in-difference approach to evaluate the impacts of the South-African employment tax incentive introduced in 2014. The data used is the National Income Dynamics panel dataset in South Africa. The results show that the ETI program increased the probability to have jobs and formal employment for the individuals who were previously unemployed or informally employed. We also find that the impact of the program increased over time.

Finally, Chapter 6 concludes the thesis with some policy recommendations, limitations of the research and avenues for future research.

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To my family

and in loving memory of Dr. Ibrahima Sory Kaba and Prof. Dr. Adam Szirmai

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Chapter 1

Introduction

This thesis aims to understand the determinants of the choice to operate in the informal economy and provides empirical evidence on the determinants of informality. The share of informal employment represents 61.2% of global employment (ILO, 2018). The vast majority of employment in Africa (85.8%) is informal (ILO, 2018). The level of informality is higher among young people. Worldwide 77.1% of young working adults are in the informal economy (ILO, 2018).

The term "informal sector" originates from the work of an anthropologist presented during a conference in 1971 and later published (Keith, 1973). The study focused on low-income migrants in Ghana who seek informal means of increasing their income due to a lack of opportunities in formal activities. The term was later popularised by a study of the International Labour Organisation on the unemployment problem in urban Kenya (ILO, 1972). Since then, the informal sector has been at the centre of attention of studies on the labour market in developing countries. The International Labour Organisation firstly defined informality in terms of the production units in which employment occurs (ILO, 1993). However, that definition did not consider informal employment taking place in formal units of production.

In 2003, the Seventeenth International Conference of Labour Statisticians defines the informal economy as the total number of informal jobs (without any type of social protection or contract), whether carried out in formal sector enterprises, informal sector enterprises or in households (ILO, 2003). Charmes (2012) emphasises that the definition based on the written contract criterion is narrower than the one based on the social protection criterion. Kanbur (2009) considers informality as a lack of compliance with any regulation. Informal firms are, therefore, those that do not comply with regulations such as tax registrations or business registration.

A large informal economy means that the statistics of the countries are unreliable and incomplete, which may affect public policy planning (Bayar and Ozturk, 2016). The productivity of the informal sector is equally low. According to La Porta and Andrei (2014), there is a productivity gap between informal and formal firms of the

same size. Indeed, the value-added of informal firms per employee is only 21% of formal firms. The informal sector generates losses in fiscal revenue and contributes to resource misallocation. Public finances are affected as the tax base shrinks, and as a result, growth prospects are compromised due to a lack of social infrastructures (Blackburn et al., 2012). Another concern arises from the informal competition that formal firms face. A recent study shows that a formal firm's innovation is affected by the competition from informal firms (Avenyo et al., 2020). More importantly, vulnerable and poor workers largely dominate the informal economy.

In June 2015, the International Labour Conference adopted the Transition from the Informal to the Formal Economy Recommendation (No. 204). The United Nations equally adopted the 2030 Agenda for Sustainable Development in 2015, which included the transition to formality in the targets for Sustainable Development Goal 8. In line with this preoccupation, we ask the following questions.

1. Does local government regulation of the informal sector reduce informal entrepreneurship? And what are the potential unwanted consequences of such a stricter approach towards informality?
2. Do the perceived benefits from the formal financial sector motivate firms to be tax compliant? And does the existence of informal finance mitigate that effect?
3. Do small firms benefit from formalisation? And what other measures can enhance those potential benefits?
4. Does an employment tax incentive for young people increase their likelihood to be employed and/or formally employed?

Three main theories explain why self-employed choose to operate in the informal sector (La Porta and Andrei, 2014; Ulysea, 2020; Bruhn and McKenzie, 2018). The first one, the *exclusion theory* (De Soto, 1989) sees self-employment in the informal sector as due to the burden of costs and time associated with the procedures of entry into the formal sector. According to this theory, though the informal self-employed would like to register their business, they are being deterred from doing so by the entry costs. This is in line with the results of Djankov et al. (2002) who find a positive correlation between entry costs and informality. According to the second theory, the *rational exit theory* (Levy, 2008), self-employment in the informal sector is due to a choice after weighing the costs and benefits of informality. Informal sector exists because of tax avoidance and the rational choice of less productive firms that do not see any benefit associated with formalisation. The third one is the "survival

view” which follows the stage of development framework of [Lewis \(1954\)](#); [Harris and Todaro \(1970\)](#) and [Rauch \(1991\)](#). Informality is considered as a lack of choice and a lack of job opportunities in the formal sector. Informal entrepreneurs are considered uneducated and unproductive ([La Porta and Andrei, 2014](#)). This view considers the benefits of operating formally for these firms to be too small to offset the costs from taxation and regulation. For those falling into that category, it may be optimal for the government to not pursue any enforcement of the law because of potential adverse consequences ([Ulyssea, 2020](#); [Bruhn and McKenzie, 2018](#)). Until recently, these views were considered as competing frameworks ([Ulyssea, 2020](#)). [Ulyssea \(2018\)](#) demonstrates that these views are rather complementary due to the heterogeneity of the informal sector.

There have been two main approaches to tackle the informal economy. Since the argument of [De Soto \(1989\)](#) and [Djankov et al. \(2002\)](#) that informality is due to burdensome regulations and high costs of the entry (exclusion theory), there have been many reforms. These reforms aimed to ease the formalisation process of informal firms and the creation of new businesses by simplifying and reducing the cost of registration. Many reforms have occurred between 2003 and 2012 ([Bruhn and McKenzie, 2013](#)). During this period, the costs have decreased by about two-third and the world time average for starting a business has dropped to 30 days, compared to 50 days before. Between 2006 and 2016, 558 reforms have taken place in 178 countries ([WB, 2017](#)).

However, many studies have documented the absence of any significant impact of the ease of entry in the formal sector on the rate of formalisation of informal firms ([Bruhn and McKenzie, 2013](#)). As highlighted by [Ulyssea \(2020\)](#), the results of several studies indicate that reducing the costs of entering the formal sector has limited effect on formalisation. The literature has come to the conclusion that lowering the costs of entry is not enough. One of the most crucial element for formalisation is the reduction of the operating costs of formal businesses such as taxation and administrative burden ([Ulyssea, 2020](#)). This evidence is supported by the work of [Rocha et al. \(2018\)](#) who estimated the impact of a policy that eliminated entry costs, and also, substantially reduced the tax burden. The first phase had an insignificant effect on formalisation while the second phase increased formalisation by around 11%.

Besides reducing the direct costs of operating formally, there is evidence that an increased perceived benefit of formalisation effectively reduces informality. The formal financial system is often cited as a potential benefit of formality ([Ulyssea, 2020](#)). Consequently, the more developed the financial sector the greater the opportunity cost of informality ([Berdiev and Saunoris, 2016](#); [Straub, 2005](#); [Capasso and Jappelli, 2013](#)). The assumption is that financial development leads to an easier access to finance.

Therefore, it increases the incentives to shift towards the formal sector. One prediction of these models is that financial development is associated with a smaller size of the informal sector.

In line with this approach, Chapter 3 investigates the effect of low costs of banks on small firms compliance with value-added tax, profit tax, and local tax. As pointed out by Ulyssea (2020), there is limited empirical evidence on the role of financial markets in driving formalisation. Moreover, the limited evidence focuses mainly on regions other than Sub-Saharan Africa, where informal finance is easily available. Consequently, this chapter equally explores the mitigating impact of informal finance on the role of low costs of banks in small firms' tax compliance. We estimate a recursive trivariate probit model that simultaneously estimates an equation of tax compliance, an equation of informal finance, and an equation of low costs of banks.

The results show that low costs of banks increase the likelihood of firms to be tax compliant. In contrast, access to informal finance decreases that likelihood. It also emerges that the lower the taxes, the greater the effects of low costs of banks on tax compliance. Another finding is that informal finance mitigates the effect of low costs of banks on tax compliance.

However, as put forth by Bruhn and McKenzie (2018), a key issue for policymakers is whether there is a public rationale for attempting to formalise small scale firms. Hence, Chapter 4 studies the impacts of formalisation for micro and small firms on a range of outcomes for several Sub-Saharan countries. More specifically, it explores the effects of formalisation on firms' performance, export, access to trade credit, and loans from banks. It equally assesses whether receiving support from incubators and training enhance the benefits and or mitigate the potentially adverse effects for micro firms.

We adopt an endogenous switching probit model to estimate the impacts on a firm's performance, exports, and access to trade credit and loans from banks. The results show that formalisation negatively impacts the performance of firms and that the effects persist for firms of all sizes. Besides, firms without employees are more affected as compared to firms with employees. For other outcomes such as export, access to trade credit, and loans from banks, the impacts are significant and positive. We equally find that business training and support from incubators mitigate the negative impacts while enhancing the positive effects. Business training and support from incubators have a more pronounced impact on trade credit and loans from banks.

The second approach to informality is to increase the costs of operating informally. As seen previously in the literature, decreasing the costs of formalisation leads some

informal firms to register. However, it still does not lead the majority of informal firms to register. Due to these weak results, research has started focusing on the effects of an increase in the direct costs of informality. The strand of the literature looking at the impact of an increase in the costs of informality finds greater effects on the formalisation of informal firms.

de Andrade et al. (2016) carried out a randomised control trial in Brazil to test different treatments to induce firms to formalise. The first treatment consisted of providing information about registration cost and procedures. For the second treatment, they gave information about the registration cost, and, they also gave free registration if the firm decided to formalise. The treatment for the third group was the visit of inspectors to enforce the law. The last group received as treatment a neighbouring firm visited by an inspector to test the spillover effect of law enforcement. The only treatment with a significant effect was the assignment of a visit by an inspector, leading to a 21% to 27% increase in registration. This suggests firms are more sensitive to a threat or the rise of the costs of informality. Along these lines, Giorgi et al. (2017), evaluated the impact of an intervention in Bangladesh, where firms received an official letter from the Bangladesh National tax authority about the threat of punishment if a firm fails to register within a given period. The treatment resulted in an increase of 17% of firms registering.

However, there is a considerable trade-off to be made because of the potential adverse consequences. If the majority of firms fall into the survivalist view, they may not be able to withstand an increase in the costs of informality and therefore would resort to unemployment. This is supported by recent evidence (Ulyssea, 2010; Charlot et al., 2015) using Brazilian data that shows that though enforcement substantially reduces informality, it also increases unemployment and reduces welfare. Given that the informal economy may be an engine for innovation as highlighted by Kraemer-Mbula and Wunsch-Vincent (2016), a repressive approach towards it may therefore not be optimal.

In line with the second approach, Chapter 2 exploits a unique regulatory framework of the informal sector in South Africa, to estimate the effects of trading permits in the informal sector. We rely on individual panel data and municipality laws to show that a mandatory trading permit in the informal sector reduces informal entrepreneurship, particularly, in the trading sector. To provide a causal effect of these regulations, we apply a difference-in-difference strategy. We investigate potential indirect effects on formal entrepreneurship, unemployment and informal wage employment. The adoption of trading permits in the informal sector significantly increases the probability to be unemployed and significantly decreases the probability

to be informally employed.

Finally, still in South Africa, our Chapter 5 investigates the effect of an Employment Tax Incentive (ETI) on youths' employment and on formal employment. The ETI lowers the cost that employers face when hiring youth who have less experience compared to adults. The ETI provides direct cash incentives by reducing the Pay-As-You-Earn(PAYE) withholding tax due to the South African Revenues by the employer.

We adopt a difference-in-difference strategy to estimate the impact on employment and on formal employment. Our baseline results on the overall sample show that the ETI program does not significantly increase the probability of employment for young workers, as well as formal employment, as in the previous literature.

The analysis on two sub-samples (individuals with previous unemployment experience and those with previous informal employment experience) indicates that the ETI has significant impact on employment and formal employment. We equally find that the impact has significantly increased over time. We equally explore the existence of gendered impacts of the ETI. The results demonstrate that the impacts of the program on employment and formal employment is lower for women compared to men.

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Chapter 2

Informal sector regulation and informal entrepreneurship: Evidence from South-Africa

2.1 Introduction

There is a remarkable absence in the literature of the possible consequences of legal entry barriers in the informal sector. It has been argued that stringent entry barriers in the formal sector or their removal affect the size of the informal sector (Bruhn and McKenzie, 2013; Ulysea, 2018). The informal sector is often seen as an entry free sector in developing countries. The main barriers focused on in the literature are economic barriers such as lack of capital to start a business or lack of necessary skills (Kingdon and Knight, 2004). Scholars have investigated the economic consequences of entry barriers in the formal sector. They argue that entry regulations hinder economic growth and generate large informal sectors (Djankov et al., 2002). There is also evidence that entry barriers affect employment (Bertrand and Kramarz, 2002; Bruhn, 2011) and that they mainly affect the low educated (Branstetter et al., 2013). So far, studies about the consequences of entry regulations have focused on the formal sector. Little is known about the consequences of entry regulations in the informal sector on entrepreneurship.

The literature either investigates the effects of regulation of the formal sector on the size of the informal sector or investigates the effects of a punitive approach towards informal activities. To the best of our knowledge, there is no empirical evidence of the consequences of entry regulations in the informal sector on informal activities, in particular informal entrepreneurship. Dibben et al. (2015) conducted a qualitative analysis of the different forms of regulation in the informal sector in Mozambique. Their results show that the state applies formal regulation but yet tolerates informal activities to keep political stability. As put forth by Charmes (2020), the State is sometimes unwilling to make its rules apply to informal activities and thereby tolerate them. Like with Dibben et al. (2015), in their study, Dube and Casale (2019) explored the equity of presumptive taxation on informal activities in Zimbabwe.

Through a mixed-method approach, their results highlight the regional disparity in the enforcement of the presumptive tax based on political interests. It is only recently that studies take a closer look at some regulations in the informal sector. Those recent studies are, however, mainly qualitative. We seek to expand the literature by providing empirical evidence on the possible consequences of regulations in the informal sector on informal entrepreneurship, in particular, the introduction of trading permits.

The informal sector is a stepping stone for youth in developing countries and also a source of livelihood for those who cannot find a job. South Africa offers an interesting case, where following the end of apartheid, the Business act of 1993 empowered local governments to regulate the informal sector while not necessarily preventing it.

In South Africa, the government fought against the informal sector during apartheid. Following the end of apartheid, the Business act of 1993 empowered local governments to regulate the informal sector. The municipalities have to make by-laws and regulations about where and how informal trading would take place. Thus, different by-laws regulating the informal sector have taken place. In some municipalities, a trading permit is necessary to become an informal trader. The procedures to obtain these permits is often burdensome, and the number of permits limited. And in cases a permit is not mandatory, there are still regulations about the places where informal trading can take place, as well as the time and the behaviour of the trader. These regulations have been the source of many conflicts between the municipalities and informal traders (Tissington, 2009). Following the evidence of the effects of entry barriers on employment provided by the literature, we may expect the same consequences regarding entry barriers into the informal sector.

To provide a causal effect of these regulations on informal entrepreneurship, informal trading, formal entrepreneurship, unemployment and informal wage employment, we apply a difference-in-differences strategy. We use the South African National Income Dynamics, which is a panel data spanning over nearly ten years. We estimate the effects of stricter regulations implemented in South African districts on our different outcomes. The findings show that the introduction of trading permits in the informal sector decreases the likelihood to be an entrepreneur in the informal economy, particularly in the trading sector. We investigate potential indirect effects on formal entrepreneurship, unemployment and informal wage employment. The adoption of trading permits in the informal sector significantly increases the probability to be unemployed and substantially decreases the likelihood to be informally employed. Our results are robust to a set of checks. The results are in line with a new strand of the literature on informality according to which an increase in the costs of informality effectively reduces informality (de Andrade et al., 2016; Giorgi et al., 2017). An analysis

of the heterogeneous impact of entry barriers in the informal sector reveals that those often considered as vulnerable such as women and black individuals are the most affected.

The rest of the paper is organized as follows. Section 2 and section 3 present a brief review of the literature on informality and the South African informal sector, respectively. Section 4 and section 5 introduce the estimation strategy and the data, respectively. We present the results in section 6. Finally, section 7 concludes.

2.2 Related literature

This paper contributes to the literature that explores the choice to operate in the informal sector. Since De Soto (1989) and Djankov et al. (2002) who argued that informality is due to burdensome regulations and the high costs of entry in the formal sector (*exclusion theory*), there have been many reforms. These reforms are aimed at easing the formalisation process of informal firms and the creation of new businesses by simplifying and reducing the cost of registration of firms. Still, there is a lack of evidence of a significant impact of these reforms on formalisation.

Bruhn (2011, 2013) evaluated the impact of simplification of business registration in Mexico and did not find any significant impact on informal firm's formalisation. The program only increased the registration of new firms. Bruhn (2013) takes into account the heterogeneity of informal firms. She used discriminant analysis to separate informal firms according to the owner's characteristics into those who have features similar to wage workers and formal business owners. She found heterogeneous effects, but with no increase in the formalisation of any of those types of firms. On the contrary, most of the self-employed who share the same characteristics as wage workers closed their businesses to become employed in the formal sector. Giorgi and Rahman (2013) in Bangladesh evaluated the effects of an information campaign on a program simplifying business' registration. They also did not find any evidence of the program on the registration of informal businesses. These non-significant results led researchers to focus more on the *rationale exit theory* that argues that firms choose rationally to operate informally when the costs of formality (taxes and regulation) outweigh the benefits (access to formal services e.g., banks, government contracts). Therefore, it is typical for firms that do not expect any benefit from formalisation to remain informal.

To test these two theories (exit versus exclusion), de Mel et al. (2013) conducted a

field experiment in Sri Lanka. They implemented four treatments. The first treatment group received information about the costs and procedures of registration with the tax authorities along with the option of costs reimbursement after registration. The second, third and fourth treatment groups received the same information about the registration process, but they were offered respectively a payment of 10000, 20000 and 40000 in Sri Lankan rupees to register. The results showed that information and reimbursing the costs of registration did not lead informal firms to register. However, when offered an amount of money that represents significant parts of their profits, more informal firms registered. This research concludes that firms do weigh the benefits and costs of formalisation, and choose to formalize only if the benefits increase. This finding is supported by the study of [Benhassine et al. \(2016\)](#) who ran an experiment in Benin and found that when offered a package of benefits such as facilitating links to government training programs, support to open bank accounts, and tax mediation services, 16.3% of informal firms registered against 9% when only free registration is offered.

Along these lines some researchers investigated to what extent increasing the costs of being informal induces formalisation. As seen previously in the literature, increasing benefits of formalisation leads some informal firms to register. However, it still does not lead the majority of informal firms to register. Due to these weak results, research has started focusing on the effects of an increase of the direct costs of informality. The strand of the literature looking at the impact of an increase in the costs of being informal finds greater impacts on informal firms. In their study, [de Andrade et al. \(2016\)](#) ran a randomized control trial in Brazil to test different treatments to induce firms to formalize. The first treatment consists of providing information about registration cost and procedures. For the second treatment, they gave information about the registration cost and also, free registration if the firm decides to formalize. The treatment for the third group was the visit of inspectors to enforce the law. The last group received as treatment a neighbouring firm visited by an inspector to test the spillover effect of law enforcement. The only treatment with a significant effect was the assignment of a visit by an inspector, that led to a 21% to 27% increase in registration. This suggests firms are more sensitive to a threat or an increase in the costs of informality. Along these lines, [Giorgi et al. \(2017\)](#), evaluated the impact of an intervention in Bangladesh, where firms receive an official letter from the Bangladesh National tax authority about the threat of punishment if a firm fails to register within a given period. The treatment resulted in an increase of 17% of firms registering. However, this increase in registration was led by large firms.

So far, the previous studies looked at the effects of inspection or threat of punishment on failure to register. However, what about a policy that aims to regulate the informal

sector itself? As far as we know, the only paper that analysed the regulation of the informal sector adopts a qualitative approach (Dibben et al., 2015). They conducted a qualitative analysis of the different forms of regulation in the informal sector in Mozambique. Their results show that the state applies formal regulation but yet tolerates informal activities in order to keep political stability. They also show that the state applies a sort of informal regulation. According to them, although the logic of state intervention is towards formalisation, it may sustain informal activities. To the best of our knowledge, there is no empirical evidence of the consequences of entry regulations in the informal sector. This may be because in many developing countries, the informal sector is, by definition, unregulated. The informal sector is a stepping stone for youth in developing countries and also a source of livelihood for those who can not find a job. It is therefore essential to know what could be the possible consequences of entry regulation in the informal sector on entrepreneurship.

2.3 Theoretical framework

2.3.1 Context of South Africa's informal sector

The informal sector in South Africa is regulated by municipal by-laws. A by-law is a legislation that is passed and enacted by a Municipal Council, and different steps are involved. First, the by-law must be drafted and examined. Second, the council must formally adopt the proposed by-law. Third, the adopted by-law must be published in the newspaper circulating in the municipal area with the exact date of application. The by-law may only be enforced after publication in the Official Gazette of the relevant province. Based on the Government definition, the informal sector comprises employees in unprotected jobs and self-employed whose businesses are not registered for either income tax or value-added tax (Mosoetsa, 2012). According to Mosoetsa (2012), in South Africa the relationship between the state and informal workers has been adversarial due to the use of force to regulate informal workers and enforcing local government by-laws. The argument often heard from the government is that street trading is associated with litter crime and then not good for business.

Informal activities were prohibited in South Africa until the end of apartheid, with the Business Act of 1993 allowing for informal trading under limited circumstances (Pieterse, 2017). This led to street trading regulation through the designation of areas where trade is either allowed or prohibited, the registration of traders and the prescription of conditions for trade. A survey of informal trading by WIEGO in the city

of Durban reports the harassment by police being the most negative driving force cited by informal traders. Another finding of their report is that the only interaction informal traders have with local government is through harassment and fines. The informal traders argue that more permits are needed and that the number of permits issued by the council is limited. Many studies report the harassment of informal traders by the police, the confiscation of goods and the impoundment costs. For instance, in Cape Town, informal trading is prohibited unless the trader has a valid permit from the City (WIEGO, 2014). The municipality may charge some fees. Moreover, an authorized official may remove or impound any property of an informal trader that does not comply with the law. According to WIEGO (2014), the introduction of these by-laws has put much economic pressure on informal traders with the confiscation of goods becoming a severe threat to their livelihood. Indeed, the enforcement of the bylaws are considered extreme. A report produced by the South African Local Government Association (SALGA) recommends a distinction between more and less serious contraventions (SALGA and SERI, 2018). The report highlights the severity of impoundment that has disastrous consequences on informal traders.

Dibben et al. (2015) studied the existence of such regulations in Mozambique. They found that in practice, the state may promote or sustain "informalisation" according to vested interests. They argue that "In some cases, the nature of informal-sector regulation may diverge from that governing the formal sector, but may be carried out by the same institutions, with variations in the operation and enforcement of formal rules and in relative governmental support" (Dibben et al., 2015), p.378. The same reflection can be applied in the case of South Africa, whereas the informal sector is somehow tolerated and regulated in a way that is different from the formal sector.

2.3.2 Theoretical consequences of a supplementary cost in the informal sector

Based on the theory, high costs of formal activities (taxes and permit fees) and weak enforcement against informal activities lead to a larger informal economy (Tumen, 2016). Empirical evidence has long supported this theory. Previously, the focus was on lowering the costs of formal activities to reduce informal activities. Since then the theory has evolved and in the literature, to effectively reduce informal activities, it is necessary to both combine tight enforcement against informal activities and lower taxes for formal activities (Tumen, 2016). The rationale behind this theory is that the previous combination will deter informal activities. However, in the South African

case, corporate tax¹ is relatively high (28%) and is even higher than the average corporate tax in Africa (27.46%).²

Let's consider the introduction of trading permits as a tightening of policies towards informal activities. We end up with a situation whereby, there are high costs in the formal sector and tight enforcement in the informal sector. The result could be less informal activities and higher unemployment. Charlot et al. (2015) provide theoretical evidence on the unemployment-informality trade-off. They find that less entry barrier in the formal sector leads to a smaller informal sector and less unemployment. They show that among all possible policies, being repressive towards the informal sector is the least desirable one because it induces higher unemployment. Porto et al. (2017) investigated how traditional policy interventions affect the size of the informal sector and affect employment. They developed a theoretical search model and calibrated their model using data from France, Italy and Spain. Their results indicate that coupling firing costs with more labour inspections reduce informality but increases the ratio of temporary jobs. It appears that any supplementary cost incurred by informal entrepreneurs (penalties for being informal, policing and or trading fees), may result in higher unemployment. The effect might be even greater based on the costs of formal activities. In South Africa, the current situation is a combination of both high taxes for formal activities and tight policies against informal activities. Our first expectation in this study is that trading permits will decrease the probability to be an informal entrepreneur due to the additional costs. Our second expectation is that the probability of being unemployed will be higher.

2.4 Empirical specification

2.4.1 Definition of the treatment and control groups

We consider municipalities without trading permits in the informal sector as our control group and municipalities with trading permits as our treatment group. The main assumption is that these by-laws impact the options available to individuals living in these municipalities, in particular, the possibility to become self-employed in the informal sector. To assess the impact, we need to observe the control group and the treatment group before and after these laws come into effect. We exclude all districts that have implemented these by-laws before or in 2008 which is the first year

¹This is the standard tax on income for all registered companies in South Africa.

²<https://www.expatica.com/za/finance/taxes/a-guide-to-company-tax-in-south-africa-949408/>.

of the panel. Among the 53 districts, 40 have implemented an informal sector by-law of which 29 took place before or in 2008. We exclude these 29 districts. The final sample contains 24 districts. Treated districts are 11 and the control group contains 13 districts.³

2.4.2 Identification of causal effects

The empirical strategy exploits the changes in the regulatory framework of the informal sector as a natural experiment since we can consider the implementation of these policies in each district to be an exogenous variation.⁴ To this end, we compare the difference in the average outcome of each of the treatment groups before and after the introduction of the by-laws with the average outcome of the control group before and after. We design a difference-in-differences strategy and we consider the timing of the treatment which allows to account for the fact that some districts had been exposed to these regulations for longer periods compared to others.

Methodology

To investigate the effect of the introduction of trading permit in South Africa, we adopt difference-in-differences approach since the districts have adopted these trading permits at different time periods. Difference-in-differences approach is used to remove the effect of confounding factors that treated and control groups may be subject to. Assuming that the policy is introduced in district d at time $t = k$ and that each district is observed before and after the introduction of the policy, the policy indicator variable is defined as follows.

$$D_{dt} = \begin{cases} 1 & \text{if trading permit}=1 \text{ and } t \geq k \\ 0 & \text{otherwise} \end{cases} \quad (2.1)$$

When there are more than two time periods and when units may enter into the treatment status at different points in time the DID results are based on OLS estimates of the following equation (Imbens and Wooldridge, 2009; Bruhn, 2011).

³Municipalities are within districts.

⁴Table A2.1 shows the level of informal entrepreneurship and informal trading in the treated and control districts prior to the introduction of the trading permits. The Table shows that there was no significant difference between the two groups in 2008 and that treated districts did not have a higher level of informal entrepreneurship and informal trading.

$$y_{idt} = \beta D_{dt} + \alpha X'_{idt} + \mu DIS_d + \lambda T_t + \varepsilon_{idt}, i = 1, \dots, N \quad (2.2)$$

where y_{idt} is a dummy that equals 1 for informal entrepreneur, informal trader, unemployed, formal entrepreneur, and informally employed in district d at time t . Consequently, for each of these five dummy variables we shall run a separate regression. With i identifying individuals in district d at time t .

The row vector of the control variables is \mathbf{X}' , ε_{idt} is the residual error term. The terms DIS_d and T_t are respectively district and year dummies. Year dummies control for any secular trend affecting our outcomes variables that is common to all districts. District dummies control for any time-invariant characteristics of states. By doing so, we rule out the potential influences originated by all time-invariant characteristics (i.e district attitude towards informality, legal system etc.). The parameter β gives the average effect of the policy.

In this case our specification is similar to the approach of [Rocha et al. \(2018\)](#) and [Bitler and Carpenter \(2016\)](#). In both studies, they estimate the impact of policies by municipality or states that implemented a policy during multiple time periods. In this case, the main variable of interest will be whether or not a district has implemented a trading permit by time t .

A more robust analysis can be obtained by using both a different district and a control group within the treated districts. To find the second control group, we consider that these trading permits should not affect all individuals the same in our sample. We consider that the policy is more likely to affect those who where in the informal sector before the introduction of these by-laws. We create the variable $Affected_{id}$ whether the individual had an informal employment in 2008 which is the first year in the sample. This setting is similar to a triple differences (DDD). It allows to control for some time-varying confounder that is not state invariant. The inclusion of a second control group such as those who were not in the informal sector prior to these by-laws enables us to find within-state comparison group that is not exposed to treatment but is exposed to the problematic time varying confounder. We then obtain the equation below. The coefficient of the interaction term $D_{idt} \times Affected_{id}$ is our parameter of interest. The focus of our analysis lies on η . The parameter β gives the effect of the policy regardless of having been or not in the informal sector.

$$y_{idt} = \beta D_{dt} + \psi Affected_{id} + \eta \times D_{dt} \times Affected_{id} + X'_{idt} \alpha + \mu DIS_d + \lambda T_t + \varepsilon_{idt} \quad (2.3)$$

2.5 Data

We use the National Income Dynamics Study (NIDS) dataset from South Africa. This survey reports information on household's members and follow them even after they leave their household. The panel is based on individuals. It includes questions related to incomes, expenditures, assets, access to services, education, health and other dimensions of well-being. The study began in 2008 with a nationally representative sample of over 28,000 individuals in 7,300 households across the country. The survey continues to be repeated with these same household members every two years and the data collection started in 2008. We use the 5 available waves (2008; 2010-11; 2012; 2014-15; 2017). The survey is representative of the South African population. The strata in the master sample are the district councils. Within strata, 400 primary sampling units were randomly selected. Since, we are looking at labour market outcomes, we restrict the sample of analysis to individuals aged between 15 and 65. The attrition rate based on the first wave is 21.02%. We test whether attrition is random. High attrition rate does not necessarily lead to biased inferences (Outes-Leon and Dercon, 2008). We apply attrition Probit tests. We estimate probit equations for the likelihood of attrition. The key variables of interests are the lagged dependent variables (Outes-Leon and Dercon, 2008).

2.5.1 Data construction

Regarding our main variable of interest which is the existence of a trading permit in the South African informal sector, we reviewed documents related to promulgated informal trading by-laws by municipalities. In South Africa, all promulgated by-laws are published in the provincial gazettes. This is to bring the attention of the local community to the existence of the different municipal laws. In order to have the right information and to be able to differentiate between by-laws that are promulgated and by-laws that are not, we resort to a legal platform which gathers all legal contents in South Africa.⁵ The key element in the distinction between municipalities without entry barriers and municipalities with entry barriers is the existence of a trading permit in the promulgated by-law. A municipality that considers trading permit as mandatory before any informal trading activity is considered as having an entry barrier in the informal sector. Municipalities that do not ask for a permit or that do not have an informal trading by-law are considered without entry barriers. In the dataset, the smallest geographical level is the district municipality.

⁵<https://discover.sabinet.co.za/>.

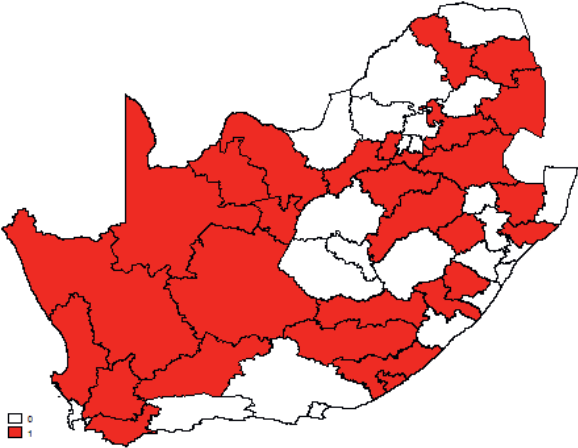
In South Africa, there are 278 municipalities divided between district and local municipalities. The local municipalities fall under the jurisdiction of district municipalities. In every district municipality, there are many local municipalities (4 to 6). We searched for all informal trading by-laws in place in all 278 municipalities. We consider that a district municipality has a mandatory trading permit when at least one of its local municipalities makes mandatory the acquirement of a permit for informal trading. Figure 1 shows the geographical partition of trading permits in South African district municipalities in 2014/2015. We construct the map with the shapefiles of South Africa district municipalities boundaries of 2016. The parts of the map in red are where trading permits are asked to informal traders. The parts of the map without color are municipalities without trading permits. One can see a geographical concentration of trading permits in the North-West part of South Africa compared to the North-East.

To assess the robustness of our results, we follow the empirical specifications of [Cho et al. \(2015\)](#) and [Besley and Burgess \(2004\)](#) by including a district-specific time trend. It is essential to include the district-specific trend in the model because it controls for heterogeneous trends among districts. This allows treatment and control districts to follow different trends in a limited but potentially revealing way ([Angrist and Pischke, 2008](#)). The results are robust when the estimated effects are unchanged.

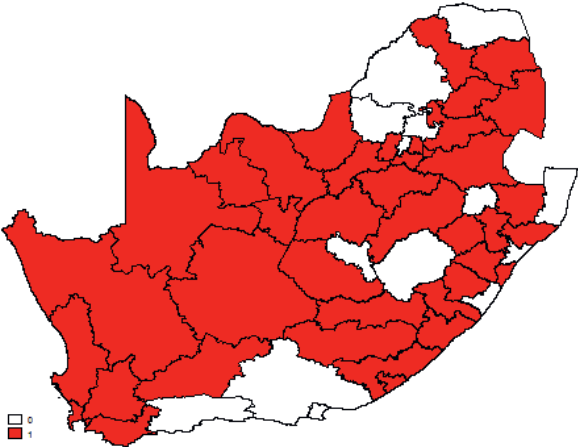
Regarding our main outcomes variables, we construct different dummy variables. The variables are whether a person is an informal entrepreneur, a formal entrepreneur, an informal trader, an unemployed, or an informal employee. We define informal entrepreneurs as those who own a business that is not registered or that is not paying value added tax. We consider the reverse as formal entrepreneur. Informal employees are those who do not benefit from social protection such as health insurance, unemployment insurance or pension scheme. Informal traders are informal entrepreneurs who are in a trade related occupation. Unemployed are those that are looking for job or are discouraged. All dummies are defined for the whole sample, their means denote the fraction of all individuals in the sample who fall into each category. We include different control variables that could be related to the different outcomes variables such as age, gender, race, level of education, size of the household, receiving a remittance, belonging to a saving group, receiving child support grant, having computer skills, and subjective health.

Table 2.1 provides the summary statistics of the variables at the individual level. Our sample contains 21672 individuals aged between 15 and 65. Black represents the

Figure 2.1: Trading permits in districts in 2008 (a) and 2017 (b)



(a)



(b)

majority with a percentage of around 86.8%. Informal entrepreneurs only represent 5% of the sample, but their share is higher than that of formal entrepreneurs who represent only 1% of the sample. Notably, those who report being unemployed constitute 17% of the sample. Informal employed represent around 10.7% of the sample which is almost the double of informal entrepreneurs. This is one of the peculiar statistics in South Africa, indeed in many developing countries, self-employment outweighs wage employment (Roever and Skinner, 2016). Informal traders are around 3.6% of the sample. With regards to gender, the sample is mostly composed of females who represent 62.5%. The majority of the sample (71.4%) has at least a secondary education.

Columns 3 to 6 show the statistics for the variables in treated and control municipalities, and column 7 reports the t-statistic for the mean difference in 2008 prior to the introduction of the by-law. Regarding our main dependent variables, there is no statistically significant difference for informal entrepreneurship, formal entrepreneurship and informal trader but, the difference is statistically significant for the unemployment and informal employment variables. Among our control variables, out of 13 variables, 6 variables turn out to have a difference that is statistically significant between the municipalities. Hence, the inclusion of these variables in the regression allow us to control for these differences. Regarding the attrition test, it is provided by Table A2.6 in the Appendix. One can notice that some variables are significantly associated with the probability to leave the sample. This means that attrition is not random. However, most of our dependent variables such are informal entrepreneurship, formal entrepreneurship, informal trader, and unemployment are not significantly associated with attrition. As pointed by Outes-Leon and Dercon (2008), the non-random attrition will likely lead to bias when the dependent variables are significantly associated with the probability of attrition. In our case, we can infer that when estimating the impact of trading permit on the above variables, the non-randomness of the attrition won't lead to bias. To further assess that conclusion, we will implement the approach suggested by Wooldridge (2010) to treat attrition problem in our robustness section.

Table 2.1: Summary statistics

Variables	Whole sample		Treated 2008		Control 2008		T statistic
	Mean (1)	Std. Dev. (2)	Mean (3)	Std. Dev. (4)	Mean (5)	Std. Dev. (6)	t-test (7)
Informal entrepreneur	0.052	0.223	0.046	0.210	0.053	0.224	1.211
Unemployed	0.177	0.382	0.225	0.417	0.190	0.392	-3.126***
Formal entrepreneur	0.010	0.101	0.010	0.099	0.009	0.096	-0.168
Urban	0.513	0.500	0.483	0.500	0.486	0.500	0.193
Informal trader	0.036	0.186	0.038	0.038	0.003	0.003	0.454
Informal employed	0.107	0.309	0.060	0.004	0.104	0.005	5.95***
Black	0.868	0.338	0.871	0.335	0.848	0.359	-2.454**
Age	36.567	13.341	32.505	13.757	33.090	13.198	1.596
No education	0.063	0.243	0.083	0.275	0.069	0.253	-1.916*
Primary Education	0.197	0.397	0.210	0.407	0.223	0.416	1.208
Secondary education	0.714	0.452	0.687	0.464	0.686	0.464	-0.098
Tertiary education	0.027	0.161	0.020	0.142	0.022	0.146	0.369
Household size	5.233	3.327	5.643	3.292	5.054	2.889	-7.011***
Female	0.625	0.484	0.628	0.483	0.602	0.489	-1.965**
Remittance	0.099	0.299	0.094	0.292	0.112	0.315	2.074**
Finance group	0.094	0.292	0.064	0.244	0.070	0.255	0.905
Child support grant	0.268	0.443	0.202	0.401	0.231	0.422	2.621***
Computer literate	0.319	0.466	0.246	0.431	0.239	0.427	-0.572
Health	0.872	0.334	0.835	0.371	0.815	0.388	-1.874*
Obs	21672		2,543		2,877		

Columns 1 and 2 report the statistics for the whole sample and period from 2008 to 2017, Columns 3 to 7 report the statistics in treated and control municipalities in 2008 (before the trading permits)
 *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

2.6 Estimation results

We use a linear probability model for the estimation of the different equations.⁶ The estimation method is ordinary least squares. For all following results, standard errors are clustered at the district level (Bertrand et al., 2004). We start with the analysis of the identifying assumption which is the parallel trend assumption. We then move to the analysis of our main results. We finally analyse the heterogeneous effects of entry barriers according to gender, age group, and race.

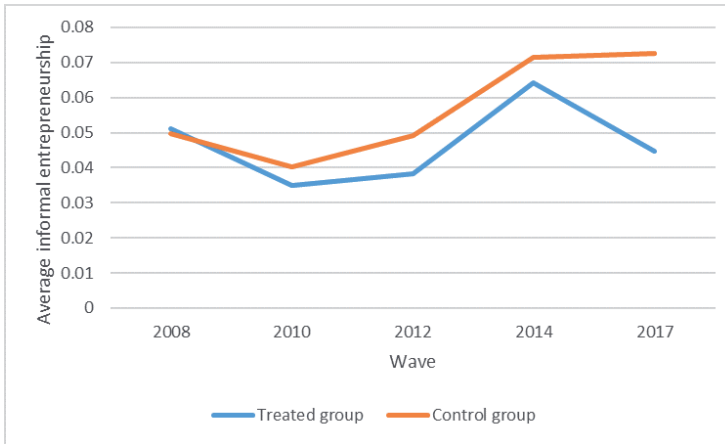
Before starting the analysis, we need to verify whether the parallel trend assumption

⁶The use of non-linear models leads to 'incidental parameters problem', especially when the length of the panel is short and fixed (Greene, 2004). Another main reason put forward is the estimated coefficients can easily be interpreted as a change in probabilities. Furthermore, nonlinear models become unsuitable in the presence of interaction terms or fixed effects (Freedman, 2008). However, we will report as a robustness check the estimations from a probit estimation.

holds. Hence, we need to exhibit the trend of the outcomes variables in some treated and control districts. This is crucial in a difference-in-differences setting where the parallel trend assumption is a key identification condition. Unfortunately, we do not possess pre-trend observations for all treated districts, since some districts introduced the mandatory trading permit just after 2008. We choose the group of districts that introduced the trading permits from 2014 and have pre-trend observations in 2008, 2010 and 2012. Figures 2 to 6 display respectively, the trend in outcomes for informal entrepreneurship, informal trading, formal entrepreneurship, unemployment and informal employment.

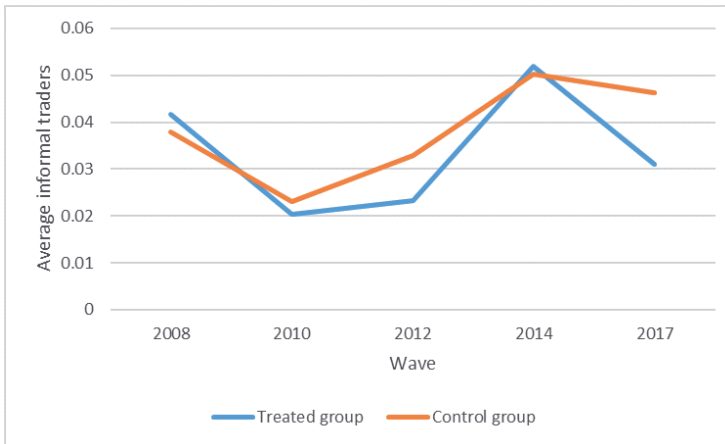
Informal entrepreneurship trend does not seem to differ among treated and control districts. In figure 2, we observe a sharp decline in informal entrepreneurship after the introduction of the trading permit in treated districts. Similar observation is made for informal trading in figure 3. Treated and control districts have similar trends prior to the introduction of the trading permits. Regarding the trend in formal entrepreneurship, it clearly appears that the parallel trend assumption does not hold in figure 4. Treated and control districts had diverging paths prior to 2014. In figure 5, we report the average unemployment rate for both treated and control districts. They seem to have similar patterns prior to the introduction of the trading permits. However, there is no sharp difference after 2014. Average informal employment is reported in figure 6. Treated and control districts seem to diverge in informal employment trend after 2012, hence prior to the introduction of trading permits. To account for this, we will further include the district specific time trends ([Angrist and Pischke, 2008](#); [Besley and Burgess, 2004](#)).

Figure 2.2: Average informal entrepreneurship in treated and control districts



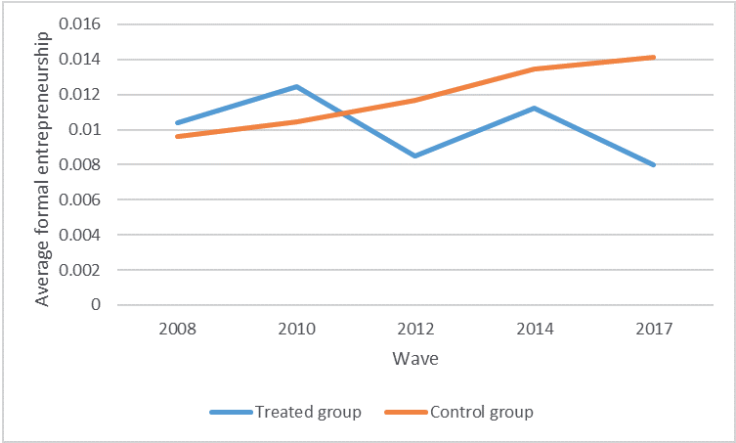
We take advantage of the difference in the time adoption, the treated group includes districts that introduced trading permits from 2014-2015

Figure 2.3: Average informal trading in treated and control districts



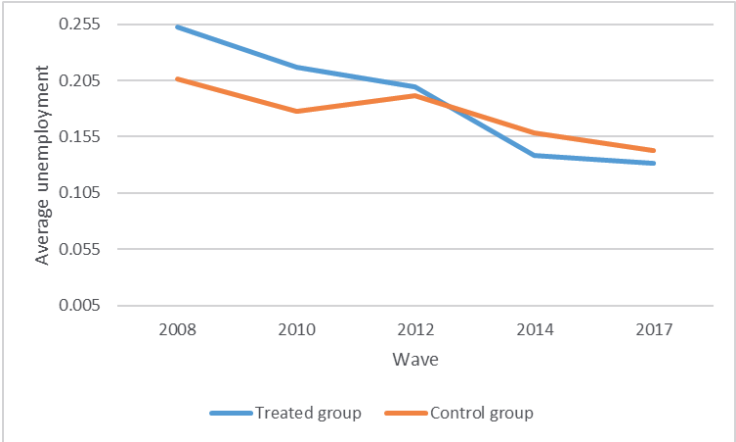
We take advantage of the difference in the time adoption, the treated group includes districts that introduced trading permits from 2014 which corresponds to wave 4

Figure 2.4: Average formal entrepreneurship in treated and control districts



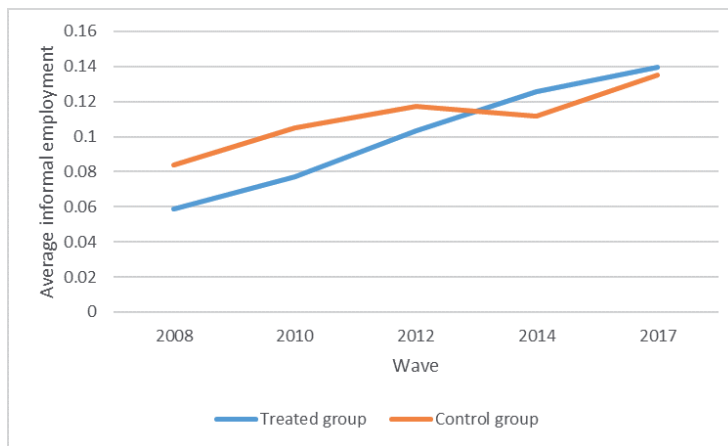
We take advantage of the difference in the time adoption, the treated group includes districts that introduced trading permits from 2014

Figure 2.5: Average unemployment in treated and control districts



We take advantage of the difference in the time adoption, the treated group includes districts that introduced trading permits from 2014

Figure 2.6: Average informal employees in treated and control districts



We take advantage of the difference in the time adoption, the treated group includes districts that introduced trading permits in 2014-2015 which corresponds to wave 4

2.6.1 The effects of trading permits in the informal sector: baseline results

Taking equation (2) estimates as a starting point, Table 2.2 reports the coefficients and standard errors from several DID specifications.⁷ Column 1 reports the estimates of equation 1 with the inclusion of the main independent variables, the district and year dummies. Column 2 includes additionally to the previous variables, the control variables. When considering column 1, most of the estimates are insignificant. The impact is only significant for formal entrepreneurship and informal employment. The impact on formal entrepreneurship is barely significant at a 10% level. Regarding informal employment, the impact is positive and significant with a magnitude of 0.03%. When we add the control variables in column 2, the weak effect on formal entrepreneurship disappears. The effect slightly decreases to 0.028%, but is still positive for informal employment.

⁷The full tables are in the appendix A2.2

Table 2.2: Effects of trading permit in the informal sector on all outcomes

VARIABLES	(1)	(2)
Informal entrepreneurship		
Trading permit	-0.008 (0.007)	-0.009 (0.007)
Informal trading		
Trading permit	-0.002 (0.005)	-0.003 (0.005)
Formal entrepreneurship		
Trading permit	-0.004* (0.002)	-0.003 (0.002)
Unemployment		
Trading permit	-0.026 (0.022)	-0.028 (0.022)
Informal employment		
Trading permit	0.030** (0.013)	0.028** (0.011)
Observations	21,672	21,672
R-squared	0.009	0.021
Controls	NO	YES
District FE	YES	YES
Year FE	YES	YES

Column 1 reports the results of the DID specification with only the inclusion of the district dummies and year dummies. Column 2 includes the control variables, the district dummies and year dummies

Robust clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

2.6.2 Effects of trading permit in the informal sector on all outcomes: DDD results

We report the results with the triple difference specification, when we interact the trading permit variable with the variable that indicates those who were working in the informal sector in 2008.

Impacts on informal entrepreneurship

Table 2.3 reports the coefficients and standard errors of the DDD model.⁸ The first coefficient (Trading permits) catches the change on the outcomes in districts with a

⁸The full tables are in appendix A2.3

trading permit relative to districts that never introduced trading permits over the period after and before the policy. The second coefficient (Trading permits \times Affected) catches the further change on the outcomes due to the introduction of the trading permits for those who have been working in the informal sector in 2008. Column 1 reports the estimates of equation 1 with the inclusion of the main independent variables, the district and year dummies. Column 2 includes additionally to the previous variables, the control variables. One observes from column 1 that the estimate is significantly different from zero with a negative effect. Trading permit in the informal sector reduces the probability to be informal entrepreneur by 11.5% for those who were in the informal sector (Coefficient on Trading permits \times Affected). The inclusion of controls in the regression still leaves the estimates stable in column 2.

Impact on informal trading

We move to the analysis of the impact on informal traders. They are the most exposed informal entrepreneurs and any enforcement is more likely to affect them. In both columns the estimates size is smaller compared to the estimates for informal entrepreneurship (Coefficient on Trading permits \times Affected). However, the impact is still significant at a 5% significance level. Overall, we can conclude that the introduction of trading permits in the informal sector reduces the probability to be an informal trader for those who were in the informal economy. As we discussed in section 3, trading permits increase the costs of operating in the informal sector. Depending on the political interest of the district in which it is implemented, such results might be desirable. When local governments are more interested in the reduction of the informal sector, introducing trading permit might be an effective way. This supports the theory according to which an increase in the costs of informality reduces the size of the informal sector. However, there might be some undesirable consequences if the district is facing high unemployment rate. As mentioned by [Dibben et al. \(2015\)](#), some local governments tolerate the informal sector in order to preserve social stability.

Impact on formal entrepreneurship, unemployment and informal employment

We now analyse the impact of trading permits on formal entrepreneurship, unemployment and informal employment. One observes that there is no impact of trading permit in the informal sector on formal entrepreneurship in both samples.

Regarding unemployment, trading permit (Coefficient on Trading permits \times Affected) increases the probability to be unemployed by 4.4% for those that were employed in the informal sector in 2008. It appears that the introduction of trading permits in South African districts increases the probability to be unemployed for those that were employed in the informal sector in 2008. These trading permits deter individuals from becoming informal entrepreneurs, hence eliminating one potential exit from unemployment or leading some individuals to become unemployed because they cannot bear the costs. Indeed, Mkhise et al. (2013) have shown that informal traders in South Africa face harassment from police and often cannot afford impoundment costs. Local governments have a trade-off to make when introducing these trading permits in the informal sector. Depending on the economic context of the districts, they may be better off tolerating the informal sector. These results support the theoretical literature on the informal sector-unemployment trade-off (Tumen, 2016; Porto et al., 2017; Charlot et al., 2015). Tight enforcement of informal activities may result in higher unemployment.

We now turn to the analysis of the impact of trading permit on informal paid employment. Trading permit decreases informal paid employment by around 15.5% (Coefficient on Trading permits \times Affected) in column 2. Based on these estimates, the introduction of trading permits decreases the probability to be informally employed. A possible explanation is that most informal employees work in informal businesses. Consequently, any policy that discourages businesses in the informal sector will lead to a decline in informal employment. Another reason could be as well that informal businesses decrease the number of their workers in order to avoid being caught in case they do not acquire trading permits.

Impact on all outcomes with the inclusion of district specific time trends

In spite of the significance of the coefficient, we have to be cautious with our interpretation. As we discussed previously, we did not effectively test the parallel trend assumption. We previously exhibited the trends of our main outcomes in order to tackle the identification issue. Unfortunately, we only observed the pre-trends for a part of the treated districts. Another alternative is to include district specific time trends in the regression (Angrist and Pischke, 2008; Besley and Burgess, 2004).

Table 2.4 shows the estimates with the inclusion of the district specific time trends. The results are close to the ones obtained in table 3 with the inclusion of district and time fixed effects and the inclusion of the control variables, when we consider the coefficient

on the variable Trading permits x Affected.

Table 2.3: Effects of trading permit in the informal sector on all outcomes:DDD specification

VARIABLES	(1)	(2)
Informal entrepreneurship		
Trading permit	0.005 (0.005)	0.004 (0.005)
Trading permit x Affected	-0.115*** (0.026)	-0.115*** (0.025)
Informal trading		
Trading permit	0.008* (0.004)	0.007* (0.004)
Trading permit x Affected	-0.096*** (0.023)	-0.096*** (0.023)
Formal entrepreneurship		
Trading permit	-0.004* (0.002)	-0.004 (0.002)
Trading permit x Affected	0.004 (0.007)	0.004 (0.007)
Unemployment		
Trading permit	-0.031 (0.022)	-0.033 (0.023)
Trading permit x Affected	0.047*** (0.017)	0.045*** (0.015)
Informal employment		
Trading permit	0.046*** (0.013)	0.044*** (0.011)
Trading permit x Affected	-0.157*** (0.033)	-0.155*** (0.032)
Observations	21,672	21,672
Controls	NO	YES
District FE	YES	YES
Year FE	YES	YES

Column 1 reports the results of the DDD specification with only the inclusion of the district dummies and year dummies. Column 2 includes the control variables, the district dummies and year dummies

Robust clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2.4: Effects of trading permit on all outcomes with the inclusion of district specific trends

VARIABLES	Informal entrepreneur	Informal trader	Formal entrepreneur	Unemployed	Informal employment
Trading permit	0.008 (0.012)	0.013 (0.010)	0.00005 (0.002)	0.016 (0.023)	-0.021 (0.014)
Trading permit x Affected	-0.114*** (0.025)	-0.095*** (0.023)	0.003 (0.007)	0.050*** (0.016)	-0.155*** (0.033)
Constant	-0.035* (0.020)	-0.024 (0.015)	-0.010 (0.007)	0.234*** (0.019)	0.125*** (0.024)
Observations	21,672	21,672	21,672	21,672	21,672
R-squared	0.082	0.056	0.028	0.063	0.085
Controls	YES	YES	YES	YES	YES
District FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Trend	YES	YES	YES	YES	YES

All columns include the control variables and the district dummies, the year dummies and the district specific trends.

Robust clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

2.6.3 Heterogeneous impact

In this sub-section, we analyse the heterogeneous impacts of the introduction of trading permits on our outcomes. We conduct an heterogeneous analysis based on gender, race and age. To estimate the impact by age group, we create 2 groups. The first group includes individuals aged between 15 and 25. The second group includes individuals who are more than 25 years old.

Table 2.5 provides the results of the heterogeneous estimations. Regarding informal entrepreneurship, the coefficient on Trading permit x Affected, is significant for both women and men. The sizes of the estimates are close, despite having a slightly higher impact on the probability of women to be an informal entrepreneur. The analysis by race reveals that the reduction in the likelihood to be an informal entrepreneur is only significant for blacks. This result reflects the structure of the South-African labour market whereby black are more likely to work in the informal sector. When we consider the different age groups, the impact seems stronger for youth with a decrease in the probability to be an informal entrepreneur of around 17% compared to 11.3% for adults. Youth might be the most vulnerable to the introduction of these trading permits in the informal sector as they are less likely to bear the supplementary cost related to them.

Regarding informal trading (coefficient on Trading permit \times Affected), the introduction of trading permits has a significant impact on both men and women and the sizes of the impacts are rather close. Trading permits decrease the probability to be an informal trader. The pattern of the impact by race shows the same pattern as for informal entrepreneurship. The effect is only significant for blacks. The disaggregation of the impact by age group, shows that the negative impact on informal trading is much higher for youth than for adults (14.5% against 9.4%, respectively).

The analysis of the heterogeneous impact of trading permits on formal entrepreneurship reveals that the effects is insignificant when considering the coefficient on Trading permit \times Affected.

For the impact on unemployment, the same pattern is noted with informal entrepreneurship and informal trading; women, and blacks face a higher probability than their counterparts to be unemployed. Regarding the impact on informal employment, the negative impact is higher for men and non-black. Trading permits decrease their probability to be informally employed. Regarding the impact on informal employment by age group, the negative impact on youth is higher than the impact on adults.

Table 2.5: Heterogeneous impact of trading permit on all outcomes with the inclusion of district specific trends

VARIABLES	Informal entrepreneur		Informal trader		Formal entrepreneur		Unemployed		Informal employment	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
Trading permit	0.009 (0.014)	0.005 (0.014)	0.013 (0.012)	0.014 (0.012)	0.002 (0.003)	-0.004 (0.007)	-0.027 (0.026)	-0.002 (0.026)	0.014 (0.013)	0.034 (0.020)
Trading permit x Affected	-0.116*** (0.029)	-0.107*** (0.028)	-0.102*** (0.028)	-0.083*** (0.024)	-0.005 (0.006)	0.021 (0.023)	0.088*** (0.019)	-0.016 (0.028)	-0.147*** (0.038)	-0.170*** (0.040)
Observations	13,541	8,131	13,541	8,131	13,541	8,131	13,541	8,131	13,541	8,131
R-squared	0.080	0.078	0.062	0.053	0.021	0.044	0.084	0.052	0.087	0.094
	Black	Non-Black	Black	Non-Black	Black	No Black	Black	Non-Black	Black	Non-Black
Trading permit x Affected	0.014 (0.012)	-0.040* (0.020)	0.017 (0.010)	-0.010 (0.010)	0.000 (0.003)	-0.002 (0.008)	-0.015 (0.024)	-0.040* (0.022)	0.022 (0.015)	0.018 (0.027)
Trading permit x Affected	-0.127*** (0.025)	-0.041 (0.050)	-0.106*** (0.025)	-0.036 (0.038)	0.001 (0.008)	0.013 (0.017)	0.053*** (0.017)	0.037 (0.055)	-0.149*** (0.038)	-0.198** (0.085)
Observations	18,814	2,858	18,814	2,858	18,814	2,858	18,814	2,858	18,814	2,858
R-squared	0.078	0.098	0.059	0.069	0.016	0.073	0.063	0.081	0.086	0.104
	Youth	Adults	Youth	Adults	Youth	Adults	Youth	Adults	Youth	Adults
Trading permit	-0.001 (0.010)	0.014 (0.017)	0.008 (0.009)	0.019 (0.013)	-0.000 (0.003)	-0.000 (0.003)	-0.058 (0.045)	-0.019 (0.020)	0.017 (0.020)	0.028 (0.017)
Trading permit x Affected	-0.170*** (0.026)	-0.113*** (0.025)	-0.145*** (0.021)	-0.094*** (0.023)	-0.020 (0.012)	0.007 (0.007)	0.036 (0.042)	0.051*** (0.016)	-0.339*** (0.080)	-0.133*** (0.034)
Observations	5,653	16,019	5,653	16,019	5,653	16,019	5,653	16,019	5,653	16,019
R-squared	0.072	0.072	0.065	0.053	0.022	0.031	0.057	0.054	0.175	0.072
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
District FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
District Trend	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

All columns include the control variables and the district dummies, the year dummies and the district specific trends.

Robust clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

2.6.4 Robustness checks

In this section we present several robustness checks of our results.⁹

Inclusion of individual fixed effects

We include in the estimation individual effects. Table 2.6 reports the results. We apply fixed effects estimators. We report the Hausman test to choose between the fixed effect and random effect models. For all outcomes, the Hausman test rejects the random effect model. Hence, we will focus our analysis on the results of the fixed effect model. We compare the results with the estimations reported in Table 2.3.

Regarding the effect based on the coefficient on Trading permit x affected, overall, we observe an increase in the magnitude of the impact. The negative impact on informal entrepreneurship goes from 11.5% to 23.7%, which is more than double the previous size, while the significance level is still the same at 1%. The same is observed for informal trading, with the negative impact going from 9.6% to 20.1%. Regarding the impact on formal entrepreneurship, although the coefficient on Trading permit x affected is still not significant, the effect of the coefficient on Trading permit is no longer significant. The size of the impact doubles as well, when we consider the effect on unemployment. The positive estimate increases from 4.5% to 11%. The same pattern is noted for informal employment with the negative impact of trading permit going from 15.5% to 29.8%. It appears that when we ignore the individual fixed effects, we underestimate the impact of the policy on our different outcomes.

⁹In tables A2.4 and A2.5 in the annex, we report the results of the probit estimations of the effects of trading permits on our outcomes.

Table 2.6: Effects of trading permit on all outcomes with individual fixed effects

VARIABLES	Informal entrepreneur	Informal trader	Formal entrepreneur	Unemployed	Informal employment
Trading permit	0.021*** (0.005)	0.020*** (0.004)	-0.005** (0.002)	-0.037*** (0.010)	0.056*** (0.007)
Trading permit x Affected	-0.237*** (0.022)	-0.201*** (0.021)	0.010 (0.008)	0.110*** (0.018)	-0.292*** (0.028)
Constant	0.196 (0.120)	0.104 (0.103)	0.143*** (0.052)	0.569** (0.280)	0.009 (0.183)
Hausman test					
$\chi(59)$	204.43	187.38	136.52	219.94	216.14
Prob > $\chi(59)$	0.000	0.000	0.000	0.000	0.000
Observations	21,672	21,672	21,672	21,672	21,672
R-squared	0.024	0.023	0.002	0.018	0.023
Controls	YES	YES	YES FE	YES	Year
Year	YES	YES	YES FE	YES	Year

The table reports the results of the DDD specification with the individual fixed effects. All columns include the control variables and the year dummies

Robust clustered standard errors in parentheses

*** p < 0.01, ** p < 0.05, * p < 0.1

Handling of attrition

To further assess our previous conclusion on the absence of attrition bias in our estimations, we will adopt the approach suggested by Wooldridge (2010) to treat attrition problem in our robustness section. More specifically, we estimate in a first step the probability of attrition and the calculation of the inverse Mills ratio. The second step consists of the inclusion of the inverse Mills ratio in our estimations. Table 2.7 reports the results with our different specifications. The estimates show that the size and the sign of the coefficients (Trading permit \times Affected) remain almost the same with a significance level at 1% of the impact on informal entrepreneurs, informal traders, unemployment and informal employment. The notable exception is with Panel B, which has similar results with the fixed effects model. The impact on formal entrepreneurs still remains insignificant.¹⁰

¹⁰Tables A2.4 and A2.5 respectively report the results of the probit estimations with the district specific trend and the inclusion of the inverse Mills ratio. The marginal effects reported are almost similar to the results in Tables 2.5 and 2.7 Panel C.

Table 2.7: Effects of trading permit on all outcomes with the inclusion of the inverse Mills ratio

VARIABLES	Informal entrepreneur	Informal trader	Formal entrepreneur	Unemployed	Informal employment
PANEL A					
Trading permit	0.028 (0.030)	0.033 (0.023)	0.003 (0.013)	0.159*** (0.056)	-0.039 (0.042)
Trading permit x Affected	-0.115*** (0.018)	-0.095*** (0.015)	0.003 (0.007)	0.049*** (0.015)	-0.154*** (0.023)
IMR	-0.040 (0.050)	0.031 (0.041)	-0.210*** (0.043)	0.257*** (0.075)	0.030 (0.068)
R-squared	0.081	0.061	0.030	0.072	0.089
Controls	YES	YES	YES	YES	YES
District FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
PANEL B					
Trading permit	0.024*** (0.007)	0.027*** (0.006)	-0.001 (0.003)	-0.019 (0.014)	0.032*** (0.011)
Trading permit x Affected	-0.237*** (0.022)	-0.200*** (0.021)	0.009 (0.008)	0.117*** (0.018)	-0.286*** (0.027)
IMR	0.228 (0.231)	0.100 (0.183)	-0.075 (0.079)	0.632 (0.450)	-1.074*** (0.397)
R-squared	0.031	0.025	0.006	0.027	0.030
Controls	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Trend	YES	YES	YES	YES	YES
PANEL C					
Trading permit	0.008 (0.013)	0.014 (0.010)	0.000 (0.003)	-0.017 (0.023)	0.022 (0.014)
Trading permit x Affected	-0.115*** (0.025)	-0.095*** (0.023)	0.003 (0.007)	0.047*** (0.016)	-0.153*** (0.033)
IMR	-0.043 (0.064)	0.030 (0.050)	-0.211*** (0.069)	0.261* (0.135)	0.033 (0.070)
R-squared	0.076	0.056	0.028	0.063	0.084
Controls	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Trend	YES	YES	YES	YES	YES
Observations	21,672	21,672	21,672	21,672	21,672

The table shows the results of the DDD method with several specifications. Panel A reports the results with the inclusion of the control variables, the year dummies, the time dummies and the inverse Mills ratio. Panel B adds the inverse Mills ratio to the fixed effect model. Panel C adds the inverse Mills ratio to the DDD model with the district trends.

Robust clustered standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

2.7 Discussion and conclusion

There is a scarcity of studies of the consequences of entry barriers in the informal sector. In this paper, we provide empirical evidence of the effects of entry regulations

through the introduction of trading permits in the informal sector on informal entrepreneurship, informal trading, formal entrepreneurship, unemployment and informal wage employment. We apply a difference-in-differences strategy to estimate the causal effects of entry barriers in the informal sector. The empirical strategy exploits the changes in the regulatory framework of the informal sector as a natural experiment. The findings show that the introduction of trading permits in the informal sector decreases the likelihood to be an entrepreneur in the informal economy, particularly in the trading sector. We investigate potential indirect effects on formal entrepreneurship, unemployment and informal wage employment. The adoption of trading permits in the informal sector seems to only have a significant impact on unemployment when we consider the possible indirect effects. The results are in line with a new strand of the literature on informality according to which an increase in the costs of informality effectively reduces informality (de Andrade et al., 2016; Giorgi et al., 2017). However, it is at the cost of unemployment. This result supports the theoretical literature on the side effects of a tighter enforcement in the informal sector (Tumen, 2016; Porto et al., 2017; Charlot et al., 2015). These results are robust to a number of robustness checks. This chapter provides insight into the possible effects of some policies implemented by local governments towards the informal sector.

Since 2012, the view on the informal sector has started to change. Local governments have been encouraged to adopt a more developmental approach towards the informal sector. This was due to the growing recognition of the importance of the informal sector in jobs creation. A National Development Plan has been introduced to create jobs in the informal sector. The first national policy on the informal sector post-apartheid had been conceived in 2014 (National Informal Business Upliftment Strategy).

However, such regulations might hinder the expected jobs creation in the informal sector to reduce unemployment. One solution could be to combine the introduction of these trading permits with some support for informal entrepreneurs to allow them to bear the cost of these trading permits or create infrastructures that enable informal entrepreneurs to manage their businesses safely. Further research could be to incorporate the diversity in the implementation of these trading permits by local governments and the extent to which they are enforced.

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APPENDIX: CHAPTER 2

Table A2.1: Significance test of the level of informality between treated districts and non-treated districts prior to the trading permits in 2008

Variables	Treated 2008		Control 2008		Test
	Mean	Std. Dev.	Mean	Std. Dev.	p-value t-test
Informal entrepreneurship	0.053	0.015	0.044	0.021	0.275
Informal trading	0.039	0.012	0.035	0.019	0.583

Treated and control municipalities in 2008

*** p<0.01, ** p<0.05, * p<0.1

Table A2.2: Full table of the baseline results

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Informal entrepreneur	Informal trader	Formal entrepreneur	Unemployed	Informal employment					
Trading permit	-0.008 (0.007)	-0.009 (0.007)	-0.002 (0.005)	-0.003 (0.005)	-0.004* (0.002)	-0.003 (0.002)	-0.026 (0.022)	-0.028 (0.022)	0.030** (0.013)	0.028** (0.011)
Urban		0.004 (0.009)		0.002 (0.006)		0.001 (0.004)		-0.019 (0.011)		0.015 (0.010)
Black		0.011 (0.009)		0.012 (0.007)		-0.024** (0.008)		0.027 (0.016)		0.022** (0.009)
Age		0.001*** (0.000)		0.001*** (0.000)		0.001*** (0.000)		-0.004*** (0.000)		-0.000 (0.000)
Household size		-0.003*** (0.000)		-0.002*** (0.001)		-0.000 (0.000)		0.005*** (0.001)		-0.006*** (0.001)
Primary education		0.026*** (0.009)		0.014 (0.009)		0.003* (0.002)		0.013 (0.011)		-0.009 (0.011)
Secondary education		0.033*** (0.011)		0.021** (0.010)		0.010*** (0.003)		0.030** (0.013)		-0.012 (0.014)
Tertiary education		-0.011 (0.013)		-0.012 (0.010)		0.036** (0.014)		-0.016 (0.018)		-0.047*** (0.015)
Female		-0.018*** (0.004)		-0.005* (0.003)		-0.011*** (0.002)		-0.001 (0.011)		-0.010* (0.006)
Remittance		0.004 (0.005)		0.004 (0.006)		-0.003 (0.002)		0.065*** (0.011)		-0.050*** (0.007)
Finance group		0.038*** (0.008)		0.029*** (0.007)		0.007** (0.003)		-0.071*** (0.010)		0.019** (0.007)

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Table A2.2 – continued

Child support grant	0.009** (0.004)	0.008** (0.004)	0.001 (0.001)	0.080*** (0.008)	0.035*** (0.006)
Computer literate	-0.001 (0.003)	-0.009*** (0.003)	0.015*** (0.003)	-0.028*** (0.009)	-0.023*** (0.006)
Health	-0.002 (0.007)	-0.003 (0.005)	0.001 (0.002)	0.008 (0.008)	0.038*** (0.006)
Constant	0.031*** (0.004)	0.024*** (0.003)	0.018*** (0.001)	0.145*** (0.009)	0.116*** (0.005)
Observations	21,672	21,672	21,672	21,672	21,672
R-squared	0.009	0.007	0.006	0.055	0.022
Controls	NO	NO	YES	YES	NO
District FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

Columns 1, 3, 5, 7, and 9 reports the results of the DID specification with only the inclusion of the district dummies and year dummies. Columns 2, 4, 6, 8 and 10 includes the control variables and the district dummies and year dummies

Robust clustered Standard errors between parentheses.

Table A2.3: Full tables of the DDD results

VARIABLES	Informal trader		Formal entrepreneur		Unemployed		Informal employment	
	Informal entrepreneur	Informal trader	Formal entrepreneur	Formal	Unemployed	Informal	employment	
Affected	0.170*** (0.020)	0.124*** (0.016)	0.004 (0.003)	0.004 (0.003)	-0.080*** (0.013)	0.251*** (0.018)		
Trading permit	0.004 (0.005)	0.007* (0.004)	-0.004 (0.002)	-0.004 (0.002)	-0.033 (0.023)	0.044*** (0.011)		
Trading permit x Affected	-0.115*** (0.025)	-0.096*** (0.023)	0.004 (0.007)	0.004 (0.007)	0.045*** (0.015)	-0.155*** (0.032)		
Urban	0.007 (0.007)	0.004 (0.005)	0.001 (0.004)	0.001 (0.004)	-0.020* (0.011)	0.019* (0.010)		
Black	0.007 (0.009)	0.009 (0.008)	-0.024*** (0.008)	-0.024*** (0.008)	0.029* (0.016)	0.016* (0.008)		
Age	0.001*** (0.000)	0.001** (0.000)	0.001*** (0.000)	0.001*** (0.000)	-0.004*** (0.000)	-0.001*** (0.000)		
Household size	-0.002*** (0.001)	-0.001*** (0.001)	-0.000 (0.000)	-0.000 (0.000)	0.005*** (0.001)	-0.005*** (0.001)		
Primary education	0.025*** (0.008)	0.014* (0.008)	0.003* (0.002)	0.003* (0.002)	0.013 (0.011)	-0.010 (0.009)		
Secondary education	0.035*** (0.011)	0.022** (0.010)	0.010*** (0.003)	0.010*** (0.003)	0.029** (0.013)	-0.009 (0.011)		
Tertiary education	-0.003 (0.013)	-0.006 (0.010)	0.037** (0.014)	0.037** (0.014)	-0.019 (0.018)	-0.035** (0.013)		
Female	-0.014*** (0.003)	-0.003 (0.003)	-0.010*** (0.003)	-0.010*** (0.003)	-0.003 (0.003)	-0.005 (0.003)		

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Table A2.3 – continued

Remittance	(0.003)	(0.003)	(0.002)	(0.011)	(0.005)
	0.008	0.007	-0.003	0.062***	-0.044***
	(0.005)	(0.005)	(0.002)	(0.011)	(0.007)
Finance group	0.031***	0.024***	0.006**	-0.068***	0.009
	(0.007)	(0.007)	(0.003)	(0.009)	(0.007)
Child support grant	0.008*	0.007*	0.001	0.081***	0.033***
	(0.005)	(0.004)	(0.001)	(0.007)	(0.006)
Computer literate	0.001	-0.008***	0.015***	-0.029***	-0.021***
	(0.003)	(0.003)	(0.003)	(0.009)	(0.006)
Health	-0.005	-0.005	0.001	0.010	0.034***
	(0.007)	(0.005)	(0.002)	(0.008)	(0.005)
Constant	-0.063***	-0.034*	-0.005	0.254***	0.083***
	(0.021)	(0.016)	(0.007)	(0.023)	(0.025)
Observations	21,672	21,672	21,672	21,672	21,672
R-squared	0.074	0.055	0.027	0.059	0.083
Controls	YES	YES	YES	YES	YES
District FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
District specific trend FE	YES	YES	YES	YES	YES

All columns include the control variables and the district dummies and year dummies

Robust clustered standard errors in parentheses.

Table A2.4: Probit estimations of the effects of trading permit on all outcomes with the inclusion of district specific trends

VARIABLES	Informal entrepreneur	Informal trader	Formal entrepreneur	Unemployed	Informal employment
Trading permit	0.010 (0.012)	0.016 (0.010)	0.00001 (0.001)	-0.019 (0.023)	0.026 (0.018)
Trading permit x Affected	-0.029*** (0.002)	-0.021*** (0.002)	0.0001 (0.016)	0.056** (0.025)	-0.064*** (0.008)
Observations	21,672	21,672	21,096	21,672	21,672
Controls	YES	YES	YES	YES	YES
District	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES
Trend	YES	YES	YES	YES	YES

Marginal effects are reported. All columns include the control variables and the district dummies, the year dummies and the district specific trends.

Robust clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A2.5: Probit estimations of the effects of trading permit on all outcomes with the inclusion of district specific trends and the inverse Mills ratio

VARIABLES	Informal entrepreneur	Informal trader	Formal entrepreneur	Unemployed	Informal employment
Trading permit	0.010 (0.011)	0.014* (0.008)	0.00001 (0.001)	-0.020 (0.024)	0.024 (0.016)
Trading permit x Affected	-0.051*** (0.008)	-0.041*** (0.008)	0.0001 (0.012)	0.051** (0.021)	-0.096*** (0.020)
Observations	21,672	21,672	21,096	21,672	21,672
Controls	YES	YES	YES	YES	YES
District	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES
Trend	YES	YES	YES	YES	YES

Marginal effects are reported. All columns include the control variables and the district dummies, the year dummies and the district specific trends.

Robust clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A2.6: Probit attrition test

VARIABLES	Attrition	
	Coef.	Std. err.
Trading permit	-0.433***	0.035
Urban	-0.002	0.028
Black	-0.131***	0.039
Age	0.005***	0.001
Household size	0.002	0.004
Primary education	0.120*	0.069
Secondary education	0.090	0.069
Tertiary education	0.345***	0.105
Female	-0.068**	0.029
Remittance	-0.161***	0.046
Finance group	-0.205***	0.051
Child support grant	-0.275***	0.034
Computer literate	-0.041	0.031
Health	-0.187***	0.039
Informal entrepreneur	-0.170	0.104
Formal entrepreneur	0.039	0.120
Unemployed	-0.031	0.034
Informal trader	-0.010	0.124
Informal wage employed	-0.128***	0.043
Constant	-0.660***	0.109
Observations	14,021	

The table shows the results of the probit estimation of the variable of attrition which is 1 for individuals who leave the sample.

*** p<0.01, ** p<0.05, * p<0.1

Table A2.7: List and definition of variables

Variables	Definition	Nature
Trading permit	Mandatory registration at the municipality	Binary
Informal entrepreneur	Individual working as entrepreneur without being registered for VAT	Binary
Formal entrepreneur	Individual working as entrepreneur and registered for VAT	Binary
Informal employee	Individual working as employee without social protection	Binary
Unemployed	Individuals who are looking for job or discouraged	Binary
Informal trader	Individual working as entrepreneur without being registered for VAT and having a trading occupation	Binary
Affected	The individual had an informal employment in 2008	Dummy
Urban	Live in urban area	Binary
Black	Population group black	Binary
Without education	Individual with no level of education	Binary (reference)
Primary	Elementary level of education reached	Binary
Secondary	Secondary level of education reached	Binary
Tertiary	University level of education reached	Binary
Age	Individual's age	Continuous
Household size	Size of the household	Binary
Female	Gender of the individual	Binary
Remittance	Individual who receives remittance	Binary
Finance group	Individual who is part of a microfinance group	Binary
Child support grant	Individual who receives child support grant	Binary
Computer literate	Individual who has computer skills	Binary
Health	Individual who considers that his health is fairly good	Binary

Chapter 3

Financial sectors and small firms' tax compliance in Sub-Saharan Africa

3.1 Introduction

In sub-Saharan Africa, about 40% of low-income countries face debt issues or at risk of debt distress (IMF, 2018). Sub-Saharan Africa is the region with the lowest revenue to GDP ratio (IMF, 2018), therefore, broadening the tax base is a must. One of the main reasons for a small tax base is the prevalence of the informal economy. In developing countries, the informal economy comprises more than half of total employment (La Porta and Andrei, 2014; ILO, 2013). In Sub-Saharan Africa, it ranges from 32% to 82% (ILO, 2013).¹ There is increasing recognition of the informal sector contribution to the overall economy. In light of the COVID19 pandemic, many governments in the region are resource-constrained.² There have been calls to grant debt-service suspension to the poorest countries to help them manage the severe impact of the COVID-19.³ This initiative is to give them fiscal space for their policy responses to the pandemic. However, in many sub-Saharan countries, most informal firms could not benefit from the packages offered by governments since they cannot be identified. It is, therefore, of utmost importance to understand what can drive small firms to the formal economy to make them reachable and to increase the governments' resources.

Besides, a large informal economy means that the countries' statistics are unreliable and incomplete, which may affect public policy planning (Bayar and Ozturk, 2016). The productivity of the informal sector is equally low. According to La Porta and Andrei (2014), there is a productivity gap between informal and formal firms of the same size. Indeed, the value-added of informal firms per employee is only 21% of formal firms. The informal sector generates losses in fiscal revenue and contributes to resource misallocation. Public finances are affected as the tax base shrinks, and

¹In South and East Asia, the share of informal employment ranges from 42% to 84%.

²Table A3.1 shows that over the period 2009-2020, the year 2020 has seen the highest fiscal deficit in sub-Saharan Africa.

³<https://www.worldbank.org/en/topic/debt/brief/covid-19-debt-service-suspension-initiative>.

as a result, growth prospects are compromised due to a lack of social infrastructures (Blackburn et al., 2012). Another concern arises from the informal competition that formal firms face. A recent study shows that a formal firm's innovation is affected by the competition from informal firms (Avenyo et al., 2020).

Consequently, there is a vast literature on the determinants of formalisation. As highlighted by Elgin and Erturk (2019), taxation, regulation, and enforcement stand out as the most frequently studied determinants of informal economic activity. However, as argued by ILO (2016), the role of finance in driving formalisation has not received much attention, while financing is one of the main incentives for firms to register. The strand of the research that looks at the finance channel in the explanation of choice to operate informally focuses on the opportunity cost of the choice to operate within the informal sector when there is financial development⁴ (Berdiev and Saunoris, 2016; Capasso and Jappelli, 2013; Straub, 2005). The assumption is that financial development leads to an easier access to finance and, thus, increases the opportunity costs of operating informally. Therefore, it increases the incentives to shift towards the formal sector. One prediction of these models is that financial development is associated with a smaller size of the informal sector. Much of this evidence relies on macroeconomic data and does not consider the financial market specificity of sub-Saharan countries with a prevalent informal finance market.⁵

Besides, most of the indicators of financial development used are macro. They do not consider the micro aspect of financial development, knowing that firms may face different access to finance translated by diverse costs of bank transactions and loans. Indeed a study in Ghana shows that the interest rates applied by banks depend on several factors, among which the size of the bank plays a significant role (Mensah and Abor, 2012).

We contribute to the previous literature in two ways. We provide empirical evidence to support the discussion between financial development and tax compliance (Capasso and Jappelli, 2013; Straub, 2005; Blackburn et al., 2012) by looking at how low costs of banks⁶ affect tax compliance. Notable exceptions are Alm et al. (2019) and Beck et al. (2014). In their study Alm et al. (2019) focus on the role of financial constraints faced by

⁴We adopt the definition of the IMF (Sahay et al., 2015) and define financial development as a combination of depth (size and liquidity of markets), access (ability of individuals to access financial services), and efficiency (ability of institutions to provide financial services at low cost and with sustainable revenues, and the level of activity of capital markets).

⁵Notable exception is Straub (2005), who considers in a general equilibrium model both the formal financial sector and the informal credit market. However, the study is theoretical and considers one specific type of informal finance: informal lenders who use coercive force for loan repayment.

⁶Our main proxy of financial development is low costs of banks. We will use in our robustness analysis another proxy of financial development which is the accessibility of banks.

firms on their tax evasion since most of the sampled firms are already formal.⁷ We use in this chapter a sample of small firms.⁸ Second, we provide the first empirical evidence of the roles of financial development and informal finance on the tax compliance of small firms. We specifically show that the existence of informal finance⁹ undermines the effect of financial development on the firm's tax compliance.

The chapter is structured as follows. Section 2 presents a brief review of the literature. Section 3 presents the data and the descriptive statistics. It is followed by section 4 which introduces the empirical approach. Section 5 presents the results and section 6 concludes.

3.2 Review of the literature

In 2003, the Seventeenth International Conference of Labour Statisticians defines the informal economy as the total number of informal jobs (without any type of social protection or contract), whether carried out in formal sector enterprises, informal sector enterprises or households. Kanbur (2009) considers informality as a lack of compliance with any regulation. We focus on compliance with taxes, namely value-added tax, profit tax, and local tax paid to municipalities.

We first, present the literature on the role of financing in decreasing informality. We then introduce the literature on the choice between informal finance and formal finance. This is crucial to understand that businesses are not necessarily relying on informal finance when they cannot have access to loans from banks. But, instead, some businesses, particularly in the African context, might prefer informal finance. This will shed light on how relying on informal finance might mitigate the effect of financial development on the choice to operate formally.

3.2.1 Financing and the informal economy

Much of the literature looking at the finance channel focuses on the effect of financial development on the size of the informal economy. Because financial development

⁷The data used is the 2002 and 2005 Business Environment and Enterprise Performance Survey (BEEPS), which is a firm-level survey of a representative sample of an economy's private sector.

⁸Small economic units make up together with own account workers 80% of total employment in Sub-Saharan Africa (ILO, 2019).

⁹For informal finance, we adopt the definition of Abor and Biekpe (2006) and consider informal finance as finance comprised of loans from family/friends, moneylenders and so on and that operates without formal intermediation.

is associated with lower costs of credit, it is considered as the main benefit of formalisation (Antunes and Cavalcanti, 2007). To access credit, firms need to meet some prior requirements, such as being registered and disclosing their revenues. If the cost of credit is low there is a high opportunity cost of operating informally. Indeed, lower costs of credit mean more accessible loans or formal financial transactions and higher benefits drawn from registering or being compliant with taxation. Hence, financial development will be associated with smaller informal economies. This argument is supported both theoretically and empirically.

Theoretically, Blackburn et al. (2012) study the relationship between the underground economy and financial development in a model of tax evasion and bank intermediation. They show that the marginal net benefit of income disclosure (formality) increases with the level of financial development. This is supported both theoretically and empirically by Capasso and Jappelli (2013). They demonstrate that financial development (a reduction in the cost of external finance) can reduce the size of the underground economy. They test the predictions of the model by using Italian data.¹⁰ They find that local financial development is associated with a smaller size of the underground economy. As highlighted by Antunes and Cavalcanti (2007), individuals choose between a formal and an informal sector by weighting the costs of entry and tax obligations in the formal sector against higher financial costs in the informal sector.

Recent studies have provided empirical evidence to support these findings. Alm et al. (2019) use the World Bank Business Environment and Enterprise Performance Survey to examine the effects of financial constraints (a proxy of financial development) on firms' tax evasion. One of the main incentives to operate in the informal sector is the absence of developed financial markets (Alm et al., 2019). Alm et al. (2019) found that more financially constrained firms are more likely to evade taxes. This result supports the theory that firms faced with costly bank credit have fewer incentives to operate formally. Bayar and Ozturk (2016) study the relationship between shadow economy, financial development, and institutional quality in European countries. They use domestic credit to the private sector as a percentage of GDP as a proxy for financial development. Using MIMIC data, they found that financial development reduces the size of the shadow economy in the long run. Over the period 1960-2009, Berdiev and Saunoris (2016) examine the relationship between financial development and the shadow economy. They used data from 161 countries and find that the development of the financial sector reduces the spread of the shadow economy. Other studies find

¹⁰They use a variable of local financial development, which measures the probability that households have access to credit locally.

similar results (Din et al., 2019; Liu-Evans and Mitra, 2019; Omri, 2020).¹¹

However, these studies miss an essential specificity of the financial market in sub-Saharan Africa, which is the importance of the informal credit market. The previous studies do not incorporate the existence of informal finance in mitigating the effects of financial development on the choice to comply with regulations, particularly taxes. An analysis of informal firms in Sub-Saharan Africa and Latin America, and the Caribbean Farazi (2014) finds that informal firms that are willing to register are those relying less on informal funding channels and are those citing financial access as their greatest constraint. This might be because informal firms that cannot rely on informal funding channels face a greater opportunity cost while operating within the informal sector.

Firms relying more on informal funding channels may see fewer benefits associated with the formal sector. Indeed, the biggest benefit associated with formalisation by informal firms is better access to credit (Farazi, 2014; Antunes and Cavalcanti, 2007).¹²

3.2.2 Choice of finance

As we emphasised previously, it is crucial to discuss the choice of firms between informal finance and bank's credit to understand how such preference can mitigate the effect of financial development on informality.

Between outside sources of finance, one distinguishes informal finance and formal finance. As argued by Kounouwewa and Chao (2011), in most of the literature, it is assumed that firms that rely heavily on informal finance do so primarily because they are rationed out of formal credit. One of the main reasons provided is asymmetry information, making it difficult for formal lenders to sort out borrowers. However, firms might prefer informal credit due to several reasons. Kounouwewa and Chao (2011) test the hypothesis that firms choose informal credit over formal credit to avoid predatory regulators and onerous regulations. As they argue, firms may choose to entirely forego formal finance if the benefits do not outweigh the costs (e.g. regulatory harassment). Their results on 16 African countries show that firms facing higher and more frequent demand for bribes are more likely to prefer informal finance. Some studies support the hypothesis of a preference for informal finance over formal finance.

¹¹There is also evidence that financial development leads to higher employment formalisation in sectors that are more dependent on external finance in Brazil and Uruguay (Catão et al., 2009; Gandelman and Rasteletti, 2016).

¹²Ivlevs (2016) finds in 6 transition economies that receiving remittances is associated with a higher likelihood of informal work. Remittances can be considered as a source of informal finance.

Turvey and Kong (2010) argue that informal borrowings amongst friends and relatives is culturally driven in rural China. They make the point that trust, combined with social preferences on the use of debt, can explain farm households' different uses of formal and informal credit (p.545). They use a survey of 1565 farm households in China and find that borrowing informally is preferred to formal lending. Peters et al. (2016) run an experiment on borrowers' preferences over bank and family loans in rural Rwanda. The results of their analysis on a sample of 480 households show that there is no significant difference in preferences over these two choices. The preference for informal finance may be due to its low cost, as most of the informal investors expect negative returns (Bygrave and Hunt, 2004). The only costs associated with it is the loss of social ties (Karlan et al., 2009; Jain, 1999; Karaivanov and Kessler, 2018).

The previous literature shows that it is highly likely that firms might prefer informal finance to bank's credit. Therefore, when they already have access to informal lending, they will be less likely to comply with regulations to get a loan from banks. This is supported by the study of Mukorera (2019), who finds that an improvement in financial constraints will decrease the odds of willingness to formalise among informal micro and small-scale firms in Zimbabwe. And as emphasised by Antunes and Cavalcanti (2007) and Straub (2005), the main benefit of being compliant with regulations is access to formal finance.

Hence, our study seeks to fill the gap regarding the mitigation effect of informal lending on the impact of financial development on tax compliance. More precisely, we investigate how low costs of banks will increase the probability to be tax compliant and how access to informal lending through family and friends will mitigate that effect. We argue that low costs of banks reflect the level of financial development since a developed formal financial market means easier access to finance and lower costs due to competition. Therefore, in the remaining document low costs of banks will be used as our proxy of financial development.

3.3 Data and Empirical approach

3.3.1 Data and information sources

The data used are the Small Business Access and Usage Survey in thirteen African countries collected in 2011-2012. Random sampling was performed in four steps for businesses. First, the national census sample frames was split into urban and rural

Enumerator areas (EAs). Second, EAs were sampled for each stratum using probability proportional to size (PPS). Third, for each EA, one listing was compiled for businesses. The listings serve as a sample frame for the simple random sections. Fourth, 24 Households and 10 businesses were sampled using a simple random sample for each selected EA. The survey collects various information on small businesses related to their characteristics, the type of finance used to create the business, their access to finance and ICT, and their productivity. The survey is nationally representative. The countries covered are Botswana, Cameroon, Ethiopia, Ghana, Kenya, Mozambique, Namibia, Nigeria, Rwanda, South Africa, Tanzania, and Uganda. The total number of businesses is 6441.

3.3.2 Data construction

Financial development

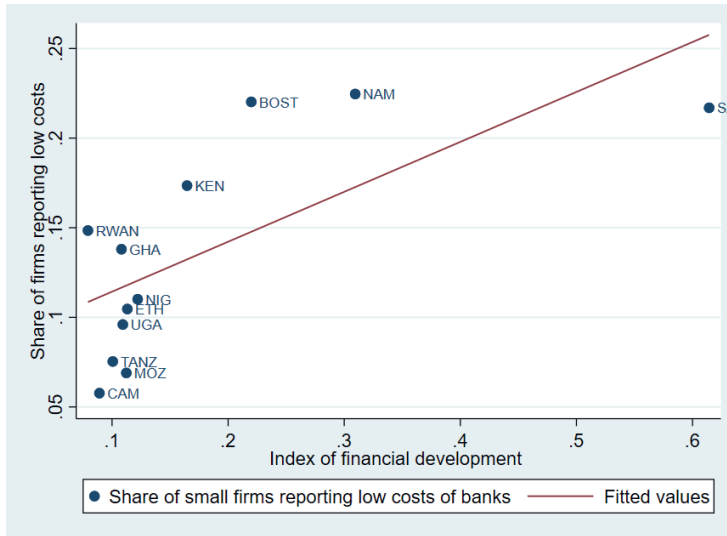
We measure financial development at the micro-level, and we follow [Alm et al. \(2019\)](#). They use self-reported financial constraints as a proxy of financial development to show their effects on tax evasion.¹³ Our measure of financial development is also at the micro-level. We use a self-reported measure of banking costs of transactions. Firms that report that banks are not expensive will have a value of 1, and firms that think otherwise will be coded 0. This variable is similar to one of [Alm et al. \(2019\)](#), where one of their proxy of financial development is low credit costs. We choose this variable because the primary role of financial development is to reduce the costs of financial transactions. Financial sector development occurs when financial instruments, markets, and intermediaries ease the effects of information, enforcement, and transactions costs.¹⁴

To check the relevance of our measure, we plot the statistical mean of the variable at the country level against the country index of financial development. The graph comprises all 12 countries in our sample, namely South Africa, Rwanda, Kenya, Namibia, Tanzania, Mozambique, Ghana, Botswana, Nigeria, Ethiopia, Cameroon and Uganda. Figure 3.1 shows that there is a strong correlation between our variable and the country level index of financial development.

¹³To show the relevance of self-reported financial constraints as proxies of financial development, they plot the aggregated average score of these variables against country-level indicators of the ratio of private credit to GDP and the ratio of banks' assets to GDP across countries.

¹⁴<https://www.worldbank.org/en/publication/gfdr/gfdr-2016/background/financial-development>.

Figure 3.1: Proxy of financial development and financial development index



Informal finance

In the questionnaire, businesses have been asked which type of finance they used to create the enterprise. We create a binary variable that captures those who used informal finance to create their business. The variable captures those who report that they have used a loan from family/friends.

Outcomes variables

We consider several measures of tax compliance. These measures are related to whether or not a business complies with formal regulations. We mainly consider compliance with tax registration. More precisely, we consider compliance with valued added tax, profit tax and local tax.

Control variables

We consider several variables. The area where the business operates (urban or rural area). Firms that are in urban area are more likely to be formal and use some types of financing. We also include the number of years the business has been

operating. The demographic variables of the business' owners are equally important. We consequently include gender and the level of education. To account for sector differences, dummies of the sector of activity are included. Some sectors are more likely to operate in the informal sector than others. It is widely acknowledged that a firm formality depends on its size. We therefore use the number of employees as a proxy. Younger and older firms may have different behaviours when it comes to formalisation. Hence, we include the age of the firm in the analysis.

3.3.3 Descriptive statistics

We will analyse the distribution of registered small firms across countries (Botswana, Cameroon, Ethiopia, Ghana, Kenya, Mozambique, Namibia, Nigeria, Rwanda, South Africa, Tanzania, Uganda, and Tunisia). Figure 3.2 (a) reports the percentages of small firms paying tax at a local level. As expected, the percentage of firms paying local taxes is higher than the percentages of firms paying profit tax and VAT. For local tax, fewer countries have more than half of their small firms paying local taxes, with the countries being Rwanda 81.56%), Ethiopia (80.14%), Kenya (56.53%) and Uganda (58.2%).

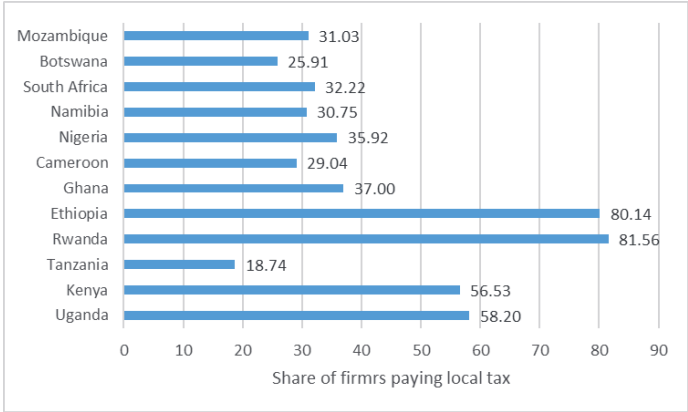
Figure 3.2 (b) depicts the share of firms that are registered for the value-added tax in each country. Only 4 countries, South Africa, Namibia, Rwanda and Uganda, have a percentage of small firms registered for VAT superior to 20%. With South Africa having the highest percentage of about 29.98%. Ethiopia experiences the lowest share of small firms registered for VAT of about 2.85%. Figure 3.2 (c) reports the percentage of firms paying profit tax. Conversely to VAT, most countries experience a share of small firms paying profit tax superior to 20%, with South Africa still having the highest share (31.26%). Mozambique, Botswana and Ethiopia are the countries with the lowest percentages of small firms paying profit tax. Overall, for all countries in our sample, most small firms are not registered for VAT and profit tax. This supports the view that in Sub-Saharan countries, the majority of small firms are informal or businesses are barely registered.

Different factors could be associated with the choices of firms in terms of types of registration, particularly access to finance.

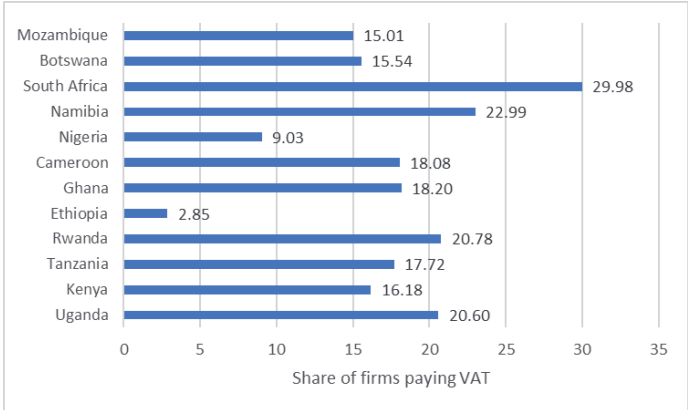
We analyse the statistics of the different variables shown in Table 3.1. We start first with informal finance: 13% of our sample have access to informal finance. Regarding the variable financial development, 13.2% of small firms reports a low cost of banks.

Regarding the characteristics of the businesses, the majority are in an urban area

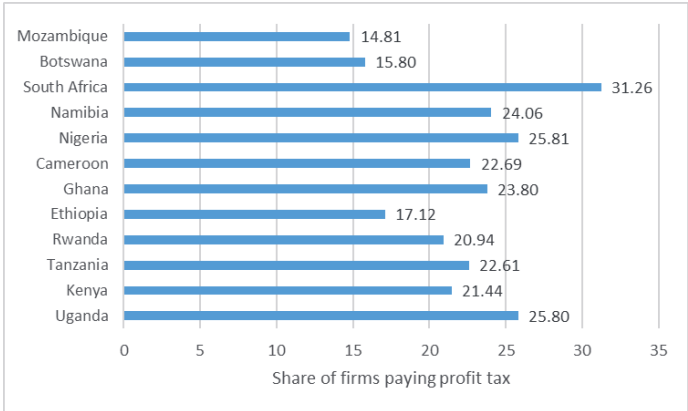
Figure 3.2: Percentages of compliant firms by country.



(a Local tax)



(b Value added tax)



(c Profit tax)

(61.7%), and most of them are male-owned (45.9%). The highest level of education attained by most owners is a primary level of education (41.6%). Most of the businesses are in the trading sector (47.4%) and in other services (35.7%).

On average, the businesses in our sample are around 8 years old. As previously seen, small firms are more likely to register locally (44%), or to pay local tax (46.2%) than to register for VAT (16.7%) or pay profit tax (22.2%).

Figure 3.3 shows the relationship between financial development and the size of the informal economy for the period 2011 in 45 African economies. The index of financial development from the World Bank development indicators is negatively correlated with the size of the informal economy.

Figure 3.3: Size of the informal economy and financial development index . Source: Global Financial Development data and IMF data for the year 2011

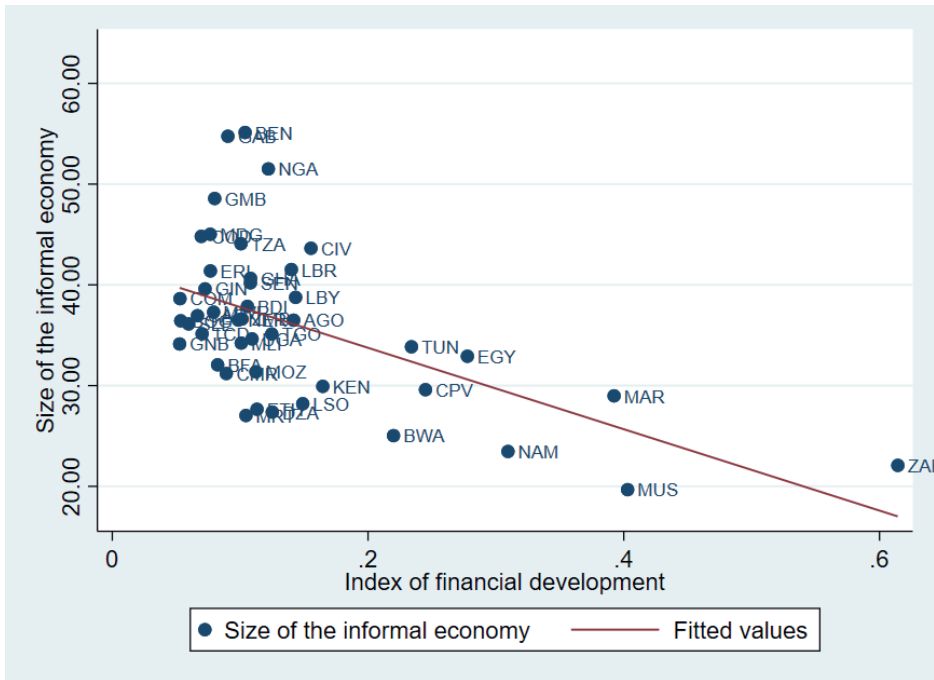


Table 3.1: Summary statistics

Variable	Obs	Mean	Std. Dev.
Continued on next page...			

Table 3.1 – continued

Main independent variables			
Informal finance	6,438	0.131	0.337
Low costs of Banks	6,439	0.132	0.23
Outcomes variables			
Business pay tax on its profit	6,439	0.222	0.415
Business registered for VAT or sales tax	6,439	0.167	0.373
Business pay local or municipal taxes (tax stamps etc)	6,439	0.462	0.499
Control variables			
Urban	6,389	0.617	0.486
Years of the business	6,418	7.83	6.98
Full time employees	6351	1	3.16
Male owner	6,430	0.459	0.498
Female owner	6,430	0.384	0.486
Owned by Male and female	6,430	0.157	0.364
Primary education	6,431	0.416	0.493
Secondary education	6,431	0.327	0.469
Tertiary education	6,431	0.120	0.325
Vocational education	6,431	0.024	0.153
No education	6,431	0.113	0.317
Trading	6,439	0.474	0.499
Manufacture	6,439	0.061	0.239
Agriculture	6,439	0.027	0.161
Other sectors	6,439	0.081	0.273
Other services	6,439	0.357	0.479
Informal means of sending money	6,439	0.836	0.369
Use of bank for transactions	6,439	0.060	0.23

3.4 Model specification

Our main explanatory variables are on finance. A firm's finance often involves several decisions that are intertwined and endogenously chosen by managers/owners (Wang, 2015). For instance, some unobserved factors may explain both the decision to get a loan and formally operate. One main source of endogeneity could be reverse

causality, where the formalisation status explains financial development. Hence, in our particular context, the issue may arise because of reverse causality, measurement errors, and omitted variable bias. In the previous empirical literature, financial development is often considered endogenous. The usual approach to solve the issue is implementing an instrumental variable approach (Alm et al., 2019; Capasso and Jappelli, 2013; Berdiev and Saunoris, 2016).

We adopt a recursive, simultaneous-equations model to handle the endogeneity of the informal finance variable and the endogeneity of the financial development variable. It consists of a system of three equations of univariate probit models that are simultaneously solved. In other words, the model estimates three potentially correlated binary outcomes, in this instance, the binary decision by a firm to formalise, the use of informal finance and the financial development that the firm faces. The model assumes that the error terms in the equations are correlated. Correlation between the error terms suggests that there are unobserved variables and or reverse causality.

$$y_{1i}^* = \beta_1 X_{1i} + \gamma_{11} y_{2i}^* + \gamma_{12} y_{3i}^* + \varepsilon_{1i}, y_{1i} = 1(y_{1i}^* > 0) \quad (3.1)$$

$$y_{2i}^* = \beta_2 X_{2i} + \varepsilon_{2i}, y_{2i} = 1(y_{2i}^* > 0) \quad (3.2)$$

$$y_{3i}^* = \beta_3 X_{3i} + \varepsilon_{3i}, y_{3i} = 1(y_{3i}^* > 0) \quad (3.3)$$

where y_{1i}^* , y_{2i}^* , and y_{3i}^* are the latent variables that determine the observed binary outcomes y_1 , y_2 and y_3 ; y_1 is the binary variable of formalisation (value added tax registration, profit tax registration, book keeping, separate finances, local registration and local tax payment); y_2 is the binary variable of informal finance; y_3 is the binary variable of perceived financial development (low costs of banks); X_1 and X_2 and X_3 are vectors of explanatory variables and includes the control variables specified above (urban or rural area, the number of years the business, the gender and the level of education, dummies of the sector of activity, the number of employees, country dummies.) ; X_2 and X_3 equally include the instrument variables for informal finance and for financial development that are excluded from the outcome equation; β_1 , β_2 , and β_3 γ_{11} , γ_{12} are vectors of parameters; and ε_{1i} , and ε_{2i} , ε_{3i} are the error terms. Assume that ε_{1i} , ε_{2i} , and ε_{3i} are jointly normally distributed.

$$\begin{bmatrix} \varepsilon_{1i} \\ \varepsilon_{2i} \\ \varepsilon_{3i} \end{bmatrix} \sim N \left(\begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}, \begin{pmatrix} 1 & \rho_{12} & \rho_{13} \\ \rho_{12} & 1 & \rho_{23} \\ \rho_{13} & \rho_{23} & 1 \end{pmatrix} \right) \quad (3.4)$$

where ρ_{12} and ρ_{13} are the correlations between $\varepsilon_1, \varepsilon_2$ and $\varepsilon_1, \varepsilon_3$, and ρ_{23} is the correlation between ε_2 and ε_3 .

We use variables of exclusion which will be excluded from the main equation. For the equation of informal finance, the variables excluded from the main equation are the main mean of sending money used by the firm and the main communication channel. We posit that those who rely on informal finance mostly use informal means of sending money, such as asking someone or in-person and use informal means of communication. The exclusion variable for the equation of low costs of banks is whether the person uses bank transactions with its customers. The firms that use banks as a primary mean of a transaction with their customers likely have lower costs of banks. We will consider another proxy of financial development in our robustness analysis, and we will consider another instrument.

We estimate a simultaneous tri-variate model. The conditional mixed process assumes that the error terms from both the formalisation equation, the informal finance equation and the financial development equation can be correlated and are thus trivariate normally distributed (Roodman, 2011). The conditional mixed process uses a full information maximum likelihood estimation procedure to simultaneously estimate the three equations.

3.5 Results

Table 3.2 reports the effects of informal finance and low costs of banks on tax compliance (value added tax, profit tax and local tax). As explained above, we estimate a model to correct for the endogeneity of informal finance and low cost of banks. We present the results of the joint estimation of the tax compliance equations, the low costs of banks equation and the informal finance equation. We report the results of the outcome equations. The full Tables of estimation are reported in Tables A3.3, A3.4 and A3.5. We report the results of three specifications for each of our outcomes variables. Columns (1) (4) (7) include basic control variables. Columns (2) (5) (8) add to the previous control variables the sectors of activities. Finally, columns (3) (6) (9) include the country dummies.

The values of ρ_{12} are significant in all specifications, rejecting the null hypothesis of exogeneity of informal finance. It means that the estimates of a simple probit of tax compliance would overestimate the effect of informal finance.¹⁵ The values of ρ_{13} are equally significant (except for local tax).

We then proceed to analyse our main results from the outcome equations.

Effects of informal finance and low costs of banks on tax compliance

Specific to the effect of informal finance on tax compliance, the effect is negative and significant at 1%, and the results are consistent across all our specifications. More precisely, access to informal finance reduces the probability to be tax compliant with value-added tax, profit tax and local tax. In our preferred specification which includes all covariates and the country dummies (columns (3), (6) and (9)), informal finance reduces value-added tax compliance by approximately 28.5%, profit tax registration by 44.9% and local tax compliance by 42.1%.

As highlighted by [Antunes and Cavalcanti \(2007\)](#), the main benefit of formalisation is access to finance. Firms that can access other types of finances will see fewer benefits in registering their businesses for tax payment. In particular, in an African context whereby informal loans are quite widespread. There is evidence of a reluctance from informal entrepreneurs to get a loan from formal financial institutions knowing that they have access to informal sources of finances.¹⁶ As discussed by [Kounouwewa and Chao \(2011\)](#), firms may choose informal credit over formal credit to avoid predatory regulators and onerous regulations.

Regarding the variable low costs of banks, the marginal effects are significant and positive, and the results are consistent across all specifications. Firms that consider banks' costs to be low are more likely to be tax compliant. Low costs of banks increase the likelihood of firms to be compliant with value-added tax, profit tax and local tax. More precisely, low costs of banks increase compliance with value-added tax by 27.2% in column 1, compliance with profit tax by 23% and compliance with local tax by 41.2%. This supports the previous evidence in the literature of the role of the costs of banks in decreasing tax evasion ([Alm et al., 2019](#); [Capasso and Jappelli, 2013](#); [Catão et al., 2009](#); [Gandelman and Rasteletti, 2016](#)).

This result is explained by the opportunity costs of staying informal when formal credit

¹⁵This interpretation is supported by the results in Table A3.2 where we estimate a simple probit model of our outcomes variables.

¹⁶<https://web.facebook.com/JTAfrique/videos/1405929239564566/>

is cheap. Firms may weigh the costs and benefits of formalisation and based on the costs involved, decide to register or not. And the incentives to register may depend on the level of costs involved. We observe that the marginal effect of low costs of banks is higher for local tax, followed by VAT and profit tax. The marginal effect for local tax is almost double, meaning that the lower the tax, the higher the effect of low costs of banks. Indeed, the costs of local taxes are often low.¹⁷ The decision to be tax compliant is still related to the opportunity costs. Low costs of banks combined with low taxes give more incentives to small firms to join the formal sector. This result shows that governments can play on three aspects to convince more small firms to be tax compliant. They can either decrease the costs of taxes or make the financial market more competitive to reduce the costs. They can also combine the two for more significant results.

¹⁷<https://www.cmi.no/publications/file/5098-local-government-taxation-in-sub-Saharan-africa.pdf>.

Table 3.2: The effects of informal finance and low costs of banks on tax compliance

	VAT			Profit tax			Local tax		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Informal finance	-0.408*** (0.029)	-0.408*** (0.030)	-0.285*** (0.082)	-0.505*** (0.021)	-0.508*** (0.021)	-0.449*** (0.049)	-0.330*** (0.084)	-0.337*** (0.085)	-0.421*** (0.068)
Low costs of banks	0.283*** (0.039)	0.278*** (0.039)	0.272*** (0.040)	0.247*** (0.059)	0.233*** (0.055)	0.230*** (0.084)	0.313** (0.134)	0.366*** (0.136)	0.412*** (0.124)
Owned by male	0.073*** (0.011)	0.068*** (0.011)	0.056*** (0.011)	0.099*** (0.012)	0.093*** (0.012)	0.081*** (0.013)	0.223*** (0.016)	0.208*** (0.017)	0.131*** (0.018)
Owned by male and female	0.102*** (0.014)	0.100*** (0.014)	0.099*** (0.014)	0.080*** (0.016)	0.080*** (0.017)	0.086*** (0.018)	0.234*** (0.024)	0.195*** (0.024)	0.177*** (0.026)
Urban	0.043*** (0.011)	0.038*** (0.011)	0.053*** (0.011)	0.035*** (0.012)	0.029** (0.011)	0.031** (0.013)	0.040** (0.016)	0.043*** (0.016)	0.066*** (0.018)
Primary education	0.047** (0.023)	0.044* (0.023)	0.012 (0.023)	-0.003 (0.020)	-0.008 (0.020)	0.026 (0.021)	-0.035 (0.023)	-0.047** (0.023)	0.030 (0.024)
Secondary education	0.106*** (0.024)	0.104*** (0.024)	0.098*** (0.023)	0.039* (0.021)	0.038* (0.021)	0.107*** (0.023)	0.080*** (0.030)	0.079*** (0.030)	0.222*** (0.031)
Tertiary education	0.147*** (0.026)	0.144*** (0.026)	0.145*** (0.026)	0.079*** (0.027)	0.077*** (0.026)	0.158*** (0.032)	0.258*** (0.046)	0.242*** (0.048)	0.407*** (0.049)
Vocational education	0.162***	0.159***	0.153***	0.167***	0.165***	0.237***	0.158***	0.166***	0.306***

Continued on next page...

Table 3.2 – continued

	(0.034)	(0.034)	(0.032)	(0.036)	(0.036)	(0.038)	(0.056)	(0.058)	(0.057)
Number of full employees	0.018*** (0.004)	0.018*** (0.004)	0.018*** (0.004)	0.015*** (0.004)	0.015*** (0.004)	0.019*** (0.004)	0.056*** (0.008)	0.053*** (0.008)	0.104*** (0.011)
Years of the business	0.002*** (0.001)	0.003*** (0.001)	0.005*** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.002* (0.001)	0.010*** (0.001)	0.010*** (0.001)	0.007*** (0.001)
Manufacture	-0.019 (0.021)	-0.019 (0.021)	-0.024 (0.020)	0.018 (0.023)	0.018 (0.023)	0.022 (0.023)		-0.147*** (0.034)	-0.140*** (0.035)
Agriculture	-0.103*** (0.038)	-0.103*** (0.038)	-0.071* (0.039)	-0.130*** (0.038)	-0.130*** (0.038)	-0.163*** (0.041)		0.181*** (0.048)	0.065 (0.046)
Other sectors	-0.051*** (0.020)	-0.051*** (0.020)	-0.031 (0.019)	-0.103*** (0.021)	-0.103*** (0.021)	-0.049** (0.023)		-0.120*** (0.030)	0.024 (0.033)
Other services	0.036*** (0.011)	0.036*** (0.011)	0.021* (0.011)	0.033*** (0.012)	0.033*** (0.012)	0.036*** (0.013)		0.154*** (0.016)	0.076*** (0.019)
rho_12	0.838*** (0.05)	0.843*** (0.052)	0.649*** (0.17)	0.879*** (0.038)	0.888*** (0.039)	0.756*** (0.099)	0.63*** (0.10)	0.634*** (0.11)	0.69*** (0.09)
rho_13	-0.405*** (0.0950)	-0.39*** (0.075)	-0.43*** (0.08)	-0.32*** (0.098)	-0.30*** (0.093)	-0.294* (0.144)	0.015 (0.183)	-0.082 (0.18)	-0.19 (0.185)
rho_23	-0.040 (0.0362)	-0.062 (0.0362)	-0.062* (0.036)	-0.024 (0.034)	-0.018 (0.035)	-0.025 (0.036)	-0.039 (0.036)	-0.035 (0.036)	-0.056 (0.037)
N	6271	6271	6271	6271	6271	6271	6271	6271	6271

Continued on next page...

Table 3.2 – continued

Wald	2380.297	2398.105	2642.689	2560.140	2606.694	2609.241	1385.648	1569.678	2595.377
P value of Wald test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Full information maximum likelihood estimations. Columns (1), (4) and (7) include all the control variables except the sectors of activity. Columns (2) (5) and (8) include all the control variables. Columns (3), (6) and (9) include additionally the the country dummies

Standard errors between parentheses.

Marginal effects are reported.

Other drivers of tax compliance

We now analyse the other explanatory variables. Enterprises owned by men are more likely to pay taxes compared to female-headed businesses. Indeed the marginal effects are positive and significant for all our outcomes (value-added tax, profit tax and local tax). The results are consistent across all our specifications. These results are consistent with previous literature on the determinants of formalisation (Khamis, 2014; Benhassine et al., 2015; Ishengoma, 2018). One of the main explanations provided relates to the fact that women entrepreneurs are more motivated by reproductive objectives such as providing for the household or paying the education of their children rather than business development (Xheneti et al., 2019; Neves and du Toit, 2012). Women may also face more financial constraints to bear the costs of tax compliance. As expected, businesses in urban areas are more likely to comply with valued added tax, profit tax, and local tax.

The level of education is equally an essential factor associated with tax payment. Businesses whose owners have a higher level of education are more likely to be formal than those whose owners are not educated. Owners with secondary education, tertiary education, and vocational education are more likely to comply with valued added tax, profit tax, and local tax than owners without a formal education. The marginal effects of these categories are all significant and positive. Besides, the size of the marginal effects increases with the level of education. This supports previous evidence on the role of education in driving formalisation (McCulloch et al., 2010; Khamis, 2014; Benhassine et al., 2015; Ishengoma, 2018). Education may be a proxy for the level of knowledge the business has on several regulatory compliances and its benefits. It may also reflect the level of resources the firm has access to to support the costs of taxes.

As expected, being in the agricultural sector significantly decreases the probability to comply with most of the taxation outcomes compared to firms in the trading sector. Businesses in the agricultural sectors are less likely to register for value-added tax, profit tax. Agricultural activities are well known to be mostly informal. Having activity in other service sector activities significantly increases the likelihood to comply with all registration procedures than firms in trading activities.

The number of employees shows that bigger firms are more likely to comply with valued added tax, profit tax, and local tax than smaller firms. The marginal effects of the variable number of employees are positive and significant for all estimations. This supports previous evidence in the literature (Ishengoma, 2018; McCulloch et al., 2010; Ng'ang'a and Gitonga, 2015). As explained by Ng'ang'a and Gitonga (2015), larger

firms may have more financial capabilities to bear the costs of formalisation. Also due to their size, it is difficult to avoid the government's attention. The firm's age also significantly increases the probability to comply with value added tax, profit tax, and local tax compared to younger firms.

Does informal finance mitigate the effect of low costs of banks on tax compliance?

The previous results showed that informal finance negatively affects the likelihood of firms to register for value-added tax, profit tax and local tax. We equally provided evidence that the effect of low costs of banks on tax compliance depends on the level of taxes. These results imply that when firms consider complying with one type of regulation, they will consider both the costs and the benefits. As we already mentioned, the benefits are mainly related to access to formal financial services. When a firm has access to informal finance, the opportunity cost it faces decreases, and the incentives will be significantly lower when tax compliance involves high costs.

To assess our hypothesis, we report the marginal effects of low costs of banks at varying values of informal finance (0 or 1). Table 3.3 reports the results. The marginal effects of low costs of banks on VAT and local tax are barely significant (10%) when informal finance is 1. Besides, the marginal effect of low costs of banks on profit tax is insignificant when informal finance is 1.

This result implies that the effect of low costs of banks on profit tax compliance is lower for those who have access to informal finance. The main explanation may be the lower opportunity costs of not complying when there is another source of finance. However, the costs may be related to the tax compliance process and the fees associated with obtaining credit or the costs related to financial transactions. High costs incurred in the financial system equally decrease the opportunity cost of remaining informal.

Table 3.3: The mitigating effects of informal finance on the effects of low costs of banks

	VAT		Profit tax		Local tax	
	No	Yes	No	Yes	No	Yes
Informal finance						
Low costs of banks	0.372*** (0.056)	0.087* (0.048)	0.267*** (0.035)	0.032 (0.094)	0.267*** (0.062)	0.251* (0.130)
N	6271					

Standard errors between parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

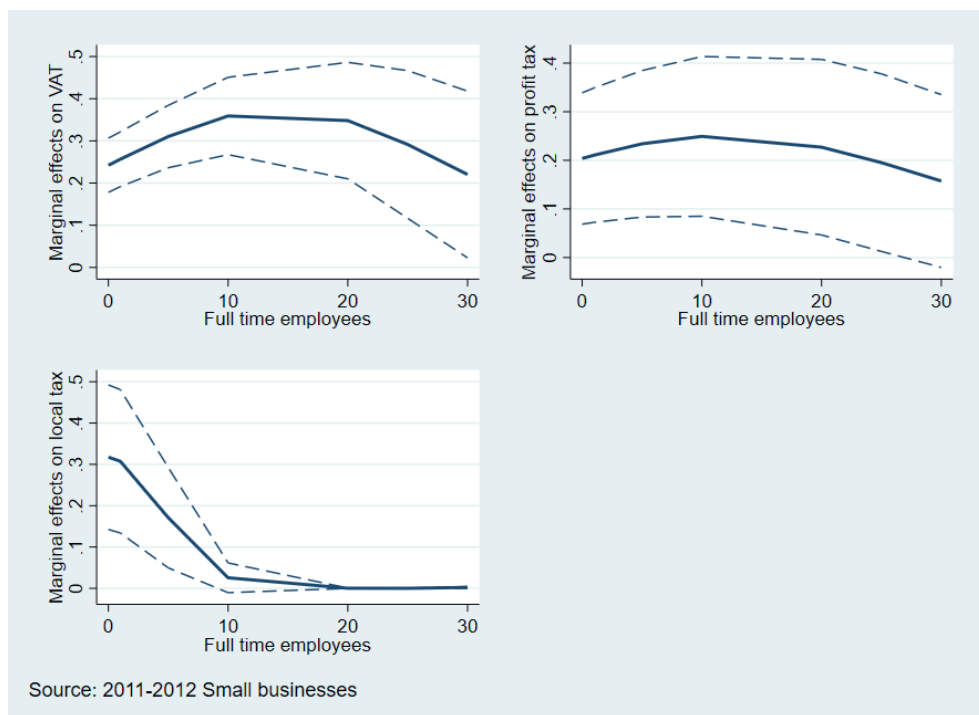
Marginal effects of low costs of banks for varying values of informal finance (yes,no). The estimations in all columns include the control variables, the sector dummies and the country dummies.

Note: Marginal effects are reported.

Heterogeneous effects of low costs of banks

This sub-section explores the heterogeneous effects of low costs of banks on small firms' compliance with taxes by the firm's size. Figure 3.4 shows the effects of the low costs of banks by the size of the firm. For VAT and profit tax, the effects are increasing with the firm's size until ten employees and start decreasing. One possible explanation is that firms with employees of 10 or less are more resource constraint. Subsequently, when the costs of banks are low, they give more significant incentives to those firms to comply with taxation. Suppose we consider the number of employees as the proxy for the size of a firm; when firms become larger (after ten employees), their ability to use internal funds increases. Therefore, low costs of banks have less impact on their decision to be tax compliant. For local taxes, the reverse is observed, and the effect becomes insignificant after 10 employees. One possible explanation is the level of local taxes that is usually low compared to VAT and profit tax.

Figure 3.4: Marginal effects of low costs of banks by firms' size



3.5.1 Robustness analysis

Alternative proxy of financial development

Financial development has several dimensions. The previous proxy that we used is related to the efficiency of the financial sector in providing financial services at low costs. Another equally important dimension is financial access. It is mainly measured through the number of bank branches in a country or an area. We consequently consider another proxy of financial development with a question in the survey asking businesses whether the next bank branch is far. We consider the variable access to be 1 when the answer is no and 0 otherwise. Table 3.4 reports the results of the estimation. We observe that the signs of the coefficients on access are all as significant and positive as the coefficients of low costs. Besides, the sizes of the coefficients are relatively close, with access increasing VAT compliance and profit tax compliance by respectively 27.1% and 21.3% compared to 27.2% and 23% for low costs of banks. A similar situation is noted for local tax compliance, with access increasing local tax compliance by 40.04%

compared to 41.2% for low costs.

Table 3.4: The effects of informal finance and financial access on firms' tax compliance

	VAT	Profit tax	Local tax
Informal finance	-0.284*** (0.074)	-0.455*** (0.046)	-0.435*** (0.062)
Access	0.271*** (0.033)	0.213*** (0.063)	0.404*** (0.089)
N	6271.000	6271.000	6271.000
Wald	2939.421	3069.024	3019.939
Wald_Pvalue	0.000	0.000	0.000

Standard errors between parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The estimations in all columns include the control variables, the sector dummies and the country dummies.

Note: Marginal effects are reported.

3.6 Conclusion

Lack of fiscal space in sub-Saharan countries is a major preoccupation, notably in the context of shocks. A large informal sector primarily drives the resource constraint. Financial development may be a catalyst for driving small firms that constitute the bulk of the economy to be tax compliant.

This chapter explores the effect of low costs of banks on small firms compliance with value-added tax, profit tax and local tax. It equally explores the mitigating impact of informal finance on the role of low costs of banks in driving small firms' tax compliance. We estimate a recursive trivariate probit model that simultaneously estimates an equation of tax compliance, an equation of informal finance, and an equation of low costs of banks.

The results show that low costs of banks increase the likelihood of firms being tax compliant. In contrast, access to informal finance decreases that likelihood. It also emerges that the lower the taxes, the greater the effects of low costs of banks on tax compliance. Another finding is that informal finance mitigates the effect of low costs of banks on tax compliance.

The major implications are the following. For governments to increase their tax base thanks to financial development, they can undertake different actions. Governments can reduce the level of taxes or make the financial sector more competitive to decrease the costs in sub-Saharan Africa, where informal finance is widespread. Indeed, a decrease in the costs of banks will not likely have the same effect on tax compliance as in developed economies. In the region, many firms can rely on informal finance from family and friends. Consequently, to effectively leverage the effect of low costs of banks on tax compliance, lower costs are needed.

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APPENDIX: CHAPTER 3

Figure A3.1: Fiscal deficit of sub-Saharan countries 2009-2021 with respect to GDP

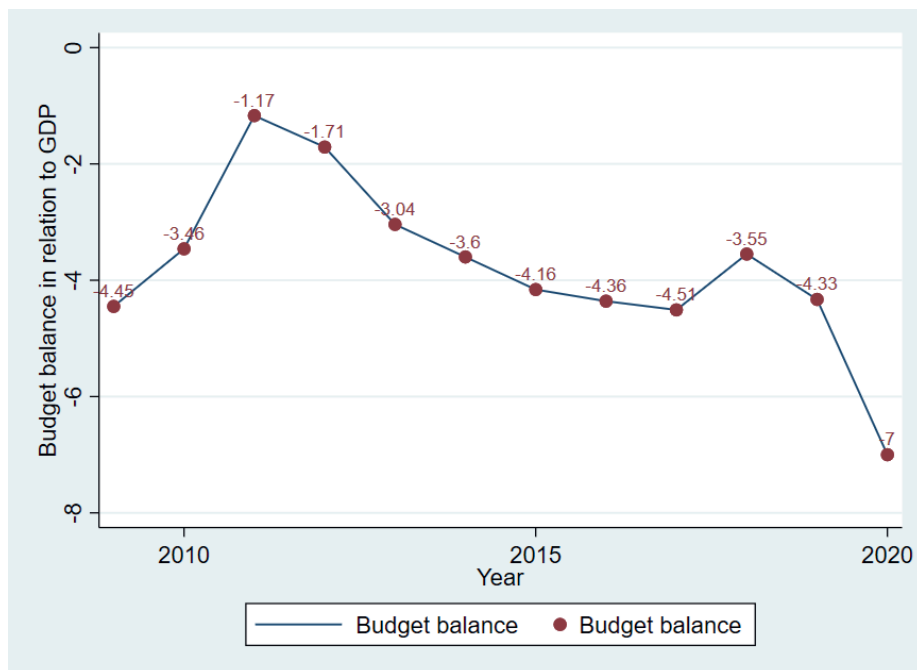


Table A3.1: Definition of the variables

Variable	Definition
Main independent variables	
Informal finance	Use of loan from family and friends to create the business
Low costs of banks (proxy of Financial development)	Firms do not think that banks are expensive
Outcomes variables	
Profit tax	Business pays tax on its profit
VAT	Business is registered for VAT or sales tax
Local tax	Business pays local tax
Control variables	
Urban	Business is in an urban area
Years of the business	Number of years the business has been established
<i>Gender of the business owner</i>	

Continued on next page...

Table A3.1 – continued

Male owner	The owner of the business is a man
Female owner	The owner of the business is a woman
Male and female	The business is owned by females and males
<i>Education</i>	
Primary education	Primary education of the business owner
Secondary education	Secondary education of the business owner
Tertiary education	Tertiary education of the business owner
Vocational education	The business owner has vocational education
No education	No education of the business owner
<i>Sector of activity</i>	
Trading	The business is in the trading sector
Manufacture	The business is in the manufacturing sector
Agriculture	The business is in the agricultural sector
Other sectors	The business is in other sectors
Other services	The business is in other service sector
Instruments	
<i>Exclusion restriction for informal finance</i>	
Informal means of sending money	Asking someone or in person
<i>Exclusion restriction of Low costs of banks</i>	
Use of bank for transactions	Use of bank for transactions with customers

Table A3.2: Simple probit of the effects of informal finance and costs of banks on tax compliance

VARIABLES	(1) VAT	(2) Profit tax	(3) Local tax
Informal finance	-0.0283** (0.0144)	-0.0748*** (0.0175)	0.0289 (0.0214)
Low costs of banks	0.0920*** (0.0113)	0.0808*** (0.0150)	0.286*** (0.0308)
Male	0.0617*** (0.00973)	0.0958*** (0.0121)	0.137*** (0.0165)
Male and female	0.108*** (0.0124)	0.108*** (0.0163)	0.190*** (0.0240)
Urban	0.0629*** (0.00965)	0.0458*** (0.0118)	0.0714*** (0.0166)
Primary education	0.0238 (0.0217)	0.0478** (0.0208)	0.0485** (0.0231)
Secondary education	0.115*** (0.0212)	0.143*** (0.0216)	0.247*** (0.0266)
Tertiary education	0.191*** (0.0230)	0.236*** (0.0252)	0.454*** (0.0388)
Vocational education	0.165*** (0.0304)	0.276*** (0.0359)	0.330*** (0.0552)
Manufacture	-0.0355** (0.0174)	0.000319 (0.0222)	-0.168*** (0.0337)
Agriculture	-0.0762* (0.0392)	-0.188*** (0.0426)	0.0689 (0.0472)
Other sectors	-0.0259 (0.0176)	-0.0497** (0.0229)	0.0251 (0.0323)
Other services	0.0164 (0.0102)	0.0302** (0.0126)	0.0693*** (0.0185)
Number of employees	0.0195*** (0.00377)	0.0220*** (0.00428)	0.103*** (0.0107)
Years of the business	0.00537*** (0.000702)	0.00302*** (0.000871)	0.00786*** (0.00140)
Country dummies	YES	YES	YES
Observations	6,271	6,271	4,625

standard errors between parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
Note: Marginal effects are reported.

Table A3.3: Full table of the effect of financing on VAT compliance

		VAT				
	(1)	(2)	(3)	(4)	(5)	(6)
	Informal fin.	Low costs	Informal fin.	Low costs	Informal fin.	Low costs
Male owned business	0.174*** (0.045)	0.180*** (0.047)	0.151*** (0.045)	0.196*** (0.048)	-0.007 (0.048)	0.213*** (0.050)
Owned by Male and female	0.146** (0.062)	0.234*** (0.063)	0.116* (0.063)	0.261*** (0.064)	-0.031 (0.071)	0.272*** (0.066)
Urban	0.048 (0.043)	0.268*** (0.047)	0.042 (0.043)	0.265*** (0.048)	-0.002 (0.049)	0.297*** (0.051)
Primary education	-0.261*** (0.061)	0.143 (0.087)	-0.270*** (0.062)	0.145* (0.087)	-0.090 (0.067)	0.184** (0.090)
Secondary education	-0.300*** (0.067)	0.568*** (0.087)	-0.299*** (0.067)	0.566*** (0.088)	-0.006 (0.076)	0.575*** (0.092)
Tertiary education	-0.455*** (0.091)	0.865*** (0.097)	-0.459*** (0.093)	0.870*** (0.097)	-0.229** (0.107)	0.869*** (0.103)
Vocational education	-0.251* (0.140)	0.456*** (0.146)	-0.260* (0.141)	0.446*** (0.146)	0.030 (0.153)	0.457*** (0.148)
Manufacture			0.124 (0.084)	0.004 (0.088)	0.245*** (0.089)	-0.010 (0.089)
Agriculture			0.107 (0.118)	-0.256* (0.151)	0.042 (0.129)	-0.236 (0.152)
Other sectors			-0.236*** (0.090)	0.185** (0.075)	-0.009 (0.098)	0.054 (0.083)
Other services			0.114**	-0.040	0.088*	-0.041

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Table A3.3 – continued

Number of full employees	0.006 (0.009)	0.018** (0.008)	0.006 (0.009)	0.048 (0.008)	0.051 (0.008)	0.053 (0.008)
Years of the business	0.008*** (0.003)	0.008*** (0.003)	0.008*** (0.003)	0.009*** (0.003)	-0.008** (0.004)	0.009*** (0.003)
Informal means of communication	0.211*** (0.042)	0.223*** (0.042)	0.223*** (0.042)	0.135** (0.059)	0.135** (0.059)	0.135** (0.059)
Informal means of sending money	0.306*** (0.062)	0.311*** (0.062)	0.311*** (0.062)	0.161 (0.099)	0.161 (0.099)	0.161 (0.099)
Use of Bank for transactions		0.580*** (0.084)		0.568*** (0.085)		0.513*** (0.090)
Constant	-1.385*** (0.098)	-1.964*** (0.095)	-1.402*** (0.100)	-1.978*** (0.096)	-1.531*** (0.183)	-2.292*** (0.134)
Observations	6,271	6,271	6,271	6,271	6,271	6,271

Standard errors between parentheses.

Equations of informal finance and low costs of banks. Full information maximum likelihood estimations.

Columns (1), (2) include all the control variables except the sectors of activity. Columns (3) (4) include all the control variables. Columns (5), (6) include additionally the country dummies.

Table A3.4: Full table of the effect of financing on profit tax compliance

	Profit tax					
	(1)	(2)	(3)	(4)	(5)	(6)
	Informal fin.	Low costs	Informal fin.	Low costs	Informal fin.	Low costs
Male owned business	0.167*** (0.045)	0.176*** (0.048)	0.142*** (0.045)	0.193*** (0.048)	-0.001 (0.048)	0.213*** (0.050)
Owned by Male and female	0.156** (0.061)	0.240*** (0.063)	0.124** (0.062)	0.266*** (0.064)	0.010 (0.069)	0.280*** (0.066)
Urban	0.036 (0.042)	0.264*** (0.048)	0.034 (0.043)	0.264*** (0.048)	0.001 (0.049)	0.298*** (0.051)
Primary education	-0.263*** (0.061)	0.144* (0.087)	-0.272*** (0.061)	0.143* (0.086)	-0.069 (0.068)	0.178** (0.089)
Secondary education	-0.298*** (0.066)	0.572*** (0.087)	-0.297*** (0.066)	0.567*** (0.087)	0.017 (0.075)	0.568*** (0.092)
Tertiary education	-0.463*** (0.089)	0.884*** (0.096)	-0.469*** (0.090)	0.886*** (0.096)	-0.193* (0.102)	0.878*** (0.102)
Vocational education	-0.237* (0.139)	0.452*** (0.146)	-0.247* (0.138)	0.443*** (0.146)	0.084 (0.151)	0.444*** (0.148)
Manufacture			0.099 (0.085)	-0.001 (0.089)	0.229*** (0.089)	-0.009 (0.090)
Agriculture			0.138 (0.113)	-0.241 (0.152)	0.061 (0.123)	-0.221 (0.153)
Other sectors			-0.228*** (0.089)	0.197*** (0.075)	-0.032 (0.098)	0.065 (0.083)
Other services			0.119*** (0.089)	-0.042 (0.075)	0.093* (0.098)	-0.026 (0.083)

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Table A3.4 – continued

Number of full employees	0.003 (0.009)	0.020** (0.008)	0.004 (0.009)	0.020** (0.008)	0.004 (0.009)	0.048 (0.008)	0.050 (0.009)	0.052 (0.008)
Years of the business	0.008*** (0.003)	0.007** (0.003)	0.007*** (0.003)	0.008*** (0.003)	-0.007* (0.004)	0.008*** (0.003)	-0.007* (0.004)	0.009*** (0.003)
Informal means of communication	0.255*** (0.039)		0.268*** (0.039)		0.204*** (0.054)			
Informal means of sending money	0.224*** (0.057)		0.228*** (0.057)		0.165** (0.075)			
Use of Bank for transactions		0.513*** (0.082)		0.499*** (0.083)				0.441*** (0.089)
Constant	-1.313*** (0.094)	-1.959*** (0.094)	-1.332*** (0.096)	-1.974*** (0.096)	-1.603*** (0.159)			-2.298*** (0.132)
Observations	6,271	6,271	6,271	6,271	6,271	6,271	6,271	6,271

Standard errors between parentheses.

Equations of informal finance and low costs of banks. Full information maximum likelihood estimations.

Columns (1), (2) include all the control variables except the sectors of activity. Columns (3) (4) include all the control variables. Columns (5), (6) include additionally the country dummies.

Table A3.5: Full table of the effect of financing on local tax compliance

	Local tax					
	(1)	(2)	(3)	(4)	(5)	(6)
	Informal fin.	Low costs	Informal fin.	Low costs	Informal fin.	Low costs
Male owned business	0.148*** (0.045)	0.188*** (0.049)	0.126*** (0.046)	0.201*** (0.049)	-0.022 (0.048)	0.215*** (0.051)
Owned by Male and female	0.071 (0.066)	0.235*** (0.070)	0.042 (0.066)	0.257*** (0.070)	-0.075 (0.069)	0.265*** (0.069)
Urban	0.039 (0.043)	0.271*** (0.048)	0.032 (0.044)	0.269*** (0.048)	-0.004 (0.049)	0.307*** (0.051)
Primary education	-0.262*** (0.062)	0.133 (0.086)	-0.273*** (0.062)	0.134 (0.086)	-0.074 (0.066)	0.175* (0.090)
Secondary education	-0.288*** (0.072)	0.562*** (0.087)	-0.294*** (0.071)	0.559*** (0.087)	0.023 (0.076)	0.572*** (0.092)
Tertiary education	-0.516*** (0.097)	0.886*** (0.097)	-0.533*** (0.097)	0.888*** (0.097)	-0.226** (0.103)	0.886*** (0.103)
Vocational education	-0.227 (0.150)	0.456*** (0.147)	-0.249* (0.149)	0.447*** (0.147)	0.085 (0.154)	0.451*** (0.149)
Manufacture			0.121 (0.084)	0.003 (0.090)	0.248*** (0.087)	-0.010 (0.091)
Agriculture			0.144 (0.122)	-0.258* (0.151)	0.052 (0.131)	-0.237 (0.151)
Other sectors			-0.228** (0.089)	0.194** (0.076)	-0.015 (0.100)	0.070 (0.084)
Other services			0.110**	-0.035	0.072	-0.029

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Table A3.5 – continued

Number of full employees	-0.006 (0.007)	0.022*** (0.008)	(0.045) -0.006 (0.007)	(0.049) 0.022*** (0.008)	(0.051) -0.003 (0.007)	(0.052) 0.019** (0.008)
Years of the business	0.009*** (0.003)	0.008** (0.003)	0.008*** (0.003)	0.009*** (0.003)	-0.005 (0.004)	0.009*** (0.003)
Informal means of communication	0.186*** (0.049)		0.186*** (0.048)		0.204*** (0.055)	
Informal means of sending money	0.158** (0.066)		0.154** (0.066)		0.060 (0.070)	
Use of Bank for transactions		0.446*** (0.088)		0.443*** (0.090)		0.407*** (0.094)
Constant	-1.224*** (0.102)	-1.963*** (0.096)	-1.223*** (0.102)	-1.977*** (0.098)	-1.431*** (0.141)	-2.284*** (0.136)
Observations	6,271	6,271	6,271	6,271	6,271	6,271

Standard errors between parentheses.

Equations of informal finance and low costs of banks. Full information maximum likelihood estimations.

Columns (1), (2) include all the control variables except the sectors of activity. Columns (3) (4) include all the control variables. Columns (5), (6) include additionally the country dummies.

Table A3.6: Number of observations

Country	Observations	Percentage
UGA	500	7.77
KEN	513	7.97
TANZ	491	7.63
RWAN	640	9.94
ETH	841	13.06
GHA	500	7.77
CAM	520	8.08
NIG	554	8.6
NAM	374	5.81
SA	627	9.74
BOST	386	5.99
MOZ	493	7.66

Chapter 4

Does tax compliance hurt small businesses? The role of incubators and training

4.1 Introduction

The informal economy is widespread in developing countries and mainly takes place in informal businesses. It comes with several challenges for countries, such as a lack of social protection and low productivity. [Amin et al. \(2019\)](#) assess the gap in labour productivity between formal and informal firms in developing countries. It appears that the labour productivity of informal firms is about one fourth that of formal firms. Among the several challenges, governments' lack of fiscal resources is one of the most compelling. Because of these challenges, scholars have been trying to uncover the main factors behind the choice of firms.

According to the rational exit theory ([Levy, 2008](#)), self-employment in the informal sector ¹ is due to a choice after weighing the costs and benefits of informality. The informal sector exists because of tax avoidance and the rational choice of less productive firms that do not see any benefit associated with formalisation. In line with the exit theory, many reforms have occurred between 2003 and 2012 ([Bruhn, 2013](#)). During this period, the costs have decreased by about two-third and the World time average for starting a business is 30 days, compared to 50 days before. One of the main policies towards the informal economy adopted by governments is the ease of regulations and procedures for firms to register and comply. This has become a significant focus of donor agencies and business environment reforms.

However, these reforms may not be enough to reduce the costs of operating formally for micro and small businesses that constitute most firms in developing countries. As highlighted by [White \(2018\)](#), micro and small enterprises deserve special attention due to their contribution to inclusive development by high job creation opportunities

¹Throughout the paper, we consider informal firms as those that do not comply with tax regulation ([de Paula and Scheinkman, 2007](#)).

and poverty reduction. This is especially important in developing countries where the self-employed and the micro firms have a combined share of total employment between 80% and 90% in low and middle-income countries (ILO, 2019). It is essential to have an environment without burdensome regulations for micro and small business development at all stages of the business life cycle. High compliance costs and the complexity of tax regimes increase the financial constraints faced by small firms (OECD, 2018). Smaller firms have less ability to absorb high compliance costs than larger firms due to a lack of resources. As argued by Williams et al. (2017), in developing economies, registration comes with high costs and few benefits.

Consequently, we can expect micro and small firms to face challenges when complying with taxation. Their earnings may not be enough to sustain high costs of compliance, particularly in Sub-Saharan Africa, which is, according to the Doing Business 2020 (WB, 2020), one of the regions with the most cumbersome tax compliance processes. Sub-Saharan Africa remains one of the weak-performing regions regarding the ease of doing business, with an average score of 51.8. This is well below the global average of 63 (WB, 2020). Nonetheless, Sub-Saharan countries need to increase their tax base and improve their financial resources. There are several ways to not impede the growth of micro and small businesses by pushing for formalisation. One is to increase the benefits of formalisation and explore policies and programs that can enhance such benefits.

This chapter studies the impacts of formalisation for micro and small firms on a range of various outcomes in several Sub-Saharan countries. More specifically, it explores the effects of formalisation on firms performance, export, access to trade credit, and loans from banks. Indeed, according to the World Bank's Informal Enterprise Survey, around 11% of the informal enterprises use loans, and 23% have bank accounts (ILO, 2016). The chapter equally assesses whether receiving support from incubators and training enhances the benefits and mitigates the potentially adverse effects for firms. The literature is inconclusive on the benefits of formalisation on firms. According to Cling et al. (2012), most informal firms do not see any benefit in formalisation. While for formal firms, the major benefits that they report are less corruption and winning contracts with large firms. Thus, the perceived potential benefits of formalisation act as incentives for formalisation. There is also evidence that the benefits of formalisation depend on the characteristics of the firm and/or its owner. From a policy standpoint, exploring avenues to increase these benefits is crucial. Some aspects that need further reflection are the necessary skills to navigate the complex and burdensome tax compliance and the support and advice to manage a business properly. Business/entrepreneurship training and incubation provide both better knowledge on these aspects.

There is evidence that managerial abilities positively affect the performance of micro and small firms in Vietnam. It is an input that can improve the productivity of other inputs (UNU-WIDER, 2018).² Around the world, many programs have been launched to improve the managerial capacities of micro and small firms. The idea is that to unlock their growth potential, these firms need to have the required knowledge and ability to find their way through the regulations and manage their finances for better investment and growth strategies. Small firms particularly may have challenges to navigate complex tax regimes, which can increase the compliance costs burden. The ability given by training or the advice provided by an incubation centre can ease these burdens.

In this context, we expect micro and small firms that are formal and benefit from this support to have better outcomes than firms that do not. Even in a loan application, firms that know the procedures and requirements may have better chances to obtain one. Thus, policymakers that have a plan to formalise micro and small firms should look into designing and putting into place such programs to help micro and small firms better cope with the consequences.³

4.1.1 Literature Review

In this study, we investigate the benefits of formalisation for small firms and the channels through which they may increase those potential benefits. McKenzie and Sakho (2010) analyse the impacts of formalisation on informal firms in Bolivia. Only medium-sized firms experienced an increase in their profits. This echoes the study in SriLanka (de Mel et al., 2013), where results showed an equally modest net benefit of formalisation. Only firms belonging to the upper tail drive the increase in profit. These results indicate that formalisation may have different benefits according to the characteristics of the firms. It could be that firms need to obtain some capabilities or facilities to enhance the gains or obtain any. Formalisation comes with different procedures and means of managing the business. A lack of knowledge or the facilities required to adapt to such a situation may negatively affect gains.

Some studies looked at the effects of formalisation on firms' performance. They found that formalisation leads to an increase in profits (Rand and Torm, 2012; Boly, 2015; Fajnzylber et al., 2011); and in value-added per year (Boly, 2015; Demenet et al., 2016; Sharma, 2014). In terms of increased profits, there is evidence of higher

²Managerial skills refer to all practices and traits of an operator that influences a firm's efficiency.

³According to the WB (2014), there is a growing interest in incubator models that help practising entrepreneurs develop market and supply chain linkages in Ghana, Mozambique, and Kenya.

impacts for micro firms with at least one employee compared to micro firms without employees (Fajnzylber et al., 2011). Some of the channels through which a firm's performance increases are improved equipment, a larger customer base, and access to business association. Business associations may act as incubators for firms that become formal and provide advice on properly managing the business and mitigating the potential costs of formalisation. Among the direct benefits of formalisation, there is an inconclusive positive impact on access to credit (Fajnzylber et al., 2011; Boly, 2015; Rand and Torm, 2012; de Mel et al., 2013). There is also evidence that the timing of registration matters for firms. Williams et al. (2017) use the World Bank Enterprise survey covering 127 economies and found that registered firms that started up unregistered have better performance than firms that registered from the start.

Some studies investigated the relationship between formalisation and corruption and or legitimacy (Tian et al., 2019; Assenova and Sorenson, 2017; McCulloch et al., 2010). In their research on nascent ventures in China, Tian et al. (2019) found that registration helps businesses cope with arbitrary government corruption. The benefits associated with registration may increase with institutional settings. In their study, Assenova and Sorenson (2017) investigated whether the benefits associated with registration is more significant in countries with the highest levels of legitimacy. They used matched data on formal and informal firms from 18 Sub-Saharan countries and found that the effect of registration on size and sales increases with the level of trust in the state. McCulloch et al. (2010), find that formalisation reduces corruption payments for firms in rural Indonesia. They also find that the benefits depend on the characteristics of the firms and the owner's education level. This result on corruption contradicts that of Rand and Tarp (2012), where they demonstrated that formalisation had increased the probability of paying bribes for firms in Vietnam and thus has affected firms' net profits.

In sub-Saharan Africa, the evidence of the impact of formalisation is still scarce. Kasseeah (2016) investigated in Mauritius the effect of formality on small firms. He found that, depending on the measure of performance chosen, formalisation has a positive impact. Using a unique panel dataset on Mozambique, Berkel (2018) investigated the relationship between formalisation and firm outcomes. They found that most informal firms do not benefit from formalisation due to their underlying conditions. They also point out that better institutions are needed for informal firms to gain any benefits from formalisation. They reveal that the costs of formalisation are high and the benefits few. Formalisation does not improve the access of firms to credit.

Our paper builds on the limitations of the previous literature. First, there is no evidence of the effects of formalisation on exports. Whereas, as argued by Schleifer and Nakagaki (2018), to enter export contracts, small firms are often required to move

from the informal to the formal economy. For micro and small firms, registration with tax offices may provide opportunities to access the markets of other countries. Second, when it comes to increased access to formal credit, the previous literature has mainly considered credit from banks, while trade credit is equally essential for micro and small firms. Third, a main limitation of the previous literature is that they do not investigate whether access to outside firm knowledge is one of the channels through which firms can improve the benefits of formalisation. As we argued above, without proper knowledge, small firms may not draw benefits from formalisation. In their study of firms' formalisation in Malawi, Campos et al. (2018) provide evidence that providing proper information to businesses increases the probability of formalised firms using formal financial services. As such, we seek to expand the literature and provide empirical evidence on the benefits associated with formalisation and investigate the knowledge channel as a way of enhancing the benefits.

This paper investigates, first, the benefits of formalisation for small firms, if any. More specifically, it explores the effects of formalisation on firms' performance, export, access to trade credit, and loans from banks. Second, it explores the differentiated channels through which those gains may be enhanced. It investigates whether having access to knowledge through training and business' incubators increases the impacts of formalisation.

4.2 Data and information sources

The data that we use is the Small Business Access and Usage Survey in twelve African countries collected in 2011-2012. Random sampling was performed in four steps for businesses. First, the national census sample frames was split into urban and rural Enumerator areas (EAs). Second, EAs were sampled for each stratum using probability proportional to size (PPS). Third: for each EA one listing were compiled for businesses. The listings serve as the sample frame for the simple random sections. Fourth, 24 Households and 10 businesses were sampled using a simple random sample for each selected EA. The survey collects various information on small businesses related to their characteristics, the type of finance used to create the business, their access to finance and ICT, and their productivity. The survey is nationally representative. The countries covered are Botswana, Cameroon, Ethiopia, Ghana, Kenya, Mozambique, Namibia, Nigeria, Rwanda, South Africa, Tanzania, and Uganda. The total number of businesses is 6441.

4.2.1 Data construction

Outcomes variables and main independent variable

We consider four outcome variables.

performance: it is derived from a question asking managers whether they have a good performance in the current year compared to the previous year.

export: the variable is derived from a question that asks whether or not the firm has customers in other countries.

trade credit: it is derived from a question asking the businesses whether they have a credit line from suppliers.

loan⁴: the variable loan reports whether businesses have loans from banks or not.

The outcome variables are binary. The main independent variable is the **formal** status of the firm. A firm is considered formal when the business is registered for Value Added Tax and/or Profit tax. This measure is commonly used in the literature (Boly, 2015; McKenzie and Sakho, 2010; Rand and Torm, 2012).

Control variables

The control variables include gender, level of education, sector of activity dummies to account for sector differences, access to the internet, access to tips, and support from incubation centres and training. We use the number of employees as a proxy of the size of the firms.

Variables that can enhance the benefits of formalisation. As we argued above, acquiring some knowledge outside of the firm may enhance the benefits of formalisation. It may provide the necessary capabilities to mitigate the costs of formalisation and adopt the practices that come along with formalisation. We consider two variables. The first variable is **training**, which is whether the firm has received training. The second variable is **incubator's support**, which is whether the firm gets tips and advice from an incubator centre. As seen in Figures 4.1 and 4.2, firms, the average outcomes of firms that possess one of these 2 types of knowledge is higher

⁴As specified above, the World Bank Informal enterprise survey shows that informal firms have access to formal finance (ILO, 2016).

than that of those that do not. Hence, these variables could enhance the benefits of formalisation.

Figure 4.1: Average of each outcome by training

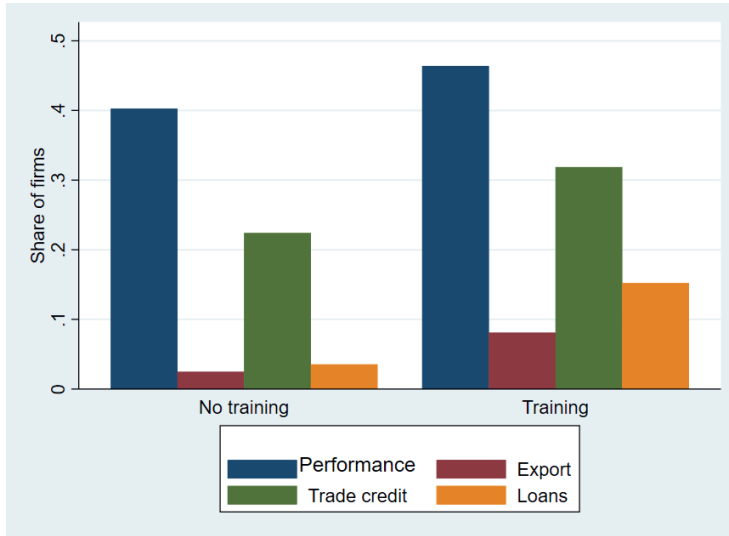


Figure 4.2: Average of each outcome by support from incubators

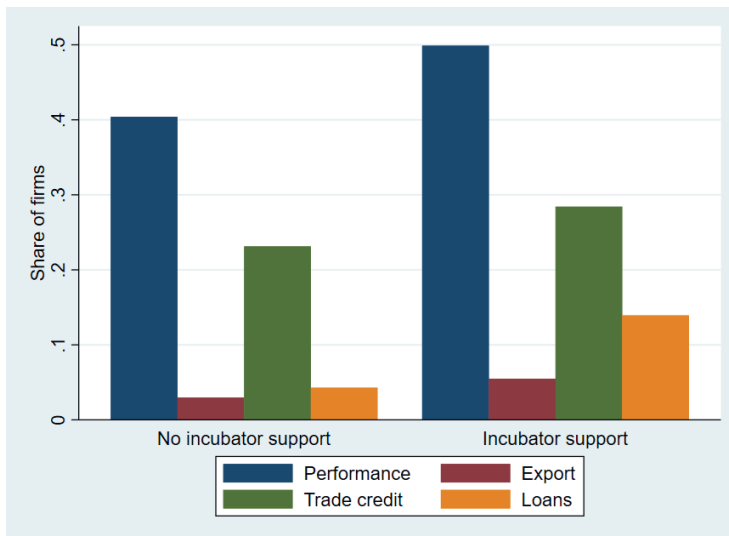


Table 4.1: Descriptive statistics

Variable Obs	Obs	Mean	Std. Dev.
Outcomes			
Improved performance	6,439	0.413	0.492
Loan	6,439	0.056	0.23
Trade credit	5,683	0.241	0.427
Export	6,400	0.034	0.183
Main independent variable			
Formal	6,439	0.262	0.439
Control variables			
Number of full employees	6,351	1.001	3.167
<i>Gender</i>			
Male owner	6,430	0.458	0.498
Female owner	6,430	0.383	0.486
Male and female owners	6,430	0.157	0.363
<i>Education</i>			
No education	6,431	0.113	0.316
Primary education	6,431	0.327	0.469
Secondary education	6,431	0.119	0.324
Tertiary education	6,431	0.0241	0.153
Vocational education	6,431	0.113	0.49
<i>Sector of activities</i>			
Trade	6,439	0.474	0.239
Manufacture	6,439	0.0610	0.239
Agriculture	6,439	0.0265	0.160
Other sectors	6,439	0.0812	0.27
Other services	6,439	0.356	0.479
Internet	6,432	0.043	0.203
Advice from incubator	5,688	0.075	0.264
Training	6,434	0.178	0.383

Table 4.1 reports the descriptive statistics of the variables. In our sample, less than 50% of the firms report having a better performance than the previous year. On export, as expected, a small percentage of firms reports exporting their products. They are, on average, only 3.4% that report having customers outside the country. Regarding access to credit, micro and small firms are more likely to receive trade credit (24%) than credit from banks (5.6%). On average, firms in our sample have only one employee. Men-led businesses constitute the majority of our sample (45.8%) compared to women-led businesses (38.3%) and businesses led by both genders (15.7%). The owners' level of education in our sample is overall low, with the majority of business owners having a primary level of education (32.27%). Only 2.4% of the sample have a tertiary level of education. The majority of the businesses operate in the trading sector, with a percentage of 47.4%. A higher rate of firms has received training (17.8%) than receiving tips and advice from incubation centres (7.5%).

Table 4.2 disaggregates the statistics on the primary outcome variables by country. Overall, none of the countries has a percentage of micro and small firms paying taxes superior to 50%. South Africa, Rwanda, and Uganda are the countries with the highest percentages of formal firms, with respectively 33%, 33%, and 34%. Regarding the performance variable, the countries in which more than 50% of the firms report a higher performance than the previous year are Tanzania, Rwanda, Ghana, Nigeria, and Botswana. For export, as highlighted previously, micro and small firms may have fewer opportunities regarding the export of their products. Among the countries, none has a percentage of exporting firms superior to 10%. The countries with the highest shares are South Africa and Uganda, with respectively 7% of firms exporting their products. There is almost a similar picture when it comes to loans from banks. In all countries, less than 10% of firms have a loan, except South Africa and Namibia, with respectively 11% and 10% of firms having a loan. In all countries, the percentages of firms with a trade credit are higher than 10%, with Uganda and Rwanda having the highest rates (37%).

Table 4.3 compares the mean of each explanatory variable between formal and informal firms. It appears that there are significant differences in all variables. For instance, formal firms have a higher number of employees compared to informal firms. They are also more likely to be led by men. Formal firms are more likely to have owners with a tertiary level of education.

Table 4.2: Statistics on formalisation and the main outcomes per country

	Formal		Improved Performance		Export		Loan		Trade credit	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
UGA	0.34	0.47	0.32	0.47	0.07	0.26	0.08	0.27	0.37	0.48
KEN	0.26	0.44	0.33	0.47	0.04	0.20	0.05	0.22	0.23	0.42
TANZ	0.27	0.44	0.50	0.50	0.01	0.08	0.07	0.25	0.12	0.33
RWAN	0.33	0.47	0.50	0.50	0.01	0.11	0.03	0.17	0.37	0.48
ETH	0.18	0.38	0.25	0.43	0.01	0.11	0.02	0.13	0.27	0.44
GHA	0.29	0.45	0.51	0.50	0.03	0.17	0.04	0.20	0.30	0.46
CAM	0.25	0.43	0.26	0.44	0.02	0.13	0.05	0.23	0.18	0.39
NIG	0.27	0.44	0.62	0.49	0.02	0.15	0.03	0.17	0.31	0.46
NAM	0.26	0.44	0.47	0.50	0.06	0.24	0.10	0.30	0.17	0.37
SA	0.33	0.47	0.41	0.49	0.07	0.26	0.11	0.31	0.16	0.37
BOST	0.18	0.38	0.52	0.50	0.04	0.21	0.09	0.29	0.13	0.34
MOZ	0.18	0.39	0.40	0.49	0.05	0.21	0.05	0.22	0.15	0.35

Table 4.3: Statistics on formalisation and the main outcomes

Explanatory variables	Formal	No formal	Difference	Pvalue
Number of full employees	2.20	0.57	1.63	0.000
Owned by Male	0.53	0.43	0.10	0.000
Owned by Male and female	0.20	0.14	0.06	0.000
Secondary education	0.38	0.31	0.07	0.000
Tertiary education	0.25	0.07	0.18	0.000
Vocational education	0.05	0.02	0.03	0.000
No education	0.05	0.13	-0.08	0.000
Manufacture	0.07	0.06	0.01	0.045
Agriculture	0.01	0.03	-0.02	0.000
Other sectors	0.07	0.09	-0.02	0.022
Other services	0.43	0.33	0.11	0.000
Business has internet access	0.13	0.01	0.12	0.000
Rely on business incubator	0.13	0.06	0.07	0.000
Training to improve business skills	0.30	0.14	0.16	0.000

4.3 Model specification

Several methods have been adopted in the literature going from Control Function method, difference-in-difference, to propensity score matching to estimate the impacts of formalisation on firms' gains, (Boly, 2015; Fajnzylber et al., 2011; Sharma, 2014). To equally assess the effects of formalisation, we adopt an endogenous switching probit model (Duysters and Lokshin, 2011). We consider the following model that describes the behaviour of the firm with two binary outcome equations and a criterion function T_i that determines which regime the agent faces. T_i can be interpreted as the formal status of the firm, and the outcome (whether the firm gains from formalisation or not) can take one of the two potential values:

$$T_i = 1 \quad \text{if} \quad \gamma Z_i + \mu_i > 0 \quad (4.1)$$

$$T_i = 0 \quad \text{if} \quad \gamma Z_i + \mu_i \leq 0 \quad (4.2)$$

$$y_{1i}^* = \beta_1 X_{1i} + \varepsilon_{1i} \quad y_{1i} = I(y_{1i}^* > 0) \quad (4.3)$$

$$y_{0i}^* = \beta_0 X_{0i} + \varepsilon_{0i} \quad y_{0i} = I(y_{0i}^* > 0) \quad (4.4)$$

The observed discrete outcomes (improved performance, export, trade credit, loans from banks) y_i are defined as

$$y_i = y_{1i} \text{ if } T_i = 1 \quad (4.5)$$

$$y_i = y_{0i} \text{ if } T_i = 0 \quad (4.6)$$

where y_{1i}^* and y_{0i}^* are the latent variables that determine the observed binary outcomes y_1 and y_0 (whether the firm gains from formalisation or not); X_1 and X_0 are vectors of explanatory variables and includes the control variables specified above as well as the knowledge variables. Z is a vector of variables that determines a switch between the regimes, it includes the same variables that are in the vector of explanatory variables but also some excluded variables from the outcome equation; β_1 , β_0 , and γ are vectors of parameters; and μ_i , ε_{1i} , and ε_{0i} are the error terms. Assume that μ_i , ε_{1i} , and ε_{0i} are jointly normally distributed, with a mean-zero vector and correlation matrix

$\Omega =$

$$\begin{pmatrix} 1 & \rho_0 & \rho_1 \\ & 1 & \rho_{10} \\ & & 1 \end{pmatrix} \quad (4.7)$$

where ρ_0 and ρ_1 are the correlations between ε_0 , μ and ε_1 , μ , and ρ_{10} is the correlation between ε_0 and ε_1 .

y_{1i} and y_{0i} are never observed simultaneously, the joint distribution of $(\varepsilon_0, \varepsilon_1)$ is not identified, and consequently, ρ_{10} cannot be estimated. This model is identified by non linearities of its functional form (Lokshin and Glinskaya, 2009; Duysters and Lokshin, 2011). We estimate a full information maximum likelihood (FIML) endogenous switching probit model to estimate the parameters of interest. We follow (Lokshin and Glinskaya, 2009) and add an exclusion restriction. We construct a variable that captures the share of firms in the country-sector of activity that are formal, excluding the firm itself.

We estimate the treatment effects based on Aakvik et al. (2000). The effect of the

treatment on the treated, or the expected effect of the treatment on firms with observed characteristics x who formalised (TT):

$$\begin{aligned}
 TT(x) &= Pr(y_1 = 1 | T = 1, X = x) - Pr(y_0 = 1 | T = 1, X = x) \\
 &= (\Phi(X_1\beta_1, Z\gamma, \rho_1) - \Phi(X_0\beta_0, Z\gamma, \rho_0)) \div F(Z\gamma)
 \end{aligned} \tag{4.8}$$

where F is a cumulative function of the univariate normal distribution and where Φ is the cumulative function of a bivariate normal distribution.

The average treatment effect on the treated is calculated by averaging equation 8 over the observations of the subgroups. The ATT is the mean effect of the treatment on those who actually chose to formalise.

$$ATT = \frac{1}{N} \sum_{i=1}^{N_T} TT(x_i) \tag{4.9}$$

4.3.1 Results and discussion

This section presents the results and offers a discussion on the main implications for micro and small businesses. We start with the estimates of the endogenous switching probit model. Tables A4.2, A4.3, A4.4 and A4.5 present respectively the full results of the effect of formalisation on performance, export, trade credit and loan. The Wald test confirms the joint significance of the error correlation coefficients in the selection equation and the outcome equations.

Effects of formalisation on businesses

Table 4.4 reports the results of the average treatment effect on the treated. The results indicate that formalisation decreases the probability of having a higher performance than the previous year of about 4.64% for formal firms compared to the counterfactual scenario of not being formal. These results demonstrate that micro and small firms may be negatively impacted by tax compliance. As stated previously, they may lack the necessary skills and resources to cope with the high costs of tax compliance. This is

in line with the findings of Mckenzie and Sakho (2010) and, more importantly, with the results of Berkel (2018) in Mozambique. In their study of the effect of tax registration on small firms' performance, Mckenzie and Sakho (2010) find that only medium-sized firms positively benefit from formalisation.

For the results of formalisation on export, we find positive and significant impacts. Formalisation increases the probability of exporting about 5.4% for formal firms than the counterfactual scenario of not being formal. Despite a rather low impact of formalisation on export, it is expected that formalisation provides further opportunities to micro and small firms to expand their market beyond their country. Indeed, to abide by the rules and get an export license having a formal status is necessary.

Formalisation equally significantly increases the probability of obtaining a trade credit and a loan. Formalisation increases the likelihood of getting a trade credit and loan of about respectively 7.7% and 11.6% for formal firms compared to the counterfactual scenario of not being formal. We notice that formalisation matters more when it comes to obtaining loans from banks, which concurs that to obtain a loan from a bank, it is often required to have a formal status compared to trade credit, where an established relationship with a supplier may be enough.

Regarding our variable of restriction, in all Tables (A4.2, A4.3, A4.4 and A4.5), the coefficient is significant and positively increases the probability to be formal.

Table 4.4: Treatment effects of formalisation

ATT	Performance	Export	Trade credit	Loan
Overall ATT	-0.464*** (0.003)	0.054*** (0.0018)	0.077*** (0.004)	0.116*** (0.003)
Own account	-0.486*** (0.004)	0.032*** (0.001)	0.02*** (0.004)	0.064*** (0.002)
Micro	-0.462*** (0.004)	0.066*** (0.002)	0.113*** (0.005)	0.13*** (0.004)
Small	-0.195*** (0.017)	0.137*** (0.026)	0.198*** (0.029)	0.585*** (0.035)
Obs	5577	5539	4904	5577

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

The table shows the results of the estimation with the variables performance, export, trade credit and loan as the outcomes. Overall represents the average treatment effect on the overall sample. Own account represent the sub-sample of firms without employees; micro represents the sub-sample of firms with 1-10 employees; Small represents the sub-sample of firms with more than 10 employees^a. All columns include control variables (number of full-time employees, education level, internet access, gender, receiving tips from incubators, sector of activities and training). The countries dummies are also included

^aIn the data, there are only 3 firms with more than 50 employees.

Heterogeneous effects by firm's size

Table 4.4 reports the results of the estimation by the firm's size. On the impacts of formalisation on firms' performance, the treatment effects are consistently adverse for all sizes in our sample. This negative impact of formalisation is more pronounced for firms without employees. Formalisation decreases the probability of having a better performance than the previous year of about 48.6% for firms without employees, 46.2% for micro firms and 19.5% for small firms.

The results demonstrate that, on average, firms of all sizes are negatively affected by tax compliance. As argued previously, in Sub-Saharan Africa, tax compliance involves high costs. As reported in the Doing Business 2020 (WB, 2020), tax compliance processes are cumbersome in the region. Moreover, simple registration and registration with tax offices do not have the same costs. As reported by Campos et al. (2018) in their experiment in Mozambique, when offered both options, most firms chose a formal status that does not involve tax obligations. Very few firms decide to register with tax offices. This may explain the negative results for all firms' size compared to the positive impacts of formalisation in Asia (Boly, 2015; Sharma, 2014;

Rand and Torm, 2012). However, as seen in (Rand and Tarp, 2012), the effects of formalisation depend on the considered measure. Most of the positive impacts found do not consider net measures of performance.

Concerning the impact of formalisation on export by the firm's size, we still observe a disparity in outcomes. Both for micro and small firms, the treatment effects are more than double that of firms without employees. This highlights the underlying conditions of firms that allow them to enhance the benefits of formalisation. The size reflects the resources and the opportunities they may have access. Firms with employees are more likely to have the necessary production scale to export. Most of the firms without employees are survivalist by nature, hence have less ability to export their products.

On the impacts of formalisation on trade credit and loan, we observe the same pattern by the firm's size as the one for export. The impacts on trade credit and loans are overall significant and positive for firms of all sizes. However, the effects on firms without employees are smaller than the size of the impacts on micro and small firms. The average treatment effect for trade credit and loans for firms without employees are respectively 2% and 6.4% compared to the estimates for micro firms and (11.3% and 13%) and small firms (19.8% and 58.5%). As previously argued, firms without employees benefit less from formalisation. They may lack the necessary collateral to obtain loans from banks. And regarding trade credit, the trust of the suppliers to provide trade credit to smaller firms may be less compared to their trust in providing trade credit to larger firms due to the potentially limited resources of the first category.

Overall, we can state that the impacts of formalisation are not homogeneously distributed across the size spectrum of firms. Due to underlying conditions related to their size, firms without employees are less likely to benefit from formalisation.

Do training and incubators enhance the benefits of formalisation for businesses?

Table 4.5 and Table 4.6 provide the treatment effects disaggregated by training status and incubator's support. One can see that formalisation significantly affects both those who receive advice from incubators and those who do not. On the outcome performance, the negative effect of formalisation is lower for firms that receive support from incubators. Formalisation decreases the probability of having a higher performance than the previous year of about 3.41% for formal firms with backing from incubators. Whereas for firms that are formal and do not receive any support from incubators, formalisation decreases the probability of having a higher performance

than the previous year of about 48.2%. It appears that receiving support from incubators may help mitigate the potential adverse effect of tax compliance on their performance.

Turning to export, one observes similarly a higher and positive treatment effect for formal firms that receive support from incubators. The treatment effect is about 6.5% for formal firms with support from incubators compared to 5.2% for formal firms without support. An interesting result is that for the outcomes of trade credit and loans, the differentiated impact between formal firms with support and formal firms without support is higher than the outcomes of export and performance. We note that the impact of formalisation for formal firms with support from incubators is almost double the treatment effects for formal firms without support. Regarding trade credit, the treatment effect is 14.9% for firms with the support compared to 6.7% for formal firms without support. Similarly, for a loan from banks, the impact for formal firms with the backing from incubators is 21.7% compared to 10.1% for firms without support.

We now analyse the effects of formalisation by the training received or not. Conversely to the treatment effect by the support received, firms that received training are not less likely to be negatively impacted by formalisation. However, when it comes to export, trade credit, and loans, we find a similar pattern. Indeed, the treatment effects of formalisation on firms with training are double when considering export, trade credit, and loans, as observed in Table 4.6. For export, the treatment effect is 15.2% for those with training compared to 3.6% for those without training. For trade credit and loans, the treatment effects are respectively 15.5% and 27.8% for firms with training compared to 6.3% and 8.5% for firms without training.

The results demonstrate that access to sources of knowledge is beneficial for micro and small firms to reap the benefits of formalisation. Indeed, business incubators and training organisations are essential for knowledge and technology transfer (Kraemer-Mbula, 2016).

Table 4.5: Treatment effects of formalisation by getting advice from incubators

Outcomes	ATT	
	Incubator	No incubator
Performance	-0.341*** (0.008)	-0.482*** (0.003)
Obs	5134	426
Export	0.065*** (0.005)	0.052*** (0.001)
Obs	5108	414
Trade credit	0.149*** (0.012)	0.067*** (0.004)
Obs	4522	369
Loan	0.217*** (0.014)	0.101*** (0.003)
Obs	5134	426

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

The table shows the results of the ESR by incubator status, with the variables performance, export, trade credit and loan as the outcomes. All columns include control variables (number of full-time employees, education level, internet access, gender, receiving tips from incubators, sector of activities and training). The country dummies are also included. Incubator means firms that receive tips from incubators.

Table 4.6: Treatment effects of formalisation by training

Outcomes	ATT	
	Training	No training
Performance	-0.329*** (0.007)	-0.49*** (0.003)
Obs	5175	385
Export	0.152*** (0.006)	0.0360*** (0.001)
Obs	5151	371
Trade credit	0.155*** (0.011)	.063*** (0.004)
Obs	4540	351
Loan	0.278*** 0.013	0.085*** (0.002)
Obs	5175	385

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

The table shows the results of the ESR by training, with the variables performance, export, trade credit and loan as the outcomes. All columns include control variables (number of full-time employees, education level, internet access, gender, receiving tips from incubators, sector of activities and training). The country dummies are also included.

Limitations

The first main limitation of this study is the use of cross-sectional data. The use of panel data would have allowed controlling for previous years of performance to mitigate the self-selection into formalisation. However, we are confident that the use of an endogenous switching probit model adequately accounts for self-selection.

The second main limitation is related to the variables of performance. The measure of performance used in this study is subjective. The use of information on profits or sales would have better captured the impact of formalisation on the firm's performance.

4.4 Conclusion and recommendations

Micro and small businesses constitute the cornerstone of Sub-Saharan Africa's economic development. Most of the job creation takes place in these units. With policies and development agendas having as a primary goal their formalisation, the consequences are not well understood. This paper attempts to estimate the impacts of formalisation through tax compliance on micro and small firms in 12 African countries. It equally explores the role of business training and the support received from incubators in mitigating or enhancing those impacts.

We adopt an endogenous switching probit model to estimate the impacts on a firm's performance, exports, and access to trade credit and loans from banks. The results show that formalisation did not improve the performance of firms and that the effects persist for firms of all sizes. Also, firms without employees (self-employees) are more importantly affected than firms with employees (micro and small firms). For other outcomes such as export, access to trade credit, and loans from Banks, the impacts are significant and positive. We equally find that business training and support from incubators mitigate the negative impacts while enhancing the positive effects. Business training and support from incubators have a more pronounced impact on trade credit and loans from banks.

These findings are essential. First, there is a trade-off between formalising micro and small firms in the region and protecting the jobs in these units. By their underlying conditions, micro and small firms support higher tax compliance costs compared to larger firms. Governments may put a system to support and train newly registered firms to minimise the potential adverse effects and enhance the positive ones. Such an approach will ensure that firms will be appropriately supported until they can navigate

the complex tax system and have the right management skills.

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APPENDIX: CHAPTER 4

Table A4.1: Definition of the variables

Variable	Definition
Main independent variable	
Formal	Whether the firm is registered for VAT and profit taxes
Outcomes variables	
Improved performance	Whether the owner judges that the performance of his business has improved compared to the previous year
Export	When the business has customers outside of the country
Trade credit	When the business has trade credit from its suppliers
Loan	When the business has loans from banks
Control variables	
<i>Gender of the business owner</i>	
Male owner	The owner of the business is a man
Female owner	The owner of the business is a woman
Male and female	The business is owned by females and males
<i>Education</i>	
Primary education	Primary education of the business owner
Secondary education	Secondary education of the business owner
Tertiary education	Tertiary education of the business owner
Vocational education	The business owner has vocational education
No education	No education of the business owner
<i>Sector of activity</i>	
Trading	The business is in the trading sector
Manufacture	The business is in the manufacturing sector
Agriculture	The business is in the agricultural sector
Other sectors	The business is in other sectors
Other services	The business is in other service sector
Instruments	
<i>Exclusion restriction</i>	
Share of formal firms	Share of formal firms in the country and sector of activity

Table A4.2: Full table Switching probit estimation for improved performance outcome

VARIABLES	Formal	Formal firms	Non formal firms
Number of full employees	0.088*** (0.024)	0.031** (0.012)	0.061*** (0.022)
Male owner	0.296*** (0.045)	0.318*** (0.101)	0.113** (0.046)
Male and female owner	0.369*** (0.063)	0.168 (0.128)	0.122* (0.068)
Primary education	0.508*** (0.048)	0.111 (0.129)	0.334*** (0.053)
Secondary education	0.859*** (0.072)	0.102 (0.192)	0.671*** (0.084)
Tertiary education	0.785*** (0.137)	0.101 (0.235)	0.396** (0.175)
Vocational education	-0.105 (0.078)	0.412** (0.178)	0.026 (0.065)
Internet	0.749*** (0.125)	0.102 (0.172)	0.370* (0.194)
Advice from incubators	0.303*** (0.074)	0.283** (0.120)	0.111 (0.081)
Manufacture	-0.203** (0.090)	-0.014 (0.153)	-0.102 (0.086)
Agriculture	-0.393** (0.185)	0.099 (0.389)	0.148 (0.161)
Other sectors	-0.149* (0.086)	-0.262* (0.151)	-0.009 (0.075)
Other services	-0.077 (0.055)	-0.013 (0.085)	0.026 (0.047)
Training	0.450*** (0.085)	0.173 (0.141)	0.137 (0.107)
Years of the firm	0.022*** (0.004)	0.022*** (0.007)	0.020*** (0.004)
Share of formal firms	1.594*** (0.275)		
Constant	-1.762*** (0.119)	-0.906** (0.459)	-0.549*** (0.104)

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Table A4.2 – continued

Observations	5,560	5,560	5,560
Wald	765.8***		
ρ_{oi}		0.056 (0.256)	1.115** (0.441)

Standard errors between parentheses.

Significance levels: *: 10% **: 5% ***: 1%

Table A4.3: Full table Switching probit estimation for export outcome

	Formal	Formal firms	Non formal firms
Number of full employees	0.083*** (0.024)	0.013 (0.010)	0.030 (0.036)
Male owner	0.293*** (0.046)	0.031 (0.152)	0.133 (0.102)
Male and female owner	0.391*** (0.063)	-0.039 (0.177)	0.205 (0.132)
Primary education	0.510*** (0.049)	-0.472*** (0.144)	-0.333*** (0.114)
Secondary education	0.851*** (0.072)	-0.434** (0.209)	-0.119 (0.140)
Tertiary education	0.770*** (0.137)	-0.333 (0.262)	-7.237*** (0.832)
Vocational education	-0.100 (0.079)	0.531*** (0.191)	-0.094 (0.162)
Internet	0.750*** (0.126)	-0.139 (0.208)	-0.110 (0.253)
Advice from incubators	0.287*** (0.075)	-0.339** (0.147)	-0.096 (0.174)
Manufacture	-0.216** (0.091)	-0.128 (0.215)	0.317* (0.174)
Agriculture	-0.353** (0.179)	0.605 (0.391)	-0.097 (0.372)
Other sectors	-0.128 (0.085)	-0.094 (0.205)	0.030 (0.151)
Other services	-0.079	0.144	0.029

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Table A4.3 – continued

	(0.053)	(0.127)	(0.114)
Training	0.474***	0.320	-0.006
	(0.085)	(0.200)	(0.181)
Years of the firm	0.022***	-0.007	0.006
	(0.003)	(0.008)	(0.006)
Share of formal firms	1.675***		
	(0.246)		
Constant	-1.792***	-0.146	-1.911***
	(0.113)	(0.561)	(0.175)
Observations	5,522	5,522	5,522
Wald	768.65***		
ρ_i		-0.897***	-2.526
		(0.327)	(1.807)
	5,539	5,539	

Standard errors between parentheses.

Significance levels: *: 10% **: 5% ***: 1%

Table A4.4: Full table Switching probit estimation for trade credit outcome

	Formal	Formal firms	Non formal firms
Number of full employees	0.080***	0.021*	0.039
	(0.023)	(0.011)	(0.028)
Male owner	0.286***	-0.085	0.078
	(0.049)	(0.099)	(0.059)
Male and female owner	0.383***	0.050	-0.095
	(0.067)	(0.127)	(0.096)
Primary education	0.516***	-0.059	0.163**
	(0.052)	(0.120)	(0.075)
Secondary education	0.852***	-0.120	0.151
	(0.077)	(0.166)	(0.132)
Tertiary education	0.729***	0.083	0.059
	(0.146)	(0.230)	(0.238)
Vocational education	-0.040	0.419**	0.126
	(0.083)	(0.174)	(0.081)

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Table A4.4 – continued

Internet	0.812*** (0.134)	0.420** (0.173)	0.143 (0.292)
Advice from incubators	0.243*** (0.081)	0.084 (0.120)	0.145 (0.111)
Manufacture	-0.252** (0.098)	-0.013 (0.164)	0.017 (0.118)
Agriculture	-0.294 (0.192)	-0.643 (0.533)	-0.225 (0.193)
Other sectors	-0.141 (0.098)	-0.194 (0.165)	-0.223* (0.124)
Other services	-0.069 (0.056)	-0.329*** (0.091)	-0.059 (0.062)
Training	0.431*** (0.089)	0.118 (0.139)	0.510*** (0.133)
Years of the firm	0.022*** (0.004)	-0.000 (0.007)	0.011** (0.005)
Share of formal firms	1.820*** (0.267)		
Constant	-1.833*** (0.118)	0.341 (0.352)	-0.534*** (0.110)
Observations	4,891	4,891	4,891
Wald	695.11***		
ρ_{oi}		-0.461** (0.201)	-0.013 (0.202)

Standard errors between parentheses.

Significance levels: *: 10% **: 5% ***: 1%

Table A4.5

	Formal	Formal firms	Non formal firms
Number of full employees	0.087*** (0.025)	0.028** (0.011)	-0.047 (0.032)
Male owner	0.293*** (0.046)	-0.175 (0.122)	0.111 (0.106)
Male and female owner	0.377***	-0.058	0.442***

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Table A4.5 – continued

	(0.063)	(0.150)	(0.124)
Primary education	0.514***	-0.176	0.166
	(0.049)	(0.151)	(0.107)
Secondary education	0.857***	-0.081	0.384**
	(0.073)	(0.221)	(0.177)
Tertiary education	0.788***	-0.202	0.240
	(0.136)	(0.265)	(0.305)
Vocational education	-0.101	-0.187	-0.306
	(0.079)	(0.311)	(0.226)
Internet	0.739***	0.400*	0.514
	(0.125)	(0.206)	(0.316)
Advice from incubators	0.290***	0.085	0.022
	(0.075)	(0.140)	(0.173)
Manufacture	-0.208**	-0.271	-0.122
	(0.090)	(0.188)	(0.221)
Agriculture	-0.358**	-5.309***	0.050
	(0.180)	(0.851)	(0.317)
Other sectors	-0.140	-0.486**	0.166
	(0.086)	(0.207)	(0.159)
Other services	-0.084	-0.192*	-0.012
	(0.053)	(0.105)	(0.112)
Training	0.467***	0.191	0.525**
	(0.085)	(0.155)	(0.204)
Years of the firm	0.022***	0.003	-0.005
	(0.003)	(0.008)	(0.007)
Share of formal firms	1.670***		
	(0.248)		
Constant	-1.788***	-0.345	-2.109***
	(0.113)	(0.541)	(0.196)
Observations	5,560	5,560	5,560
Wald	780.29***		
ρ_i		-0.571**	-0.571
		(0.281)	(0.520)

Standard errors between parentheses.

Significance levels: *: 10% **: 5% ***: 1%

Chapter 5

The impacts of the Employment Tax Incentive on formal employment in South Africa

5.1 Introduction

In South Africa, the unemployment rate was 27.5% in 2017 (StatSA, 2017). The unemployment rate is exceptionally high among youth leading to an increasing number of discouraged workers. The structural nature of the unemployment problem is evidenced by a large number of people in long-term unemployment. In 2011, 28.5% of unemployed people were looking for a job for more than five years (SSA, 2014).

Most low-skilled youth end up in the informal sector due to the lack of opportunities in the formal sector. Consequently, the South African government introduced a programme in 2014 to increase the prospects of employment for young people.

This chapter investigates an Employment Tax Incentive (ETI) effect on youth employment and formal employment in South Africa. Young people are significantly affected by vulnerable jobs. They are more likely to end up in informal employment due to their lack of experience. Young people are more likely to have a vulnerable job compared to adults (ILO, 2017). The percentage of young people in the age group 20-24 in an informal employment was higher than the percentage of young people in formal jobs in 2014 (Rogan and Skinner, 2017). The major challenge South Africa is facing is related to the high unemployment rate of its youth.

The Employment Tax Incentive (ETI) has been introduced to reduce unemployment among youth. The ETI lowers the cost that employers face when hiring young people who have less experience than adults. The ETI provides direct cash incentives by reducing the Pay-As-You-Earn(PAYE) withholding tax due to the South African Revenues by the employer. Previous evaluations of the ETI (Ranchhod and Finn, 2014; Ebrahim et al., 2017) have investigated its impact on youth employment. Ranchhod and Finn (2014) use the Quarterly Force Survey with a difference-in-difference strategy

to estimate the impact on youth employment and formal employment. None of their results is significant. One of the limitations of their study is that the data they have used is not a panel.¹ Ebrahim et al. (2017) have used administrative data of firms to assess the effect of ETI on youth employment. They also adopt a difference-in-difference approach, and they do not find a statistically significant impact on youth employment on average.

The previous literature has not evaluated the difference in outcomes based on the previous labour market experience. Conversely to previous studies (Ebrahim and Pirttilä, 2019; Ranchhod and Finn, 2016, 2015), our analysis at the individual level is based on a panel; more precisely, we use the National Income Dynamics dataset, which follows individuals and not dwellings. One advantage of such data is that we can construct variables based on the past employment history of those in our samples. The ETI targets youth and limits the types of jobs that are eligible based on the wage. Firms could only claim the ETI for jobs with a salary not superior to R6000. These jobs are low paid jobs, and we posit that not all individuals may be interested. Our argument is the following: individuals with a past unemployment experience and/or informality experience may be more likely to be hired since they have lower reservation wage. There is evidence in the literature of unemployed having lower reservation wage, the longer they stay unemployed (Pannenberg, 2010; Brown et al., 2011). Therefore, we also estimate the impact on the sub-samples of individuals with previous labour market experience in unemployment and/or informality.

Therefore, we add to the previous literature by first using more appropriate data at the individual level and assessing the heterogeneity of the impact of the Employment Tax Incentive. We investigate whether there exists heterogeneity in the impacts based on previous labour market experience. Young people represent an essential part of many African countries. Yet, they are often subject to vulnerable jobs. This study will shed light on the relevance of the Employment Tax Incentive in increasing the chances of young people to move up the ladder and obtain better jobs in the formal sector.

We adopt a difference-in-difference strategy to estimate the impact on employment and formal employment. Our baseline results on the overall sample show that the ETI program has not significantly increased the probability of young workers having jobs and formal employment as in the previous literature (Ebrahim and Pirttilä, 2019; Ranchhod and Finn, 2016, 2015). The analysis on two sub-samples (individuals with previous unemployment experience and those with previous informal employment)

¹Their analysis is based on the cohorts of young people and adults before and after the programme.

indicate that the ETI has a significant impact on employment and formal employment. We equally find that the impact has significantly increased over time. We equally explore the existence of the gendered effects of the ETI. The results demonstrate that the impacts of the program on employment and formal employment are lower for women than men.

The rest of the chapter is organised as follows. Section 2 and section 3 present respectively an overview of the literature and the background to the Employment Tax Incentive. Section 4 introduces the estimation strategy and the data. We present the results in section 5. Finally, section 6 concludes this chapter.

5.2 Overview of the literature

Economic theory predicts an increase in employment with policies subsidising employers (with a hiring credit or a wage subsidy) or employees (Neumark, 2016). There is vast empirical literature on the effects of tax incentives on employment. It mainly focuses on tax incentives provided for disadvantaged groups like the long-term unemployed, youth or old workers and incentives to firms to motivate them to retain workers during a crisis. Related to the latter, Bruhn (2020) evaluates the effect of wage subsidies on employment in the wake of the economic crisis in Mexico. She uses monthly administrative data at the industry level and finds that the impact of the wage subsidy was only significant after the programme ended. Eligible industries had about 18% higher employment compared to ineligible industries. The effects that she captures represent the intent to treat.

Cahuc et al. (2019) estimate the effects of tax incentives targeted at low paid workers in small firms in France for one year. They use firm-level data and find that the programme had an immediate impact on employment (outcomes employment, wages, hours, hires and separations). Rapidly, three months after the programme started, new hires and employment started to increase in eligible firms. Their results also highlight the heterogeneity in the programme's effects, with employment effects decreasing with recruitment difficulties. One unintended consequence of tax incentives targeted at some disadvantaged youth is the stigma that it may entail.

In this line, Sjögren and Vikström (2015) evaluate the effects of a programme targeted at individuals who have been absent from the labour market for at least one year in Sweden. Their results show that wage subsidies increased re-employment by around 16% to 20%. They also explore the heterogeneity in impact and find that

the effects are more substantial for larger subsidies and a more extended period of subsidies. Still, in Sweden, another programme that targeted youth employment has been evaluated. [Egebark and Kaunitz \(2018\)](#) evaluate a large tax cut for which only youth were eligible. They find a small impact on wages and employment. The effects only lasted temporarily. They conduct a heterogeneity analysis and find no significant effect on individuals with a recent record of unemployment and foreign-born. In their analysis, they used age groups close to the cut-off and the whole eligible age group. [Saez et al. \(2019\)](#) evaluate the same tax cut for young workers in Sweden. They equally find a significant effect of around 2-3% increase in youth employment.

Specific to the South African ETI programme, several studies have attempted to estimate the impacts, both ex-ante and ex-post. [Levinsohn and Pugatch \(2014\)](#) prospectively analyse an employer wage subsidy targeted at youth. They construct a model of the labour market with a high unemployment rate and simulate the ETI policy. They calibrate the model with data from the Cape Area Panel study and find that an R1000 wage subsidy per month increases youth employment by 12%. Six months after the start of the employment tax incentive, [Ranchhod and Finn \(2016\)](#) estimate the impact on youth employment. They use the South African Quarterly Labour force survey (QLFS). They assess the impact within six months of implementation. They do not find any significant effect of the programme on employment and formal employment. One main shortcoming of their study is the timeframe of their evaluation which is short. Within the first six months, many firms and individuals were not undoubtedly aware of the programme. Another limit is the nature of their data; the QLFS is not a panel based on individuals but dwellings. The same authors ([Ranchhod and Finn, 2015](#)) conducted another evaluation of the programme. They expand the period of analysis to all quarters of 2014, one year into the programme. They equally did not find any statistically significant result on youth employment.

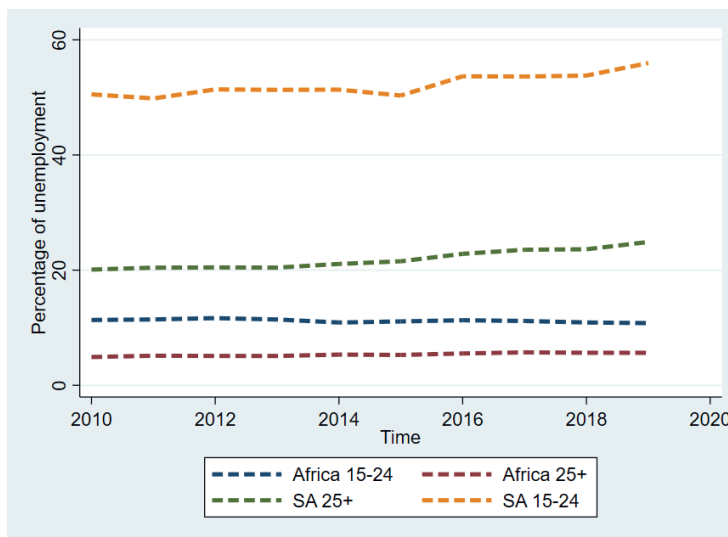
[Ebrahim et al. \(2017\)](#) use administrative data and conduct their analysis at the firm level. They do not find any significant effect of the ETI programme at the aggregate level. However, when they break down the results by firms' size, their results suggest that the ETI has increased employment for youth in firms employing up to 200 workers. [Ebrahim and Pirttilä \(2019\)](#) also evaluate the impacts of the programme on employment and earnings. They use two datasets, the PALMS dataset, a harmonised survey about employment and wages and an administrative tax dataset that is anonymised and provides details on earnings and actual use of ETI. The results suggest that the ETI programme did not significantly increase employment. However, the programme significantly increased earnings for the target group. The main drawback

of their study is equally related to the nature of the data used. The PALMS data is a stacked cross-sectional dataset created by DataFirst at the University of Cape Town.

5.3 Background policy

South Africa faces a high unemployment rate than the other African countries, as evidenced by Figure 5.1. The unemployment problem is more prominent among youth over the period 2010-2019, as observed in Figure 5.1. The unemployment rate of young South Africans is more than double the average unemployment rate of youth on the continent. Youth job seekers in South Africa have difficulties finding their first job. Some have pointed out the poor quality of education as a main driver (Festus et al., 2016).

Figure 5.1: Unemployment rates from ILO estimates 2010-2019 for Africa and South Africa



Africa 25 and SA 25 represent individuals 25 or older and Africa 15 – 24 and SA 15 – 24 represent individuals aged between 15 and 24.

Many studies have investigated the sources of a relatively high unemployment rate in South Africa. Most of that literature has drawn from the work of Kingdon and Knight (2004). They found that the South African labour market is characterised by long periods of unemployment and is most likely involuntary. Since then, many studies have tried to uncover the primary sources of unemployment in South Africa. Rodrik

(2008) argued that the high prevailing unemployment rate is due to a shrinkage of the non-mineral tradable sector since the early 1990s. According to his study, this sector is intensive in low-skilled labour compared to the service sector. Thus, since the early 1990s, there is a drop in demand for unskilled workers. One of his arguments was that the service sector does not absorb unskilled workers resulting in high unemployment.

Gupta and Toit (2009) pointed out high fixed costs of hiring as one of the main sources of unemployment. Schoeman et al. (2010) analysed the role of labour conflict in the persistence of underemployment in South Africa. One of their main findings was that when bad labour relations variables such as frequencies of strikes become higher, the switch to capital is more likely. Hence, bad labour relations contribute to the persistence of underemployment in South Africa. Many other factors have also been investigated. Fourie (2011) in a meta-analysis of the South African unemployment literature summarised some major sources. One crucial aspect is the existence of a high wage elasticity of the demand for labour. This is mainly due to strong labour unions, which play an essential role in non-clearing wages in the formal sector. Another interesting finding is that education does not guarantee employment. A high level of education is necessary to impact unemployment significantly.

Many programmes have been implemented to fight unemployment in South Africa. These programmes are mainly demand-side policies and include the Expanded Public Works Programme (EPWP), implemented in 2004 and Leadership Agreements (Ranchhod and Finn, 2016). In this context, the Employment Tax Incentive was proposed to motivate firms to hire youth with uncertain productivity levels (Ranchhod and Finn, 2016).

The Employment Tax Incentive (ETI) aims to encourage employers to hire young workers. The programme was signed in October 2013 and came into force in January 2014. It was created under the Employment Tax Incentive Act, No 26 of 2013 (“ETI Act”). It was legislated to end on 28 February 2019. In a 2011 discussion document, it was estimated that R5bn would be spent on the ETI over three years, supporting 423 000 jobs (Chatterjee and MacLeod, 2016).

The mechanism of the ETI is the following. It reduces the cost of hiring young workers by allowing employers to reduce the amount of Pay-As-You-Earn (PAYE)² while leaving the wage unaffected. The period during which an employer can claim the ETI for an employee is limited to 24 months. The ETI does not apply to employers who are

²Employees’ Tax refers to the tax required to be deducted by an employer from an employee’s remuneration paid or payable. The process of deducting or withholding tax from remuneration as an employee earns it is commonly referred to as PAYE (South African Revenue Service).

government-related. Employers can only claim the ETI for an employee hired on or after 1 October 2013 and who is paid more than the minimum wage applicable to that employer or if a minimum wage does not apply, is paid the amount contemplated in the Minimum Wage Act and not more than R6 000 remuneration. The main qualifying criteria for the employee is to be between 18 and 29 years old. The ETI comes with penalties for employers who do not comply with the rules by either claiming ETI for an employee paid below the minimum wage or displacing older workers. A penalty of R30 000 will be levied for each employee displaced. The ETI has been extended for 10 years. Employers will therefore be able to claim the ETI for qualifying employees until 28 February 2029.

Tables A5.3 and A5.4 show how the ETI is calculated respectively for the first 12 months and the second 12 months after the employee becomes eligible. For instance, in the first 12 months of employment, 50% of the monthly remuneration can be claimed when the salary is between R0 and R2000. According to a technical report on the ETI released by the National Treasury of South Africa ([Chatterjee and MacLeod, 2016](#)), there has been a strong take up of the programme. Around R6.3 billion was claimed between January 2014 and February 2016, and the take up accelerated in the last half of 2015.

5.4 Methodology and data

5.4.1 Data

We use the National Income Dynamics Study (NIDS) dataset from South Africa. This survey reports information on the household's members and follows them even after they leave their household. The panel is based on individuals. It includes questions related to incomes, expenditures, assets, access to services, education, health, and other dimensions of well-being. The study began in 2008 with a nationally representative sample of over 28,000 individuals in 7,300 households across the country. The survey continues to be repeated with these same household members every two years. The data collection started in 2008. We use the 5 available waves (2008; 2010-11; 2012; 2014-15; 2017). The survey is representative of the South African population.

Construction of the variables

We create two binary variables, which are employment and formal employment. The variable employment takes the value one for working individuals, similar to (Ranchhod and Finn, 2016). The variable formal employment takes the value one for those with employment with social benefits. Regarding the control variables, we include gender, the highest level of education achieved, the population group (whether the person is black), and the area of living (Urban). We equally include a variable that captures whether the person receives social benefit such as a child support grant and whether the person has computer skills. Besides, we construct two additional variables. The first variable is *previous_unemployment*; it takes the value 1 if the person has had a period of unemployment before the start of the policy. The second variable is *previous_informality*; it takes the value 1 if the person has had a period of informal employment before the policy.³

Comparison groups

We consider the individuals aged between 18 and 29 as our treatment group. The policy targeted individuals within that age bracket as eligible for the programme. We include in the control group those who are 30 years old and above. In our robustness analysis, we will change the age bracket of the control group to include individuals who are closer to the age cut-off to obtain a group more similar to the eligible group.

Summary statistics

Table 5.1 shows pre-reform summary statistics divided by age for the full sample. The Table highlights some of the large differences in background characteristics across the eligible and non-eligible groups. Column (5) shows that the eligible and non-eligible groups significantly differ in their background characteristics and employment. For instance, related to labour market outcomes, the Table shows that before the introduction of the policy, only 29% of eligible youth were employed, against 42% for adults. Regarding formal employment, only 12% of youth had formal employment against 20% for adults.

Table 5.2 reports the summary statistics for the whole sample. The number of observations is 88 040. On average, 39% of individuals are employed, and 19% are

³Table A5.1 in the annex gives a detailed definition for all variables.

formally employed. The majority of the sample is black (80%), live in an urban area (51%) and are women (59%). The highest level of education achieved by most individuals is a secondary level of education (66%). Around 23% of the sample receive a child support grant and around 32% have computer skills.

Table 5.1: Pre-policy summary statistics

	Adults 30+		Youth 18-29		Diff
	Mean	SD	Mean	SD	
Employed	0.42	0.49	0.29	0.45	0.13***
Formal employment	0.20	0.40	0.12	0.33	0.08***
Black	0.78	0.42	0.86	0.34	-0.09***
Urban	0.50	0.50	0.48	0.50	0.02***
No education	0.21	0.40	0.01	0.11	0.19***
Primary education	0.29	0.45	0.09	0.29	0.19***
Secondary education	0.48	0.50	0.88	0.32	-0.40***
Tertiary education	0.03	0.16	0.01	0.10	0.02***
Female	0.63	0.48	0.55	0.50	0.07***
Child support grant	0.21	0.41	0.22	0.41	-0.01***
Computer literate	0.20	0.40	0.36	0.48	-0.16***

Table 5.2: Summary statistics on the whole sample

Variable	Obs	Mean	Std. Dev.
Employed	88,040	0.39	0.48
Formal employment	88,040	0.19	0.39
Black	88,040	0.80	0.39
Urban	88,040	0.51	0.49
Education			
No school..	87,494	0.11	0.31
Primary education	87,494	0.19	0.39
Secondary education	87,494	0.66	0.47
Tertiary education	87,494	0.025	0.15
Female	88,021	0.59	0.49
Child support grant	87,967	0.23	0.42
Computer literate	84,833	0.32	0.46

5.4.2 Identification strategy

The empirical strategy exploits the introduction of the policy that only targets youth who are between 18-29 in 2014. The policy can be considered a natural experiment

since the government decided to treat the age group. To this end, we compare the difference in the average outcome of youth before and after introducing the ETI with the average outcome of the control group (adults). We will adopt a difference-in-differences approach (Ranchhod and Finn, 2015, 2016; Ebrahim et al., 2017; Ebrahim and Pirttilä, 2019). The difference-in-differences approach is used to remove confounding factors to which treated, and control groups may be subject. Our primary dependent variable will be the formal employment status. Since our analysis is at the individual level, the treatment effect captured is the Intent to Treat (ITT).

$$Y_{it} = \alpha + \beta ETI_i + \gamma t_i + \lambda(ETI_i * t_i) + \delta X_{it} + \epsilon_i \quad (5.1)$$

where:

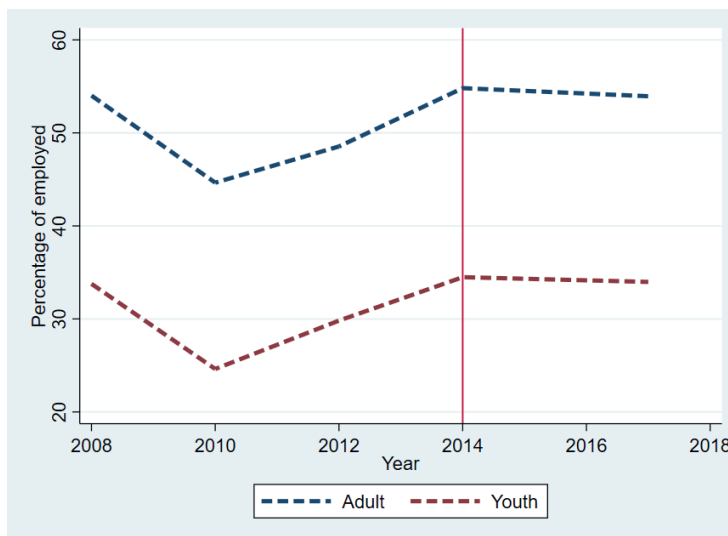
Y_{it} = employment or formal employment dummies
 t = before and after the introduction of the ETI
 i = individual index
 α = constant term
 ETI = dummy variable for eligibility (youth aged between 19 and 29)
 γ = time trend common to control and treatment groups
 λ = true effect of treatment, the year-specific treatment effects
 β = treatment group-specific effect.
 X_{it} = control variables

The parameter of interest in the above regression is λ , which estimates the change in employment beyond the number that would have been employed in the absence of the subsidy. More technically, this is termed the average Intent to Treat effect on the treated. Our regressions are OLS regressions run at the individual level and are linear probability models (Ranchhod and Finn, 2015, 2016). The standard errors are clustered at the individual level.

5.5 Results

The main assumption of the difference-in-difference strategy is the parallel trend assumption. Figure 5.2 depicts the evolution of the employment rate of the eligible group (18-29) and the non-eligible group (30 and above). The employment rates of the two groups follow a similar trend, with a decrease in 2010 and a subsequent increase in the following years in the pre-policy period. There is no clear break in the average employment rate of the eligible group compared to the ineligible group the start of the ETI programme. We then analyse our baseline results, which presents the programme's overall impact on our outcomes.

Figure 5.2: Parallel trend of the employment rate of youth aged 18-29 and adults aged 30+



5.5.1 Baseline results

Table 5.3 and Table 5.4 display the impact of the employment tax incentive on respectively employment and formal employment. Different specifications are reported in each column. Column 1 reports the results without control variables. Columns (2) and (3) include control variables (Black, education level, living in an urban area, gender, receiving a child support grant and computer skills). The districts fixed effects are included in the estimation reported in column (3). Related to the impact of the programme on employment, we observe that none of the coefficients

is statistically significant despite having a positive sign shown in Table 5.3. Similar results are observed for formal employment. The impact of the programme displayed in Table 5.4 is insignificant in all specifications. Our baseline results corroborate previous assessments of the ETI (Ranchhod and Finn, 2015, 2016; Ebrahim and Pirttilä, 2019; Ebrahim et al., 2017). The employment tax incentive does not have an overall significant impact on youth employment.

Table 5.3: Effects of the tax incentive on employment

VARIABLES	Employment		
	(1)	(2)	(3)
t	0.046*** (0.004)	0.003 (0.004)	0.004 (0.004)
ETI	-0.133*** (0.005)	-0.222*** (0.006)	-0.223*** (0.006)
ETI*t	0.005 (0.007)	0.009 (0.007)	0.008 (0.007)
Observations	88,040	84,232	84,183
R-squared	0.019	0.121	0.134
Controls	NO	YES	YES
District	NO	NO	YES

Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The table shows the results of the estimation with the variable formal employment as the outcome. Column 1 reports the results without control variables. Columns (2) and (3) include control variables (Black, education level, living in an urban area, gender, receiving a child support grant and computer skills). The districts fixed effects are included in the estimation reported in column (3).

Table 5.4: Effects of the tax incentive on formal employment

VARIABLES	Formal Employment		
	(1)	(2)	(3)
t	0.042*** (0.003)	0.007** (0.003)	0.008** (0.003)
ETI	-0.078*** (0.004)	-0.151*** (0.005)	-0.151*** (0.005)
ETI*t	0.002 (0.005)	-0.003 (0.005)	-0.004 (0.005)
Observations	88,040	84,232	84,183
R-squared	0.012	0.141	0.155
Controls	NO	YES	YES
District	NO	NO	YES

Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The table shows the results of the estimation with the variable formal employment as the outcome. Column 1 reports the results without control variables. Columns (2) and (3) include control variables (Black, education level, living in an urban area, gender, receiving a child support grant and computer skills). The districts fixed effects are included in the estimation reported in column (3).

Are the results robust to the age bandwidth?

Following Egebark and Kaunitz (2018), we estimate the impact with different age groups to check the sensitivity of our results. We estimate the effects for the age groups 18-64, 18-44, and 18-34. Table 5.5 reports the results. The impact of the programme on employment and formal employment is still insignificant.

Table 5.5: Effects of the tax incentive on employment by age groups

VARIABLES	Employment		
	Age 18-34	Age 18-44	Age 18-64
t	0.041*** (0.009)	0.032*** (0.006)	0.021*** (0.004)
ETI	-0.215*** (0.008)	-0.258*** (0.006)	-0.244*** (0.005)
ETI*t	-0.017 (0.011)	-0.011 (0.008)	-0.005 (0.007)
Observations	40,593	55,108	76,175
R-squared	0.135	0.163	0.143
Controls	YES	YES	YES
District	YES	YES	YES

Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The table shows the results of the estimation with the employment as the outcome for different age bracket. Columns (1) (2) and (3) include control variables (Black, education level, living in an urban area, gender, receiving a child support grant and computer skills). The districts fixed effects are included in the estimation reported in column (3).

5.5.2 Heterogeneity of the Results

We now proceed to analyse the results on two different sub-samples, as discussed earlier. As argued, the jobs eligible for the ETI must not be superior to R6000. Consequently, individuals who are more likely to benefit from the programme are those with low reservation wages or those who are more likely to end up in low paid jobs. Therefore, we re-estimate the impacts of the tax employment incentive on the sub-samples of those with previous unemployment experience and those who had an informal job previously.

Table 5.6 reports the results on the sub-sample of those with previous unemployment experience. Columns (1), (2) and (3) provide the impacts of the programme on the employment outcomes. Whilst columns (4), (5) and (6) report the results for the formal employment outcome. The findings suggest that the programme has significantly increased the probability to be employed for youth who were previously unemployed compared to adults who were also previously unemployed. The estimated effect is positive and ranges from 10% to 8.7%, depending on the specification. Contrasted with our baseline results, it means that the programme only significantly increased the employment probability of those who would not have been hired otherwise. We obtain similar significant effects on formal employment. The employment tax incentive increased the likelihood to obtain formal employment between 7.6% and 6% depending on the specification.⁴

Table 5.7 repeats the same exercise on the sub-sample of individuals who held an informal job previously. Related to the effects on employment, it appears that the results are barely significant and become insignificant with our preferred specification, which includes control variables and districts dummies. In contrast, the effects of the policy on formal employment are highly significant in all our specifications. The sizes of the impacts are significant and range from 10.8% to 9.7%, depending on the specification. The results demonstrate that the programme helped youth in an informal job obtain a formal job. We report Figures 5.3 and 5.4 to verify the parallel trend assumption for these sub-groups. For the young and the adults who were unemployed, the parallel trend seems to hold, while for those who were in informal employment, the parallel trend is not conclusive.⁵

⁴Table A5.5 in the annexe reports the results of the probit estimation on the sub-sample of previously unemployed people. The marginal effects reported are almost similar in sign and close in size.

⁵Table A5.6 in the annexe reports the results of the probit estimation on the sub-sample of individuals with previous informal jobs. The marginal effects reported are almost similar in sign and close in size. The significance levels of the effects are also similar.

Table 5.6: Effects of the tax incentive on employment and formal employment on the sub-sample of those with previous unemployment experience

VARIABLES	Employment			Formal Employment		
	(1)	(2)	(3)	(4)	(5)	(6)
t	0.221*** (0.009)	0.200*** (0.009)	0.198*** (0.009)	0.112*** (0.007)	0.094*** (0.006)	0.094*** (0.006)
ETI	-0.037*** (0.009)	-0.080*** (0.009)	-0.082*** (0.009)	0.008 (0.006)	-0.031*** (0.006)	-0.033*** (0.006)
ETI*t	0.103*** (0.019)	0.091*** (0.018)	0.087*** (0.018)	0.076*** (0.016)	0.064*** (0.015)	0.060*** (0.015)
Observations	14,152	13,695	13,692	14,152	13,695	13,692
R-squared	0.072	0.105	0.116	0.041	0.096	0.116
Controls	NO	YES	YES	NO	YES	YES
District	NO	NO	YES	NO	NO	YES

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

The table shows the results of the estimation with the variables employment and formal employment as the outcomes on the subsample of individuals with previous unemployment experience. Columns (1) and (4) report the results without control variables. Columns (2),(3),(5) and (6) include control variables (Black, education level, living in an urban area, gender, receiving a child support grant and computer skills). The districts fixed effects are included in the estimation reported in columns (3) and (6)

Table 5.7: Effects of the tax incentive on employment and formal employment on the sub-sample of those with previous informal employment experience

VARIABLES	Employment			Formal Employment		
	(1)	(2)	(3)	(4)	(5)	(6)
t	-0.110*** (0.009)	-0.118*** (0.009)	-0.118*** (0.010)	0.097*** (0.008)	0.082*** (0.008)	0.080*** (0.008)
ETI	-0.015 (0.012)	-0.066*** (0.013)	-0.072*** (0.013)	-0.024** (0.010)	-0.083*** (0.011)	-0.087*** (0.011)
ETI*t	0.055* (0.029)	0.052* (0.029)	0.047 (0.029)	0.108*** (0.030)	0.098*** (0.029)	0.097*** (0.029)
Observations	10,883	10,317	10,312	10,883	10,317	10,312
R-squared	0.012	0.039	0.054	0.020	0.074	0.094
Controls	NO	YES	YES	NO	YES	YES
District	NO	NO	YES	NO	NO	YES

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

The table shows the results of the estimation with the variables employment and formal employment as the outcomes on the subsample of individuals with previous informal employment. Columns (1) and (4) report the results without control variables. Columns (2),(3),(5) and (6) include control variables (Black, education level, living in an urban area, gender, receiving a child support grant and computer skills). The districts fixed effects are included in the estimation reported in columns (3) and (6).

Figure 5.3: Parallel trend of the employment rate of youth aged 18-29 and adults aged 30+ for those who were previously in unemployment

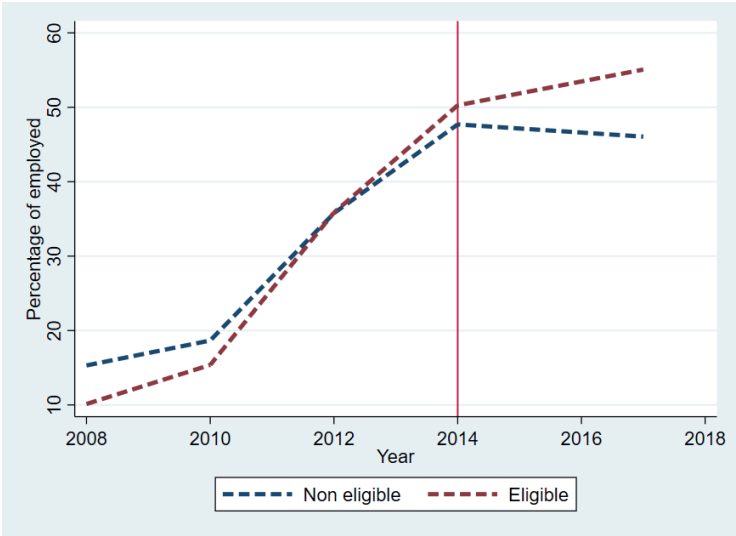
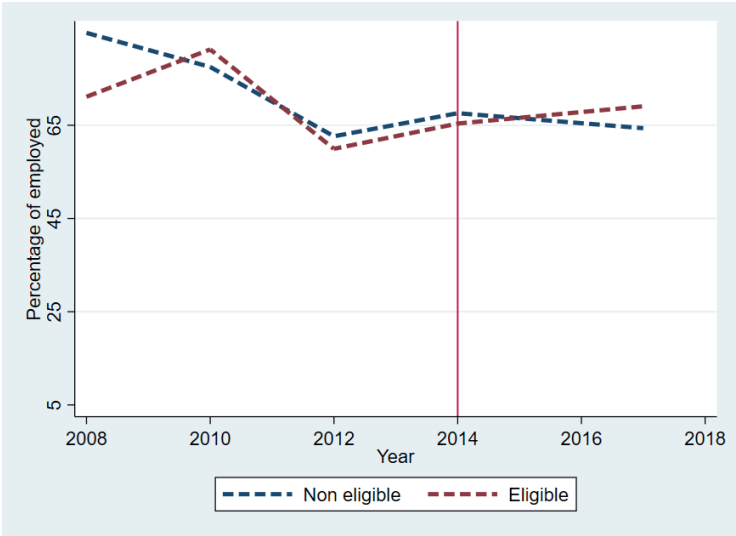


Figure 5.4: Parallel trend of the employment rate of youth aged 18-29 and adults aged 30+ for those where previously in informal jobs



Did the effects increase over time?

At the start of the programme in 2014, it might not have been popular for firms to claim the ETI. Over time, the programme may have gained in popularity, hence increasing the effects of the programme. To assess this assumption, we run the estimations of the impact for two periods. To do so, we use the period 2014, which corresponds to the year of the programme's start and the period 2017, which is roughly 3 years into the programme. Table 5.8 presents the results of the estimation. Columns (1) and (2) report respectively the impacts of the programme on employment and formal employment for those who had previous unemployment experience. We consider short-term results the estimates for the period 2014 and as medium-term the results for the period 2017.

We observe that both the short and medium-term effects are significant and positive in columns (1) and columns (2). During the first year, the programme increased employment by 5% and the effect has more than doubled in 2017 with the impact being around 11.1%. A similar pattern is observed for formal employment. The programme's short-term impact is around 3.8%, while the medium term impact is about 8.2%. Over time, the tax incentive programme has increased the probability of those who had previous unemployment experience to be employed and have formal employment.

On the sub-sample of those with previous informal jobs, the estimates are reported in columns (3) and (4). The impact of the programme is not significant on employment in the short term. It only becomes significant in the medium term, increasing the probability of employment by about 11.4% for those who had informal employment. The impacts of the programme on formal employment are significant in the short and medium terms for those who had informal jobs previously. The effect increases going from 6.2% in the short term to 13.5% in the medium term.

Table 5.8: Effects of the tax incentive on employment and formal employment on the sub-sample of those with previous informal employment experience

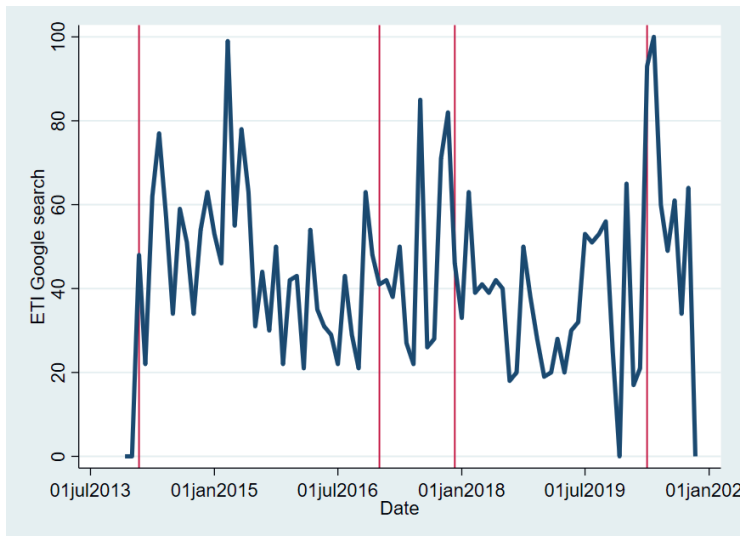
VARIABLES	Unemployment experience		Informality experience	
	Employed (1)	Formal employment (2)	Employed (3)	Formal employment (4)
Short term	0.050** (0.021)	0.038** (0.017)	0.034 (0.032)	0.062** (0.031)
Medium term	0.111*** (0.027)	0.082*** (0.023)	0.114** (0.047)	0.135*** (0.047)
Observations	13,692	13,692	10,312	10,312
R-squared	0.139	0.124	0.080	0.107
Controls	YES	YES	YES	YES
District	YES	YES	YES	YES

Robust standard errors in parentheses; *** p<0.01, **p<0.05, * p<0.1

The table shows the results of the estimation with the variables employment and formal employment as the outcomes on the sub-sample of individuals with previous unemployment and informality experiences. All columns include control variables (Black, education level, living in an urban area, gender, receiving a child support grant and computer skills) and districts fixed effects.

To check our hypothesis about the ETI programme gaining popularity over time, we plot the Google searches for the theme "**SARS ETI**" in Figure 5.5. We observe that the google search for that theme started in February 2014 (the first red vertical line). The searches sharply increased around mid-2015. The second and third red vertical lines show the year 2017. As we observe, the volume of search is larger in 2017 than in 2014. We also plotted a fourth vertical line in April 2020. We choose specifically that date because it corresponds to the peak of the pandemic in 2020. As we observe, there is a sharp peak in April 2020.

Figure 5.5: Google search for SARS ETI in South Africa December 2013 to July 2020



Are there gendered effects?

In Table 5.9, we explore the gendered effects of the Employment tax incentive on our subsamples of previously unemployed and informal workers. On the subsample of previously unemployed, we observe that the impact of the ETI is significant and positive for both men and women. We note a large gap in the size of the effect for men and women. Related to employment, the programme increased the probability of employment of men by 15%, three times higher than the impact for women, which is around 4.6%. A similar pattern is observed for formal employment. The size of the impact for men is 4.4% which represents almost double the impact for women, which is 2.8%.

On the subsample of previous informal workers, the impact is insignificant for women while it significantly increases the employment probability of men by around 9.7%. For formal employment, the sizes of the impact for both women and men are almost similar.

Table 5.9: Effects of the tax incentive on employment and formal employment on the sub-samples for men and women

VARIABLES	Unemployment experience				Informality experience			
	Employment		Formal employment		Employment		Formal employment	
	Men	Women	Men	Women	Men	Women	Men	Women
t	0.223*** (0.018)	0.186*** (0.011)	0.115*** (0.014)	0.083*** (0.007)	-0.095*** (0.015)	-0.130*** (0.012)	0.077*** (0.014)	0.080*** (0.010)
ETI	-0.065*** (0.018)	-0.088*** (0.011)	-0.044*** (0.014)	-0.028*** (0.007)	-0.045** (0.017)	-0.085*** (0.018)	-0.114*** (0.017)	-0.067*** (0.014)
ETI†	0.151*** (0.029)	0.046** (0.023)	0.089*** (0.028)	0.042** (0.018)	0.097*** (0.038)	-0.011 (0.042)	0.103** (0.042)	0.090** (0.040)
Observations	4,403	9,289	4,403	9,289	4,099	6,213	4,099	6,213
R-squared	0.144	0.098	0.143	0.101	0.053	0.057	0.119	0.093
Controls	YES	YES	YES	YES	YES	YES	YES	YES
District	YES	YES	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1
 The table shows the results of the estimation with the variables employment and formal employment as the outcomes on the subsample of individuals with previous unemployment and informality experiences. All columns include control variables (Black, education level, living in an urban area, gender, receiving a child support grant and computer skills) and districts fixed effects.

5.6 Conclusion

South Africa faces a high unemployment rate among its youth. Many programmes have been introduced to provide employment opportunities for young job seekers. We estimate the impact of the Employment tax incentive introduced in 2014 in South Africa on youth employment and formal employment. The programme targeted youth aged between 18 and 29. We use the National Income Dynamics dataset, which follows individuals over the period 2008-2017. We construct variables based on the past employment history of those in our samples and apply a difference-in-difference.

Our baseline results on the overall sample show that the ETI programme did not, on average, increase the probability of employment for young workers. We also investigate whether there exists heterogeneity in the impacts based on previous labour market experience. Our results show that the ETI programme increased the probability of employment and a formal employment for the previously unemployed or informally employed individuals. A significant impact for these groups is because there is a wage limit for the ETI eligibility. People with lower wage reservation would likely be more interested to apply for the eligible jobs.

We also find that the impact of the programme increased over time due to increased popularity. An analysis by gender demonstrates that men benefited more from the programme than women.

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APPENDIX: CHAPTER 5

Table A5.1: List and definition of variables

Variables	Definition	Nature
Employed	When the individual is employed	Binary
Formal employment	When the individual has a work with social benefit	Binary
Urban	Live in urban area	Binary
Black	Population group black	Binary
Without education	Individual with no level of education	Binary(reference)
Primary	Elementary level of education reached	Binary
Secondary	Secondary level of education reached	Binary
Tertiary	University level of education reached	Binary
Female	Gender of the individual	Binary
Child support grant	Individual who receives child support grant	Binary
Computer literate	Individual who has computer skills	Binary

Table A5.3: The first 12 months of tax payments from January 2014 to February 2019

Monthly Remuneration	Determination	Monthly Calculated ETI Amount
R0 – R2000	50% x monthly remuneration	R0 - R1000
R2001 - R4000	Fixed at R1000	R1000
R4001 – R6000	Formula: $X = A - (B \times (C - D))$ X = monthly calculated amount A = R1000 B = 0,5 C = Monthly Remuneration D = R4000	R 999 - R0

Source: South-African Revenue Service SARS

Table A5.4: The second 12 months of tax payments from January 2014 to February 2019

Monthly Remuneration	Determination	Monthly Calculated ETI Amount
R0 – R2000	25% x monthly remuneration	R 0 – R499
R2001 - R4000	Fixed at R 500	R500
R4001 – R6000	Formula: $X = A - (B \times (C - D))$ X = monthly calculated amount A = R500 B = 0,25 C = Monthly Remuneration D = R4000	R499 – R0

Source: South African Revenue Service SARS

Table A5.5: Probit estimation of the effects of the tax incentive on employment and formal employment on the sub-sample of those with previous unemployment experience

VARIABLES	Employment		Formal Employment	
	(1)	(2)	(3)	(4)
t	0.214*** (0.009)	0.195*** (0.009)	0.106*** (0.006)	0.081*** (0.006)
ETI	-0.045*** (0.010)	-0.097*** (0.011)	0.011 (0.008)	-0.028*** (0.008)
ETI*t	0.102*** (0.017)	0.094*** (0.018)	0.041*** (0.011)	0.031*** (0.010)
Observations	14152	13692	14152	13692
Controls	NO	YES	NO	YES
District	NO	YES	NO	YES

The table shows the marginal effects of the probit estimation with the variables employment and formal employment as the outcomes on the subsample of individuals with previous unemployment experience. Columns (1) and (3) report the results without control variables. Columns (2),(4) include control variables (Black, education level, living in an urban area, gender, receiving a child support grant and computer skills). The districts fixed effects are included in the estimation reported in columns (3) and (6)

Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A5.6: Probit estimation of the effects of the tax incentive on employment and formal employment on the sub-sample of those with previous informal job experience

VARIABLES	Employment		Formal Employment	
	(1)	(2)	(3)	(4)
t	-0.108*** (0.009)	-0.119*** (0.010)	0.093*** (0.008)	0.076*** (0.008)
ETI	-0.015 (0.013)	-0.075*** (0.014)	-0.029** (0.012)	-0.089*** (0.013)
ETI*t	0.054* (0.028)	0.047* (0.029)	0.094*** (0.023)	0.087*** (0.023)
Observations	14152	13692	14152	13692
Controls	NO	YES	NO	YES
District	NO	YES	NO	YES

The table shows the marginal effects of the probit estimation with the variables employment and formal employment as the outcomes on the subsample of individuals with previous informal job experience. Columns (1) and (3) report the results without control variables. Columns (2),(4) include control variables (Black, education level, living in an urban area, gender, receiving a child support grant and computer skills). The districts fixed effects are included in the estimation reported in columns (3) and (6)

Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Chapter 6

Concluding Remarks

Conclusion

The informal economy is associated with the vulnerability and the poverty of workers. Other negative consequences are also reported, such as a negative effect on formal firms' innovation and the loss of resources for governments. Many policies or reforms have aimed to reduce the informal economy's size without any conclusive evidence on their success. Some policies opt for a stricter stance towards informality. While emerging voices advocate for an increase in formalisation advantages. Much of the evidence in the literature is limited to South America or Asia. Sub-Saharan Africa has its specificities, and policies adopted in other regions may not entirely apply and produce similar results. We approach these preoccupations by asking the following questions.

1. Does local government regulation of the informal sector reduce informal entrepreneurship? And what are the potential unwanted consequences of such a stricter approach towards informality?
2. Do the perceived benefits from the formal financial sector motivate firms to be tax compliant? And does the existence of informal finance mitigate that effect?
3. Do small firms benefit from formalisation? And what other measures can enhance those potential benefits?
4. Does an employment tax incentive for young people increase their likelihood to be employed and formally employed?

To answer these questions, Chapter 2 and Chapter 5 rely on the National Income Dynamics panel dataset that spans over ten years. While Chapter 3 and Chapter 4 rely on the Small business survey data that covers 12 African economies.

In this thesis, we argue that due to some sub-Saharan African countries' specificities, unwanted and unexpected outcomes may arise with some approaches towards the

informal economy. Some of the specificities include a small formal economy that cannot absorb a surplus of workers from the informal economy. A second one is the existence and predominance of an informal credit market that may challenge prior knowledge of financial development's role on formalisation. A third specificity is that most firms in the regions are micro and small firms.

Hence, considering the first specificity, Chapter 2 focuses on the informal economy's approach to increase the costs of informality. We evaluate the effects of trading permits in the informal sector and apply a difference-in-difference approach. As discussed, trading permits can be considered additional costs in operating informal activities and can have several possible outcomes. For instance, in a formal economy that cannot absorb an additional workforce or has high entry costs, unwanted effects are likely to arise. The main results provide evidence on the effectiveness of such an approach in reducing informal entrepreneurship but at a cost. The policy has equally increased unemployment and does not increase formal entrepreneurship.

The results demonstrate that there is a trade-off to be made by local governments. There is a vested interest to tolerate informal activities as a large part of it is survivalist by nature. Individuals working in informal activities will rather exit than bear additional costs that are monetary and psychological since there is evidence of police harassment. Besides, a heterogeneous analysis of the impact of entry barriers in the informal sector reveals that those often considered vulnerable, such as women and black individuals, are the most affected.

Informality can be approached differently from introducing stricter measures and increasing the financial benefits of formal activities. Thus, Chapter 3 explores the effect of a more developed financial sector on small firms' tax compliance. More precisely, it studies the impact of banks' low costs on value-added tax, profit tax and local tax compliances. We adopt a trivariate probit approach, and the main results reveal that financial development effectively increases tax compliance. The results highlight that an increase in the advantages of running formal activities successfully increases formalisation. Indeed, lower costs of banks increase the opportunity cost of operating informally. We also note that the effects' sizes depend on the costs of each tax's expected cost. For high taxes, the size of the effect is smaller. This means that a high level of taxation may offset any benefit obtained through formalisation. Most of the firms are small in the region and may not sustain high levels of taxes.

Nonetheless, the results also reveal that informal finance may mitigate the effects of financial development on formalisation. Informal credit markets are well developed in the region, and due to their less burdensome process, they may be preferred by many

individuals. The emerging conclusion from this chapter is that when using financial development to increase formalisation, we have to consider other informal businesses' financial choices.

As previously discussed, most firms are micro or small firms in sub-Saharan Africa. Thus, we investigate whether there is a public rationale for attempting to formalise small firms.

To investigate whether there is a public rationale for formalising small firms, Chapter 4 examines whether small firms benefit from formalisation. More specifically, we estimate the effects of formalisation on improved performance, export, business credit and access to credit. The results show that small firms are likely to be negatively impacted when it comes to their performance. However, there are positive effects on export, business credit and access to credit. For all the effects (negative or positive) it appears that firms without employees are the ones who lose the most or gain less from formalisation. Considering the importance of formalisation for Sub-Saharan countries, we equally investigate whether business training and receiving tips from incubators can mitigate the adverse effects and enhance the positive ones. The results provide evidence on the effective role of training and advice from incubators in cushioning the adverse effects and enhancing the positive impacts of formalisation for small businesses.

A large part of the informal economy is made of employees. And in countries like South Africa, obtaining formal employment is challenging, particularly for young people. Therefore, in Chapter 5, we investigate whether an employment tax credit targeted at young people positively impacts formal work. We adopt a difference-in-difference approach to evaluate the impacts of the South-African employment tax incentive introduced in 2014. The results show that the ETI program increased the probability to have jobs and formal employment for the individuals who were previously unemployed or informally employed. We also find that the impact of the program increased over time due to increased popularity. An analysis by gender demonstrates that men benefited more from the program than women.

Policy recommendations

This thesis provided empirical evidence on the effects of a set of approaches/ policies towards the informal economy. In Sub-Saharan Africa, the informal sector employs the majority of individuals. Therefore, it is crucial to understand the best approaches to tackle it.

Our results demonstrate that a more severe approach does not lead to the best outcomes. As highlighted previously, the informal economy is heterogeneous. There are survivalist activities as well as opportunistic activities. Depending on which one dominates in the economy, different approaches may lead to unwanted results.

For survivalist activities, additional costs are difficult to bear and endanger the livelihoods of those in these activities. An outcome worse than informality is increased unemployment for these individuals. Any policy that wishes to adopt a stricter approach towards them will have to provide safety nets or create conditions for jobs creation in the formal sector.

With regards to opportunistic informal activities, the right approach would be to increase the benefits of formalisation. One way investigated in this paper is to work towards financial development. Indeed, due to increased opportunity costs of remaining informal when there is financial development, firms will be motivated to become formal. Some of the approaches would be to promote financial liberalisation to provide an efficient and competitive banking sector. Another area of improvement is to set the stage for macroeconomic stability and an efficient regulatory framework.

Since most of these firms are small in Sub-Saharan Africa, it may be difficult at first for them to navigate the complexity of the tax system or the administrative burden to obtain a loan from the banks. To enhance the benefits of formalisation, governments could design and tailor a training program for newly registered firms. They could also use incubators to accompany and support small formal businesses. This will help small businesses to make the most out of formalisation.

Limitations and directions for future research

Though this thesis presents a perspective and new empirical evidence on several approaches towards informality in Sub-Saharan Africa, the work can be extended further. The thesis considers a dichotomous view of informality, while informality is a continuum. Hence, considering its different levels will enrich the analysis. Various factors can be associated with varying levels of informality. It is thus essential in future research to disentangle the main drivers of informality according to several levels. Indeed, the formalisation line may be blurred, and firms or individuals may choose some formalisation aspects while keeping some other elements of the informal economy. For instance, it has been established that formal firms (extensive margin) may have employees without a contract or social protection (intensive margin), thus being both formal and informal. Future research should try to assess to what extent

firms will use the intensive margin to compensate for any increase in formal activities' costs.

Another limit of this thesis is the lack of productivity data on both informal and formal firms. Data on the firms' productivity would better capture the differences between firms and adequately assess the impact of formalisation on productivity in Chapter 4. Sub-Saharan countries need to upgrade their statistical system to collect consistent data on micro and small firms to inform policymakers on the informal economy's right approaches and the long-term effects. Panel data availability will allow in both Chapter 3 and Chapter 4 to assess the long-term effects of financial development on formalisation and the long-term impacts of formalisation on micro and small firms. Specific to chapter 4, panel data will help establish whether micro and small firms can sustain formalisation in the long term or exit to return to informality.

In Chapter 5, we provide evidence on the impact of the employment tax incentive in South Africa on the formal employment of individuals. Further research could extend the analysis in that chapter by using administrative data on firms that would capture firms that applied to the program. Such data will enrich the research and investigate the impact on job creation and the characteristics of the individuals who benefitted the most from the program.

ADDENDUM ON IMPACT

In line with article 22 of the regulation governing the attainment of the doctoral degree at Maastricht University in the following paragraphs I highlight the scientific impact of the results of the research described in the thesis, as well as the social impact. The aim of this section is to show how the knowledge developed in my research project can be valuable for society, policy makers, and researchers.

The dissertation's main objective was to examine the main determinants of the informal economy to inform policymakers on the best approach to tackle it. This thesis's novelty stems from the empirical evidence it offers on the main strategies used so far to tackle informality while considering the African continent's specificities. In line with this objective, Chapter 1 shows that policies that increase informality costs will effectively reduce its size, but at the expense of higher unemployment. The contribution of this chapter to social challenges is essential. A large share of the population in African countries have their livelihoods in the informal economy. Therefore, Chapter 2 informs local governments in South Africa that a repressive approach towards informality does not produce the best outcome. It emphasises that conditions must be met, such as offering alternative employment opportunities in the formal or the informal sector to avoid an increased exit into unemployment. This chapter provides the first empirical study that tries to assess a stricter policy's impact on the informal economy. Governments can learn from this chapter's results and consequently adapt their stance towards informality and implement accompanying measures to cushion the potential consequences.

Chapter 3 provides an insight to policymakers eager to use the financial sector as leverage to reduce informality. The chapter's results have demonstrated that an increase in the benefits of the formal sector effectively increases the compliance of micro and small firms to a wide range of taxes. Its results will also be of interest to tax offices in African countries. Indeed, African governments are in desperate need of resources now more than ever. Besides, the chapter considers the existence of an informal financial sector. It demonstrates that any policy that wishes to use the banking sector must factor in the availability of other financial resources to firms on the continent. It provides evidence that more efforts will be needed to effectively use the banking sector as leverage in Sub-Saharan Africa compared to other regions. Chapter 4 offers a leeway to governments reluctant to push micro and small firms towards formalisation. It shows that training and support from incubators help micro and

small firms reap the benefits of formalisation. On another note, with the increasing migration of youth in Sub-Saharan Africa because of poor working conditions and lack of opportunities, Chapter 5 offers an exciting insight to governments facing these challenges. The results show that governments can effectively use employment tax incentives to motivate firms to formally hire young people previously employed in the informal economy or unemployed.

The results from this thesis will be of interest to governments, policymakers and researchers. All chapters were presented at conferences. For instance, Chapter 2 was presented at the DRUID Academy Conference in Denmark in 2019. Chapter 3 was presented at the 11th Conference on Model-based Evidence on Innovation and Development (MEIDE) in Abidjan, Ivory Coast. Chapter 4 was presented at the 2020 UNU-MERIT internal conference. Finally, Chapter 5 was presented at the virtual Western Economic Association International conference in March 2021. The discussions in these meetings were positive and indicated the relevance of the topic in both research and policy. Besides, all chapters will be submitted to peer-reviewed journals.

ABOUT THE AUTHOR

Racky Balde holds both a Bachelor degree in Economics and a Master degree in quantitative economics from Gaston Berger University. Her work is at the intersection of labour economics, informality and social protection. In particular, her research uses empirical analysis and theory to uncover the effects of several approaches towards the informal economy. She was a teaching assistant of Econometrics in the Master of Science in Public Policy and Human Development at UNU-MERIT, and micro/macroeconomics in the Bachelor of European Studies at the Faculty of Art and Social Sciences, Maastricht University. She also led tutorials of an online impact evaluation course offered to professionals interested in impact evaluation methods by UNU-MERIT. During her doctorate, she worked as a researcher on World Food Program (WFP) projects focusing on social protection for refugees. She equally did an internship at the International Labour Organisation in Geneva and consulted for the African Development Bank. Before joining UNU-MERIT, she worked as a research assistant at both CREFAT research institute and CRES institute in Senegal.

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