



**TURUN  
YLIOPISTO**  
UNIVERSITY  
OF TURKU

# ESSAYS ON TAXATION AND SOCIAL PROTECTION IN DEVELOPING COUNTRIES

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Maria Jouste





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# **ESSAYS ON TAXATION AND SOCIAL PROTECTION IN DEVELOPING COUNTRIES**

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The originality of this publication has been checked in accordance with the University of Turku quality assurance system using the Turnitin OriginalityCheck service.

ISBN 978-951-29-8897-6 (PRINT)  
ISBN 978-951-29-8898-3 (PDF)  
ISSN 2343-3159 (Print)  
ISSN 2343-3167 (Online)  
Painosalama, Turku, Finland 2022



UNIVERSITY OF TURKU

Turku School of Economics

Department of Economics

Economics

MARIA JOUSTE: Essays on Taxation and Social Protection in Developing Countries

Doctoral Dissertation, 155 pp.

Doctoral Programme of Turku School of Economics

May 2022

## ABSTRACT

This doctoral dissertation investigates how tax administration and tax and social protection policies impact citizens' income and tax authorities' revenue collection in the developing world. Two of the essays use impact evaluation methods and administrative tax data, whereas the third essay employs microsimulation modelling and survey data.

The first essay studies how a taxpayer register campaign and a simpler electronic tax filing form impact the number of taxpayers and tax revenues. We use the Ugandan administrative data from 2012–18 in a staggered and standard difference-in-difference analysis. We find that both reforms significantly increased the number of presumptive taxpayers and tax revenues. The reforms complement each other, and the taxpayer register campaign was cost-effective.

The second essay studies the impact of a large personal income tax reform in 2012 on employees' income and tax revenues in Uganda. We use the difference-in-difference approach and the Ugandan tax register data from 2010–15. Our analysis focuses on the high-income earners because they faced the largest increase in the marginal tax rate. We find that the elasticity of taxable income is high compared to developed countries. Revenue implications of the reform are positive even though behavioural responses are significant.

The third essay investigates the effects of hypothetical universal pension reforms on poverty and inequality in Ecuador, Ghana, Tanzania, and South Africa and calculates the reforms' cost implications. We use tax-benefit microsimulation modelling and nationally representative household survey data to analyse the impacts of three different universal pension scenarios. We find that universal pensions reduced poverty and inequality in Ghana and Tanzania. In South Africa, universal pensions have a limited impact on poverty and inequality compared to the existing old-age pension, which covers most poor elderly. In Ecuador, the effect of universal pensions depends on the existing means-tested pensions. When the universal pension was given as a top-up scheme, it reduced poverty and inequality because the existing pension did not reach all vulnerable elderly. In all countries, the cost implications are substantial.

**KEYWORDS:** taxation, social protection, tax administration, tax reform, tax compliance, administrative data, personal income tax, pensions, microsimulation, small businesses

TURUN YLIOPISTO

Turun Kauppakorkeakoulu

Taloustieteen laitos

Taloustiede

Maria Jouste: Esseitä verotuksesta ja sosiaalityöistä kehittyvissä maissa.

Väitöskirja, 155 s.

Turun kauppakorkeakoulun tohtoriohjelma

Toukokuu 2022

## TIIVISTELMÄ

Tämä kokoomaväitöskirja tutkii kuinka verohallinto, verotus ja sosiaalityö vaikuttavat kansalaisten toimeentuloon ja verotuloihin kehittyvissä maissa. Väitöskirjan kaksi esseettä käyttävät vaikutusanalysointia ja hallinnollisia veroaineistoja, kun taas yksi essee hyödyntää mikrosimulointimallinnusta ja kyselyaineistoja.

Ensimmäinen essee tutkii kuinka veronmaksajien rekisteröintikampanja ja yksinkertaisempi verolomake pienille yrityksille ovat vaikuttaneet veronmaksajien määrään ja verotuloihin. Käytämme ugandalaista veroaineistoa vuosilta 2012–18 ja hyödynnämme porrastettua ja tavanomaista difference-in-differences –menetelmää. Tutkimuksen tuloksena on, että molemmat reformit lisäävät merkittävästi veronmaksajien määrää ja verotuloja. Lisäksi reformeilla on yhteisvaikutus ja veronmaksajien rekisteröintikampanja on kustannustehokas.

Toinen essee tutkii kuinka henkilön tuloverotuksen muutos vuonna 2012 vaikutti työntekijöiden tuloihin ja verotuloihin Ugandassa. Käytämme difference-in-differences –menetelmää ja ugandalaista veroaineistoa vuosilta 2010–15. Keskitymme analyysissämme eniten ansaitseviin palkansaajiin, koska heidän marginaali-veroasteensa kasvoi merkittävästi. Tutkimuksemme osoittaa, että verotulojen joustavuus on korkea verrattuna kehittyneisiin maihin. Reformi vaikutti positiivisesti verotuloihin, vaikka käyttäytymisvaikutukset ovat merkittäviä.

Kolmas essee analysoi kuinka hypoteettiset universaalit eläkereformit vaikuttavat köyhyyteen ja epätasa-arvoon Ecuadorissa, Ghanassa, Tansaniassa ja Etelä-Afrikassa. Lisäksi laskemme reformien kustannukset. Hyödynnämme mikrosimulointimallinnusta ja kansallisesti edustavaa kotitalouksien kyselyaineistoa analysoidaksemme kolmen erilaisen universaalien eläkereformien vaikutuksia. Tutkimuksemme osoittaa, että universaalit eläkkeet vähentävät köyhyyttä ja epätasa-arvoa Ghanassa ja Tansaniassa. Etelä-Afrikassa universaaleilla eläkkeillä on rajoittunut vaikutus köyhyyteen ja epätasa-arvoon verrattuna olemassa oleviin eläkkeisiin, jotka tavoittavat suurimman osan köyhistä vanhuksista. Ecuadorissa universaalien eläkkeen vaikutus riippuu olemassa olevista tarveharkintaisista eläkkeistä. Kun universaali eläke annetaan lisätulona, se vähentää köyhyyttä ja epätasa-arvoa, koska olemassa olevat eläkkeet eivät tavoita kaikkia haavoittuvassa asemassa olevia vanhuksia. Kaikissa maissa, eläkereformien kustannukset ovat huomattavat.

ASIASANAT: verotus, sosiaalityö, verohallinto, verolakien noudattaminen, rekisteriaineisto, henkilön tuloverotus, eläkkeet, mikrosimulointi, pienet yritykset

# Acknowledgements

Writing this dissertation has been a long journey which has included many exciting paths and interesting individuals. This dissertation has given me opportunities that I could not imagine before starting this journey. It has taken me to live in Uganda, enabled me to meet inspiring colleagues from different backgrounds, and of course, widen my knowledge of tax and social policies in developing countries. I am grateful for all the support I have received during the past five years.

I want to express my gratitude to my supervisors, who have believed in me the whole time, even though my research topic was not the most straightforward. Jukka Pirttilä introduced me to UNU-WIDER and development economics, but most of all, he encouraged me to start my doctoral studies. I have enjoyed working with him all these years, and he has been my closest supervisor. Janne Tukianen became my supervisor later, but his influence on my research, especially on finalising this dissertation, has been remarkable. Kaisa Kotakorpi was my supervisor when I started my studies in Turku. I am grateful to Kaisa and Heikki Kauppi that they trusted my research proposal so much that I got the funding for the first year.

I want to thank my co-authors, who have made it possible for me to research the topics of this dissertation. First, I thank Pia Rattenhuber, she has been not only an inspiring mentor and a colleague at UNU-WIDER, but also a friend. Her influence on my research career has been substantial, and she has made me believe in myself. Next, I want to express my appreciation to my Ugandan colleagues. Ronald Waiswa guided me through complex tax and administrative policies and worked with me on data for many hours in the URA offices in Kampala. Joseph Okello patiently described and extracted personal income tax data for our research and helped me to run the codes when I was not in Uganda. Tina Kaidu provided essential information for our study, and she has been a critical person in our collaboration. Milly Nalukwago was the initiator of the UNU-WIDER and URA collaboration and made it possible for us to access Ugandan data. Without her, this dissertation would not have been done.

I thank my pre-examiners Mazhar Waseem and Ohto Kanninen for reading my dissertation. Their constructive comments have improved my dissertation and will help me further develop the papers for publication.



I want to express my gratitude to Kunal Sen and Finn Tarp, who have made it possible for me to join and continue to work at UNU-WIDER. I am grateful for the travel funding and employment that UNU-WIDER provided to me. In the past years at UNU-WIDER, I have shared my days with great colleagues; I thank you all, especially Kati, Antti, Amina, Sami, Risto, Anustup and Lorraine.

During my several visits to Kampala and afterwards, Dorothy Nakyambadde, you have been a warm and loving colleague, and you have always thought best of me. I also thank Nicholas Musoke, I have learned a lot from our discussions. I am thankful to Kyle McNabb, you provided insightful comments on my papers, and you have been a great colleague to see in Kampala.

I am grateful for the opportunities to present my papers at several conferences and workshops. All the feedback I have received has made this dissertation better.

My doctoral studies were funded by Kone Foundation (grant no. 80-42327) and Yrjö Jahnsson Foundation. Also, I was employed by the University of Turku for a few months.

This journey has not been meaningful without my fellow graduate students. Especially, Aliisa and Annika, you have made this journey more fun. I would also like to thank my friends Pauliina, Sari and Marianna, who have been my friends from the beginning of my studies in Economics. They have supported me during these years, and we have had great moments together. Pauliina, I am grateful that we had our regular sports activities; those kept me functioning.

My greatest supporter has been my family. I would like to thank my parents, Anna-Maija and Petteri; they have encouraged and supported me in whatever I have chosen to pursue. I also thank my brother Erkka.

Finally, thank you, Tomi. You have always believed in me and supported me in so many ways. I could not imagine having anyone else besides me. Last but not least, I thank our daughter Sirkku who brings joy into my life every day.

May 2022  
*Maria Jouste*

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# List of Original Publications

This dissertation is based on the following essays and original publication, which are referred to in the text by their Roman numerals:

- I Jouste, Maria, Milly I. Nalukwago, and Ronald Waiswa. Do Tax Administrative Interventions Targeted at Small Businesses Improve Tax Compliance and Revenue Collection? Evidence from Ugandan Administrative Tax Data, *Published manuscript*.
- II Jouste, Maria, Tina Kaidu, Joseph Okello Ayo, Jukka Pirttilä, and Pia Rattenhuber. Taxpayer Response to Greater Progressivity: Evidence from Personal Income Tax Reform in Uganda, *Published manuscript*.
- III Jouste, Maria, and Pia Rattenhuber (2019) A Role for Universal Pension? Simulating Universal Pensions in Ecuador, Ghana, Tanzania and South Africa. *International Journal of Microsimulation*, 12(1): 13–51.

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# 1 Introduction

This dissertation consists of three empirical essays on taxation and social protection in the developing world. All three essays focus on evaluating different policy reforms in developing countries. The first essay evaluates the impacts of two tax administrative reforms on a number of small business taxpayers and revenue collection in Uganda. The first administrative reform was a taxpayer register expansion campaign focused on enhancing and simplifying taxpayer registration. In the second reform, the Uganda Revenue Authority (URA) introduced a new simpler tax-filing system of presumptive tax. The second essay investigates employees' responses to a major personal income tax reform in Uganda. The tax reform introduced a new higher tax rate for the highest income earners, increased the zero-tax threshold, and hiked the threshold of the second-lowest tax bracket. Further, the essay estimates the elasticity of taxable income and calculates the revenue implications of the reform. Both essays use Ugandan administrative tax records and employ a difference-in-differences design, thus contributing to the scarce but rapidly increasing literature on using administrative data in developing countries, particularly low-income countries, for analysing policy-relevant research questions with credible research designs.

The third essay applies static microsimulation modelling, using national household surveys to produce nationally representative results. The essay introduces hypothetical 'universal' pension benefits to four developing countries and evaluates the effects of 'universal' pension benefits on poverty, inequality, and governments' expenditure. This essay contributes to the ongoing discussion on how social protection policies can be designed to reduce poverty and how expansion of such policies can be evaluated using simulation methods.

This introductory section is organised as follows. Section 1.1 describes recent trends in tax revenue collection and social protection programmes worldwide and introduces the concept of informality. Section 1.2 focuses on the design of tax systems in developing countries, which are characterised by weak institutions and large informal sectors. Further, the section shows how tax systems can be used for income redistribution. Section 1.3 compares targeted and universal social protection policies in a developing country context and discusses constraints on social

spending. Section 1.4 summarises research using administrative data in developing countries, presents a framework for working with revenue authorities and describes the experience of working with the URA. In addition, the section presents a useful tool for tax and benefit policy evaluation: microsimulation models.

## 1.1 Background

United Nations (UN) Sustainable Development Goal 17<sup>1</sup> and the Addis Tax Initiative<sup>2</sup> emphasise the importance of raising domestic resource mobilization to support development in low- and middle-income countries. To achieve sustainable development, countries need to improve their tax capacity and revenue collection from other resources. Governments cannot provide sufficient social protection services to their citizens without higher domestic revenues, and countries have to rely more on foreign aid. Foreign aid is seen as the second-best solution to finance public policies in developing countries because it can deteriorate national policies and hinder countries' efforts to raise domestic revenues (Manning, 2012).<sup>3</sup>

### 1.1.1 Taxation

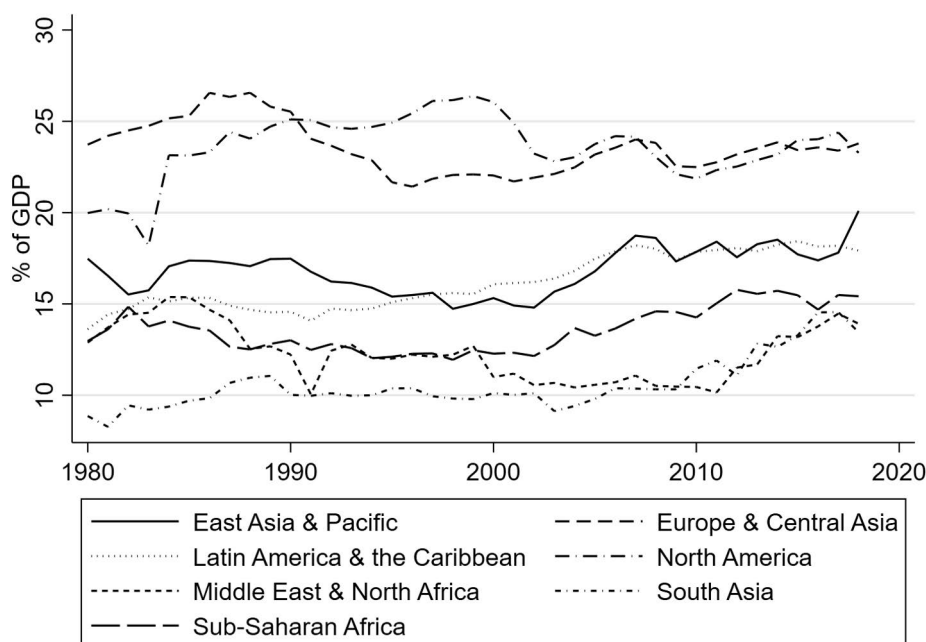
In recent decades, tax-to-GDP ratios have remained stable and at low levels in the developing world (see Figure 1). A positive development in tax-to-GDP ratios started around 2000, but levels are still low compared to developed countries in North America, Europe and Central Asia. For example, in sub-Saharan Africa the tax-to-GDP ratio is only around 15 per cent, compared to almost 25 per cent in North America.

<sup>1</sup> UN Sustainable Development Goal 17 calls for higher domestic resource mobilisation and improvements in domestic tax capacity (see <https://sdgs.un.org/goals/goal17>).

<sup>2</sup> The Addis Tax Initiative is a multi-stakeholder partnership which advocates fair and effective tax systems for sustainable development and improved domestic revenue mobilisation. The Addis Tax Initiative Declaration 2025 can be read at <https://www.addistaxinitiative.net/resource/ati-declaration-2025>.

<sup>3</sup> Morrison (2010) reviews the literature on foreign aid and the resource curse and linkages between natural resources and foreign aid. He summarises the large literature which has shown that foreign aid suffers from similar problems as natural resources, namely the resource curse. Foreign aid can lead to negative effects, for example the 'Dutch Disease', which means that exchange rates appreciate because the value of exports increases, which could in turn reduce the competitiveness of the tradable sector (Morrison, 2010; Manning, 2012). Another negative effect is that foreign aid could lead to corruption and deteriorate accountability, especially when government has weak institutional capacity.

Tax rates around the world are in a similar range. Indirect tax rates are, on average, 16 per cent in Africa, 20 per cent in Europe, 12 per cent in Asia, and 13 per cent in North and South America (KPMG, 2021b). Individual income tax rates are on average 26 per cent in Africa, 35 per cent in Europe, 28 per cent in Asia, and 31 per cent in North and South America (KPMG, 2021c). Corporate income tax rates are on average 27 per cent in Africa, 19 per cent in Europe, 22 per cent in Asia, and 27 per cent in North and South America (KPMG, 2021a). Therefore, minor differences in tax rates cannot explain the significant differences in tax-to-GDP ratios around the world.

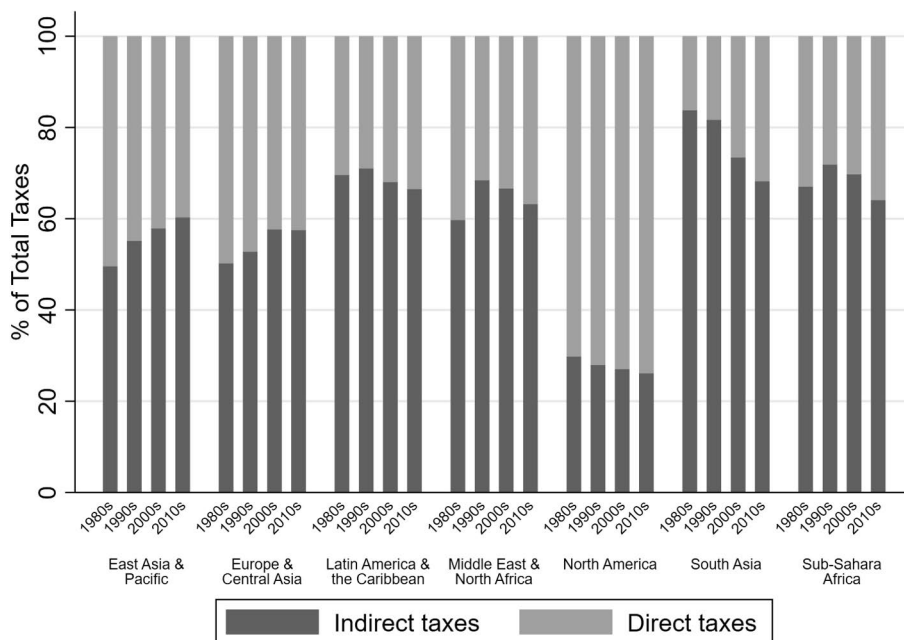


**Figure 1.** Total tax revenue as a share of GDP by regions.

Note: Total tax revenue excluding social security contributions. Source: UNU-WIDER (2020).

Figure 2 illustrates that the tax mix between direct and indirect taxes varies in different regions of the world. Direct taxes comprise personal and corporate income taxes and property taxes. Indirect taxes include sales, value-added, excise and trade taxes. North America stands out from other regions because it collects more direct than indirect taxes. Other regions have higher revenues from indirect taxes. In particular, sub-Saharan Africa, South Asia, the Middle East and North Africa, and Latin America and the Caribbean collect over 60 per cent of revenue from indirect taxes. However, the share of revenues from direct taxes has increased over the

decades in sub-Saharan Africa, South Asia, Latin America and the Caribbean. Overall, this means that less developed regions collect less direct than indirect taxes. The large share of indirect taxes, mainly value-added tax (VAT), in developing countries is a consequence of the IMF’s promotion of VAT since the late 1970s (Keen, 2012). For example, most of the countries in sub-Saharan Africa have adopted VAT.



**Figure 2.** The share of indirect and direct taxes of total tax revenue by decades and regions.

Note: All taxes excluding social security contributions. Source: UNU-WIDER (2020).

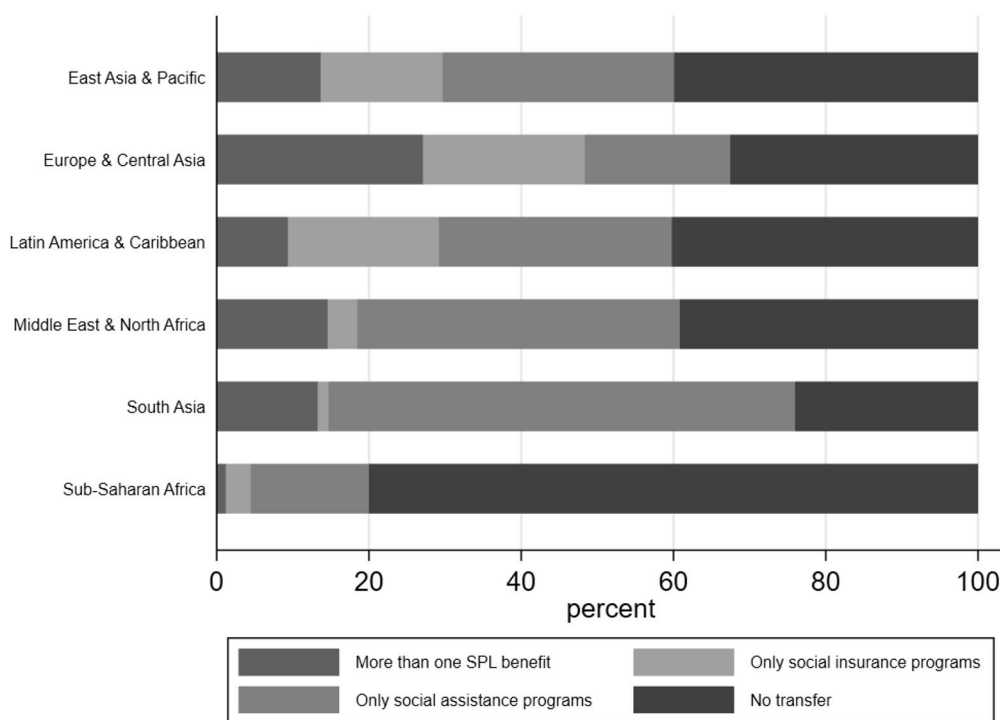
### 1.1.2 Social protection

Social protection services are limited in many developing countries. Figure 3 shows a large difference in the coverage of social protection and labour (SPL) programmes between regions. In sub-Saharan Africa, 80 per cent of the population is not covered by any social protection or labour programmes, whereas in other regions most of the population is covered at least by one social assistance or insurance programme. In the Middle East and North Africa, and South Asia, SPL programmes are mainly social assistance, such as cash transfers or in-kind benefits, providing basic income security for poor and vulnerable people. In more developed regions, social insurance



programmes, including pensions, unemployment benefits, and health insurance, cover a larger share of the population.

The number of social protection programmes, particularly social assistance programmes, has increased substantially in developing countries (Niño-Zarazúa, 2019). In 2000, there were around 80 programmes, but already by 2015 almost 180 programmes were in operation in low- and middle-income countries. However, as Figure 3 illustrates, the coverage of SPL programmes is still unequal between different regions, and social assistance programmes are the main SPL programmes in the developing world. Moreover, the average amount of social assistance benefit for the poorest households is much lower in sub-Saharan Africa and South Asia (US\$0.42 and US\$0.11 per capita per day at purchasing power parity, respectively) than in Europe and Central Asia (US\$0.93) (Niño-Zarazúa, 2019).



**Figure 3.** The coverage of social protection and labour programmes in total population by regions.

Note: Regions' most recent values between 2008 and 2016. SPL=social protection and labour. Source: World Bank (2020).

### 1.1.3 Informality

The International Labour Office (ILO) (2018) defines the informal economy or sector and informal employment as consisting of unincorporated enterprises and the employees working in these enterprises, which are not registered with government authorities such as the social security and tax authorities; they do not keep records as required by the law (e.g. balance sheets), and their production is partially for sale and not only for their own use. Using this definition, the ILO compiles statistics which show that the size of the informal economy is huge in developing countries. In Africa, 85.8 per cent of employment, including the agriculture sector, is informal; in Asia and the Pacific, the figure 68.2 per cent and in the Arab states, 68.6 per cent (ILO, 2018). By contrast, in the Americas, only 40 per cent of employment is informal and in Europe and Central Asia, 25.1 per cent, even though these regions also include middle-income countries. As these statistics show, informality is one of the main challenges that developing countries face in increasing domestic revenues.

The informal economy is characterised by four additional facts other than size (La Porta and Shleifer, 2014). First, the productivity of the informal economy is significantly lower than the formal economy because the businesses are small, and their owners are not educated. Second, most businesses have low productivity, and even if they grow, they will not reach the lowest threshold for paying taxes, and the registration costs are often too high for them to afford. Third, informal businesses are not connected to the formal economy; i.e. informal and formal businesses operate in different markets, and the transition from informal to formal is not common. However, Ulyssea (2018) and Maloney (1999) have shown findings contradicting the third fact. Ulyssea (2018) shows that both formal and informal firms operate in the same industries,<sup>4</sup> and Maloney (1999) finds that employees migrate between the formal and informal sectors. Fourth, as the economy grows and develops, the formal economy will naturally become larger than the informal economy because of the higher productivity of formal businesses.

<sup>4</sup> Productive firms can choose to operate either in the formal or the informal sector. Some firms choose to operate informally because they can benefit from the cost advantages of non-compliance (Ulyssea, 2018).

## 1.2 Tax systems in developing countries

### 1.2.1 Designing tax systems in the presence of informality and weak institutions

Designing efficient and equitable tax systems in developing countries cannot follow the structure of taxation in developed countries because the fiscal capacity and economic structure are different. Weak institutions, an unstable political environment, a lack of transparency and the tax-paying culture are challenges that limit tax collection in developing countries (Besley and Persson, 2014). Moreover, most low- and middle-income countries are characterised by a large informal sector, and most of the population has informal employment (International Labour Office, 2018). Consequently, a tax system that is optimal for developed countries cannot be adopted directly by developing countries.

The informal economy plays an important role when governments design their tax systems. Gordon and Li (2009) emphasise that increasing the size of the formal sector should be the most important goal when designing tax and other government policies in developing countries. For example, if most employment is informal, as in Africa, personal income taxes are collected only from a small part of the working population. Similarly, when firms operate informally and are not registered, the tax authorities miss out on a large amount of corporate income tax revenue.

The formalisation of firms and employees is one of the biggest challenges governments face in developing countries. Besley and Persson (2014) emphasise that the benefits of a functioning legal system may be a key to attracting more firms to act in the formal sector and thus enhance firm growth. Ulyssea (2020) reviews papers that evaluate the causal impacts of different (quasi-)experiments in formalisation. He summarises that there is only weak or no evidence that lower formalisation costs lead firms to become formal. Instead, he argues that strengthening enforcement is the best policy for increasing registration by firms. La Porta and Shleifer (2014) emphasise that simplifying registration and improving the education of entrepreneurs could enhance formality. In the first essay of this dissertation, my co-authors and I evaluate administrative reforms which aimed at simplifying tax registration and filing in Uganda. We found that better information and tax enforcement combined with simpler filing and registration procedures are crucial elements in enhancing the formalisation of small businesses. Moreover, we showed that these administrative reforms led to higher tax revenues from small businesses.

Furthermore, informality affects the design of tax policy reforms in developing countries. Besley and Persson (2014) argue that because the elasticity of taxable income is high in countries with a large informal sector, it is difficult to raise

revenues by increasing tax rates since taxpayers choose to report less income. Therefore, they suggest that low-income countries could increase revenue collection by broadening the tax base instead of increasing tax rates. Jensen (2019) supports this view and shows in his empirical analysis that the size of the tax base is strongly associated with income tax collection and development. This means that broader tax bases increase tax collection. McKay, Pirttilä and Schimanski (2019) estimate the tax elasticity of formal work in four sub-Saharan African countries. They find that tax policy changes have no significant impact or only a weak non-robust impact on the probability of having formal employment. Based on this finding, they conclude that a small increase in tax rates does not always induce workers to shift to informality. On the other hand, Waseem (2018) shows a large increase in the tax rates of partnerships compared to other legal forms of firms leads partnerships to respond by moving into the informal sector in Pakistan. This shift from formality to informality resulted in lower tax revenues, and the effect persisted over three years. In summary, these findings show that it is crucial to take informality into account when governments consider changing tax policies in developing countries.

A large informal economy is associated with high levels of non-compliance because firms can easily choose to operate in the informal sector, and the tax authorities have limited capacity to enforce the payment of taxes. In many developing countries, governments do not have access to different types of third-party information as in developed countries; for instance, information-sharing with banks is usually limited. Nevertheless, because of increasing electronic filing in developing countries, tax authorities could have third-party information on electronic transactions, such as VAT sales and credit card information (see e.g. Carillo, Pomeranz and Singhal, 2017), and most personal income taxes are withheld by employers (see example.g. the second essay of this dissertation).

High levels of tax evasion and weak enforcement capacity can affect the design of optimal tax policies. Best et al. (2015) find that turnover tax can be more optimal than profit tax when tax evasion is included in the model. They test the model using administrative tax data from Pakistan and find that tax evasion was reduced by 60–70 per cent of corporate income when using turnover tax instead of profit tax.

Moreover, low tax administrative capacity combined with other factors, for example weak social norms regarding tax-paying and low trust in government, affect tax compliance, and thus revenue collection in developing countries — see Alm (2019) for a review of studies on motivations in tax compliance. Therefore, increasing tax compliance by strengthening institutions and social norms should be one of the main goals when designing tax systems in developing countries.

## 1.2.2 Income redistribution and tax systems

Developing countries have different capacities for redistribution.<sup>5</sup> Ravallion (2010) states that a country's capacity for redistribution can be measured by calculating how high marginal tax rates on wealthy persons<sup>6</sup> could cover the aggregate poverty gap<sup>7</sup> in total or proportionally. He argues that many low-income countries would need to have such high marginal tax rates (MTR) on the rich to close even half of the aggregate poverty gap that it is not sufficient to apply such MTRs. For instance, he calculates that Brazil would only need to have a 1 per cent MTR on the rich to cover the aggregate poverty gap at the US\$1.25-a-day line, whereas India would need to have a 100 per cent MTR on the rich to cover only 20 per cent of the aggregate poverty gap. He estimates that in developing countries the average MTR to close the poverty gap for the US\$1.25-a-day line would be 41.6 per cent, and for the US\$2-a-day line it would be 52.4 per cent. A striking finding is that 29 developing countries would need to have a 100 per cent MTR to close the poverty gap for the US\$1.25-a-day line.

Countries can redistribute incomes using tax policies. In many countries, indirect taxes are regarded as being regressive and direct income taxes progressive. For instance, Gasior et al. (2018) find that indirect taxes (VAT) are regressive and increase inequality in six African countries using microsimulation methods. Furthermore, they conclude that the regressive impact of indirect taxes can undermine or even cancel out the progressive effect of direct taxes and benefits. Conversely, some studies have found that VAT and sales taxes can be even slightly progressive, and thus indirect taxes do not affect income distribution much (e.g. Gemmell and Morrissey, 2005). Coady (2006) reviews studies that evaluate the distributional impact of VAT using partial or general equilibrium models. He summarises that the progressivity of VAT depends on whether basic food items are exempt from VAT or not. Using empirical methods and household expenditure data, Bachas, Gadenne and Jensen (2020) show that consumption taxes are progressive and reduce inequality because informal consumption, e.g. purchases from street stalls, is larger among the poor in developing countries. Moreover, they find that when informality is taken into account, different consumption tax rates on products

<sup>5</sup> Jäntti, Pirttilä and Rönkkö (2020) review earlier literature on the determinants of redistribution. They examine the determinants of redistribution using new data and improved methods. They note that information on redistribution and data available for estimations are scarce in developing countries.

<sup>6</sup> Ravallion (2010) defines in his paper that a rich person is a person who is not poor by rich country standards.

<sup>7</sup> The aggregate poverty gap is the sum of all individual incomes under the poverty line.

have only a weak redistributive impact. Especially in low-income countries, tax rate differentiation does not increase progressivity, but it can increase progressivity in middle-income countries because a smaller share of consumption is informal.

Personal income taxes can be designed to be progressive and more redistributive when tax rates are higher for wealthy than for poor individuals (Gordon and Li, 2009). Gordon and Li (2009) point out that when countries want to have more redistribution, they tend to design more progressive personal income taxes instead of using VAT. One option for increasing the progressivity of personal income taxes in developing countries is to focus more on groups, such as the self-employed and high-income earners, who can evade taxes more easily than poor individuals (Bastagli, Coady and Gupta, 2015). Moreover, the large informal sector reduces the distributional impact of personal income taxes because only a small share of the population pays these taxes.

## 1.3 Social protection in developing countries

### 1.3.1 Targeted versus universal social protection programmes

Social protection programmes can be either targeted or universally distributed to all citizens. Targeted social protection programmes can be social assistance or social insurance (contributory) programmes. Barrientos (2011) classifies social assistance programmes into programmes targeted at poor households or individuals, and programmes providing income transfers that are unconditional or conditional on labour or human capital investments. He emphasises that the focus of social assistance should be on integrated programmes combining several social assistance programmes because a single programme cannot support households in developing their human capital and at the same time reduce poverty, vulnerability, and inequality. In addition, integrated programmes could improve the effectiveness of social protection. As explained in subsection 1.1.2, social insurance programmes include contributory pensions and health and employment insurance.

The large informal economy creates challenges in designing effective social protection services in developing countries. One issue in social protection is how to reach poor citizens if they primarily work in the informal economy and are therefore not on the records of institutions that deliver social protection services. The effectiveness of targeted social assistance policies in poverty reduction depends on how many eligible individuals receive benefits. If most of the population is informal, this could lead to low take-up. Without adequate information on incomes and living

conditions, it is hard to identify eligible individuals or households. For instance, Brown, Ravallion and van de Walle (2018) evaluate the performance of different targeting methods, mainly proxy-means tests (PMTs), in African countries; they find that standard PMTs and other poverty-targeting methods do not reach all poor people. Moreover, social insurance programmes do not by definition cover any informal workers because the benefit amount of social insurance programmes is based on social security contributions, which are only collected from formal employment.

One solution to the targeting problems in social security is to provide basic income benefits to citizens. Basic income benefits are given to the whole population, including informal employees, and no proxy means-testing or any other targeting methods are needed. In general, these benefits are easier to administer, and social security authorities do not need to collect any additional information related to eligibility. Brown et al. (2018) argue that universal basic income benefits and uniform transfers with categorical targeting for vulnerable groups could work better in reducing poverty when PMTs fail to reach the poorest citizens. Conversely, Hanna and Olken (2018) find that targeted programmes, even if distributed imperfectly to the poor, lead to higher welfare gains than universal programmes because targeted programmes provide larger benefit amounts to the poor. Even though the basic income benefit could perform better in poverty reduction in some cases, the problem with a benefit that has universal coverage is that it can be too costly to fund. Hanna and Olken (2018) show that universal programmes cannot be easily financed using progressive tax rates in developing countries because of the prevalence of informality and limited information on individual taxpayers' incomes. This issue is relevant in developing countries where domestic revenue mobilisation is low. For example, Ravallion (2010) estimates that basic income schemes are not feasible in most developing countries, and especially the poorest countries, as marginal tax rates of over 100 per cent on the rich would be needed to finance these benefits.

Social protection programmes and public services are designed to reduce poverty and inequality in developing countries. However, their effectiveness and distributional impact depend on how well they are implemented and administered. For example, targeted social assistance benefits are more progressive than basic income benefits since targeted programmes are given only to the poor. Rigolini et al. (2020) show using simulations that targeted social assistance programmes reduce poverty and inequality more than budget-neutral universal basic income in 10

countries with different income levels.<sup>8</sup> Social insurance programmes do not have a large redistributive impact because of the low participation rate due to the large share of informal employment in developing countries (Bastagli, Coady and Gupta, 2015). Other public spending, such as spending on education and health services, could alleviate poverty and inequality if poor households have access to these. For instance, if governments spend more on higher education, which usually benefits elites, instead of financing public healthcare, this kind of public spending will not be a pro-poor policy (Besley and Persson, 2014). The size of the redistributive impact of social spending depends on how well developing countries can administer social protection programmes and whether they have enough revenue to finance public services.

### 1.3.2 Constraints on social protection in the developing world

The feasibility of different social protection programmes depends on political inclinations regarding redistribution and how much domestic revenues governments can spend on social protection. Overall, the capacity to redistribute using a transfer system is limited in developing countries. Some of the reasons for this are the high level of the informal economy, a lack of domestic revenues, low capacity to administer transfer systems, weak institutions, and an unstable political environment.

One of the main constraints on social protection in the developing world is how to finance social protection and labour programmes if the level of domestic revenue is low, as shown in Figure 1. For this reason, fiscal policies cannot redistribute as much as in more advanced countries (International Monetary Fund, 2014). Furthermore, spending on social services is at a low level. For example, the International Monetary Fund (2014) describes that social spending in sub-Saharan Africa is less than 10 per cent of GDP, and only a third of that is spent on social protection. In contrast, in Latin America, social spending is approximately 15 per cent of GDP, of which around half is spent on social protection. Barrientos (2011) argues that countries whose tax-to-GDP ratio is 15 per cent or less do not have enough revenue to spend on social assistance programmes. Therefore, developing countries need to increase domestic resource mobilisation to enhance income redistribution and the provision of public services (Bastagli, Coady and Gupta,

<sup>8</sup> The study includes three low-income countries (Haiti, Mozambique, and Nepal), two lower-middle-income countries (India and Indonesia), three upper-middle-income countries (Brazil, Kazakhstan, and South Africa), and two high-income countries (Chile and the Russian Federation).



2015). Many countries with low levels of domestic revenues have to rely on international aid to provide social protection to their citizens. Relying on international aid can be problematic, as explained in subsection 1.1.

Another constraint can be the political system. The political system affects how governments spend their revenues on social protection. In many developing countries, clientelism is a prevalent part of the political system (see the review of clientelism research by Hicken (2011)). Clientelism impacts how social protection policies are distributed to different groups in society. When clientelism is the main type of politics, politicians can exploit vote-buying and promise social protection services and other public goods to particular groups of voters belong. By contrast, if redistributive policies are programmatic, they are based on well-defined rules on entitlement of benefits and are not based on voting history, for example. A clientelist policy system is in some cases linked with non-democratic regimes because, in authoritarian countries, governments' social protection policies can only be provided to a narrow group of the population to favour political supporters (Mares and Carnes, 2009).

## 1.4 Data sources and challenges in developing countries

### 1.4.1 Administrative data

In recent years, there has been an increase in the amount of tax research based on administrative data in developing countries. However, the tax systems in developing countries are still an understudied topic in the literature, particularly using administrative data. In many low- and middle-income countries, access to administrative tax data is limited, the data is in a manual paper format, and the data quality is not sufficient. The recent literature review by Pomeranz and Vila-Belda (2019) summarises studies on taxation in both developed and developing countries. They focus on research conducted with tax authorities and present studies employing both randomised and natural experiments. The review shows that an increasing number of studies have investigated the importance of information to tax authorities in developing countries and, for instance, found that third-party information can reduce tax evasion (see e.g. the studies by Naritomi (2019) and Brockmeyer and Hernandez (2019)). Another strand of literature has evaluated how tax authorities' tax enforcement and communication practices, for example audits and letter reminders, can improve tax compliance. In developing countries, research has focused on analysing the effects of letters or messages on taxpayers using randomised experiments (see the overview of letter experiments by Mascagni

(2018)). A vast number of studies have analysed taxpayers' responses to changes in tax policies using administrative data and natural experiments. However, most of these studies were conducted using administrative data from developed countries. Only a few studies are on developing countries, such as Best et al. (2015), Kleven and Waseem (2013) and Waseem (2018) on Pakistan, Carillo, Pomeranz and Singhal (2017) from on Ecuador, Bachas and Soto (2018) on Costa Rica, and Boonzaier et al. (2019) on South Africa. Increasingly, studies using developing countries' administrative data employ various modern econometric methods to investigate causal inference. For example, difference-in-differences (DiD) and bunching approaches have been used to evaluate natural experiments (e.g. Kleven and Waseem, 2013; Naritomi, 2019), and the DiD approach is standard practice when analysing random experiments (e.g. Pomeranz, 2015).

Pomeranz and Vila-Belda (2019) provide practical guidance on how to initiate and maintain collaboration with tax authorities and describe challenges that researchers face in such collaboration around the world. Their advice is based on interviews with researchers who have collaborated with tax authorities. In interviews, researchers highlight the importance of a close relationship between collaborators. Furthermore, they advise having ongoing interaction at the different stages of projects to ensure that the research is relevant and the interpretation of results is in line with the context. Other researchers have written similar practical instructions as Pomeranz and Vila-Belda (2019) on how to work with administrative data and engage with tax administrations in developing countries (see, e.g. International Centre for Tax and Development (2021) and Brockmeyer (2019)).

This dissertation includes two essays where the analysis is based on administrative tax data from Uganda. These essays are a part of a research project in collaboration with UNU-WIDER<sup>9</sup> and the Uganda Revenue Authority (URA). UNU-WIDER followed the International Centre for Tax and Development's (2021) principles of engagement with tax administrations in developing countries when the project was initiated in 2018 and continued working collaboratively with the URA. The project has included several research visits to Uganda and regular conversations both in-person and remotely to understand the data and research context. The data was extracted from the URA's electronic tax (e-tax) system, where all tax returns and payments are saved for tax administration purposes. After extraction, the data was anonymised, cleaned from duplicated observations, and the variables were organised and trimmed into a usable format. In the research projects, we merged several datasets using an anonymised identifier.

<sup>9</sup> United Nations University World Institute for Development Economics Research

The quality of data from the Uganda Revenue Authority varies between different datasets. Most income and tax-related variables such as taxable income and payable amount of tax are of sufficient quality in all the datasets. In contrast, the geographical indicator variables needed more comprehensive cleaning and therefore were not of such good quality in a raw format. The quality also depended on the tax forms that the data is based on. For instance, corporate income tax (CIT) return data has more variables than presumptive tax return data, making it harder to organise CIT return data in a reliable and usable format. Another example of the issue with data was that employees are not obliged to have a unique identification number, and thus we could not create a panel of employees. Instead, we use this data in the cross-section analysis. Mayega et al. (2019) wrote a report about the quality of tax register data in Uganda and found that data suffers from several quality problems such as duplicated phone numbers, and that one taxpayer could have many taxpayer identification numbers in register data. We encountered the issues that Mayega et al. (2019) describe. Still, after extensive cleaning and cross-checking of the datasets used in the UNU-WIDER project (and in the first and second essay of this dissertation) we arrived at datasets that we trusted to be credible and of sufficient quality for use in research.

UNU-WIDER is not the only international research institute that has used the URA's administrative tax data in research. Other research papers have investigated VAT transactions, the taxation of high-net-worth individuals, and surveyed auditors (Almunia et al., 2015; 2020; Kangave et al., 2018). The ongoing research by Almunia et al. (2020) employs transaction-level VAT return data from the URA to examine if firms, both sellers and buyers, report the same amount. They found that 79 per cent of firms reported different amounts, and 27 per cent of these misreported their sales in a way that increased their taxes. Kangave et al. (2018) examine the URA's approach to taxing high-net-worth individuals (HNWIs) and if this approach has led to higher tax payments from HNWIs. They show that in the first year, the new HNWI unit at the URA collected more than US\$5.5 million in income tax revenue. Further, they describe the reasons why the URA's approach was successful. Almunia et al. (2015) survey the URA's auditors and combine survey data with information from the URA's tax returns and audit cases. They describe the characteristics of auditors and taxpayers and examine if there is a correlation between these characteristics and higher additional tax liabilities collected as a result of audits.

## 1.4.2 Microsimulation models and nationally representative survey data

The third essay in this dissertation uses tax-benefit microsimulation modelling. Tax-benefit microsimulation models have been developed to model countries' tax and benefit systems. These models can be used for calculating and analysing the impacts of current tax and benefit systems or hypothetical policy reform scenarios. Tax-benefit microsimulation models use nationally representative household surveys that collect information on households' consumption and incomes and basic demographic characteristics such as family structure, education, and employment. Tax-benefit microsimulation models are user-friendly tools for policymakers to simulate new policies ex-ante, but the models can also be used for more comprehensive and in-depth research.

One caveat of microsimulation modelling in developing countries is that the models must assume that disposable income is calculated from consumption and the taxes and benefits modelled. This calculation is done because nationally representative surveys only collect information on households' consumption and not households' incomes as in developed countries. Nevertheless, information on households' consumption is measured as well as possible in such surveys. For instance, consumption-based poverty and inequality measures are commonly used in most developing countries due to the lack of income information. Moreover, in developing countries, many households live from subsistence farming, which is not defined as income in surveys but is included in consumption.

Research based on administrative tax data and microsimulation modelling can provide highly policy-relevant findings if research questions are designed in collaboration with local partners or based on an understanding of a country's political context. Local partners can also help to disseminate the research findings and share policy recommendations from research with relevant government institutions. This information-sharing could increase the uptake of research and support policy-making.

## 2 Overview of the essays

In this section, I present an overview of the three essays of this dissertation. I describe the research setting, institutional background, and data, explain the used methodologies, and finally summarise the main findings of the essays.

### 2.1 Do tax administrative interventions targeted at small businesses improve tax compliance and revenue collection? Evidence from Ugandan administrative tax data

In this essay, we investigate the effects of two tax administrative interventions on tax compliance and revenue collection in Uganda. This essay contributes to the narrow but increasing literature on using administrative data to evaluate natural experiments in developing countries.

The first administrative intervention, a Taxpayer Register Expansion Project (TREP), aimed to enhance taxpayer formalisation, simplify business registration of different authorities, educate businesses about their tax obligations and reduce compliance costs. TREP was introduced in Kampala-based municipalities in 2013, and it expanded in 2014–16 to cover more municipalities in Uganda. However, it does not yet cover all municipalities in the country. The most significant reform in TREP was the establishment of one-stop shops where businesses could register for several authorities in the same visit.

The second administrative intervention simplified the presumptive tax return system. It introduced a new electronic tax filing (e-filing) form, which can be filled directly on the URA's webpage, in July 2015. Before the reform, taxpayers needed to download an Excel form from the URA's website for completion.

This essay employs URA's presumptive<sup>10</sup> and corporate income tax (CIT) return data and includes firm characteristics from tax registration data. We restrict the CIT data to cover only small firms comparable to presumptive taxpayers. We use presumptive returns for 2012–18 and CIT returns for 2012–17.

We use a staggered difference-in-differences (DiD) approach to estimate the impacts of TREP and a standard DiD setup to analyse the effects of the new e-filing form on the number of presumptive taxpayers and tax revenues in Uganda. In the case of TREP, we compare the number of presumptive taxpayers (or tax revenues)

<sup>10</sup> The presumptive tax is a tax regime for small businesses who do not keep comprehensive records of sales. The tax is based on estimated turnover instead of profits.

in areas where TREP is active to those where TREP is not in operation. We estimate an aggregated average treatment effect as well as a group-specific and dynamic effects of TREP. In the case of the new e-filing form, we compare the number of presumptive taxpayers (or tax revenues) with the number of small CIT payers (or tax revenues) because the new e-filing form affected all presumptive taxpayers. In addition, we investigate the impacts of the first and second years after the reform and estimate the interaction of TREP and presumptive taxpayers. Finally, we calculate the cost-effectiveness of TREP.

Our main finding is that both interventions significantly increased the number of presumptive taxpayers filing tax returns. Furthermore, we find that presumptive tax revenues grew after the interventions. We show that the interventions have complementary effects because the interaction of TREP and presumptive taxpayers was positive, and both interventions were introduced during the same period. The mechanism behind this effect is most likely increased tax enforcement and taxpayer education in TREP. It was complemented by the simpler e-filing system, which enabled tax officers to help taxpayers file their returns easier. Moreover, we find that TREP was a cost-effective intervention.

## 2.2 Taxpayer response to greater progressivity: Evidence from personal income tax reform in Uganda

This essay analyses the impacts of the major personal income tax (PIT) reform on employees' taxable income and revenue collection in Uganda. This essay contributes to the very limited literature on the elasticity of taxable income in a low-income country in Africa.

The PIT reform came into force in July 2012. The largest reform was the introduction of the new marginal tax rate (MTR) for the highest income earners. The MTR increased from 30 to 40 per cent. Moreover, the PIT reform increased the tax-free threshold and the threshold of the second tax bracket. In this essay, we focus on the employees in the highest tax bracket as they have the largest change in MTR.

We use pay-as-you-earn (PAYE) administrative data from 2010–15 to analyse the reform. PAYE taxes and incomes are submitted to URA by formal employers on behalf of their employees. We use the difference-in-differences (DiD) method to analyse the effects of the reform on employees' taxable income and calculate the elasticity of taxable income based on the DiD estimate. Our main treatment group is employees in the highest tax bracket, and a control group is employees just below the highest tax bracket. Furthermore, we investigate the possible mechanism behind taxable income changes by calculating the estimates using basic salary instead of

taxable income and comparing dividends, sales and other firm level outcomes of firms whose employees' incomes decreased most and other similar firms. Finally, we calculate the revenue and inequality implications of the reform.

We find that employees' incomes in the highest tax bracket decreased substantially. Our preferred estimates of the elasticity of taxable income are between 0.33 and 0.48 because elasticities over 1 are sensitive to income weighting and censoring of the highest incomes. Our results show that the elasticity of taxable income in Uganda is larger than estimates from developed countries — see the review of literature by Neisser (2018). We explore the possible mechanism behind the large decrease in employees' incomes and find that dividends increased more in firms whose PAYE incomes dropped most than in other similar firms. This increase in dividends indicates that firms probably shift their incomes between tax bases. Moreover, we calculate the revenue impacts of adding the higher MTR for highest income earners and found that revenue gains were large even when taken into account the behavioural responses. Finally, we find that behavioural reactions strengthen the inequality reduction of the reform.

## 2.3 A role for universal pension? Simulating universal pensions in Ecuador, Ghana, Tanzania and South Africa

This essay investigates the ex-ante effects of hypothetical universal pension reforms on poverty and inequality in four developing countries: Ecuador, Ghana, Tanzania, and South Africa. Furthermore, we calculate government expenditure on universal pensions and discuss the cost implications of such reforms. This essay contributes to the literature on designing social protection policies in developing countries and how the expansion of these policies can be analysed using microsimulation.

We introduce three different universal pension reforms. In the first reform, a universal pension is provided to all citizens aged 60 or older, and the pension amount is 50 per cent of the national poverty line. The second reform gives a universal pension to all citizens above aged 70 or older, and the amount they receive is 50 per cent of the food poverty line. In the third reform, all citizens aged 60 or above are eligible for a universal pension, and the amount of the pension is 50 per cent of the World Bank US\$3.10-a-day line. The most generous reform in Ghana, Ecuador and South Africa is the first reform, but in Tanzania, the most generous reform is the third reform because the national poverty line is lower than the World Bank US\$3.10-a-day line.

Ecuador and South Africa have existing means-tested old-age benefits. We introduce two different scenarios in these countries: (1) we substitute the means-

tested benefit with universal benefits, or (2) we give the universal benefit as a top-up of the existing benefit.

We employ four novel, cross-country comparable, static tax-benefit microsimulation models for Ecuador (ECUAMOD), Ghana (GHAMOD), mainland Tanzania (TAZMOD), and South Africa (SAMOD). All models are based on the EUROMOD software and nationally representative household survey data. Models capture the tax and benefit policies of the country, which are possible to model.

Our results show that universal pensions substantially reduced poverty and inequality in Ghana and Tanzania, but the cost of these reforms was high for the governments. In Ecuador, the reduction of poverty and inequality depends on the benefit amount of the existing means-tested pensions. When the existing benefit was smaller than the universal pension, the universal pension as a top-up scheme decreased poverty and inequality. Moreover, the top-up universal pension reduced poverty and inequality when the existing benefit did not reach all vulnerable elderly. In South Africa, the existing old-age pension has large coverage among the poor elderly, and therefore, the effects on poverty and inequality are limited. In both Ecuador and South Africa, the costs of the reforms are substantial.



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ISBN 978-951-29-8897-6 (PRINT)  
ISBN 978-951-29-8898-3 (PDF)  
ISSN 2343-3159 (Print)  
ISSN 2343-3167 (Online)