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Employment income tax in Africa

Findings from a new dataset

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Abstract

This study introduces the first set of findings from the Centre for Tax Analysis in Developing Countries employment income taxes dataset (TaxDev EITD). The EITD is a new, publicly available dataset that comprises detailed information of the personal income taxes (PIT) and other mandatory taxes and social security contributions owed by employees on wage earnings in Africa, over the period 1995–2020. We begin by discussing high-level trends in PIT structure, before analysing reform episodes, effective tax rates for individuals and progressivity. We find that reform of employment income taxes (EIT) is infrequent, effective tax rates differ greatly across countries and that the taxes are, on average, progressive, although less so at higher levels of income. We also find that EIT can kick in at a very low level of income; in one in four African countries, an individual would be liable to pay employment income taxes if their wage was less than or equal to the international poverty line of $1.90 a day.

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Acronyms/Glossary

ARP   Average Rate Progression

EIT   employment income taxes

EITD   employment income taxes dataset

ETR   effective tax rate

FCDO   Foreign, Commonwealth and Development Office

GDP   Gross Domestic Product

ILO   International Labour Organization

GMD   Gambian dalasi

IMF   International Monetary Fund

KES   Kenyan shillings

LCU   local currency unit

LIC   low-income country

LMIC   low- and middle-income country

MIC   middle-income country

OECD   Organisation for Economic Development and Co-operation

PAYE   Pay As You Earn

PIT   Personal Income Tax

PPP   Purchasing Power Parity

SSC   social security contribution

TaxDev   Centre for Tax Analysis in Developing Countries

Executive summary

This working paper presents the first set of findings from the Centre for Tax Analysis in Developing Countries employment income taxes dataset (TaxDev EITD). The EITD is a new, freely available dataset which, for the first time, allows researchers and policymakers to study personal income taxes (PIT) and other mandatory taxes and social security contributions owed by employees on their wage earnings in Africa for the last 20 to 25 years. To the best of our knowledge, no other study has examined employment income taxes (EIT) in a cross-country setting for African countries.

Specifically, this paper presents the results of a number of preliminary analyses of taxes on employment income (that is, personal income taxes plus other mandatory surtaxes and employee social security contributions) in Africa, including:

- **The evolution of African EIT systems** over the period 1995–2020, shedding light on their structure, design and complexity
- **Reform episodes** and the implications for the in-country effective tax burdens and progressivity calculations
- **Effective tax burdens** at various income levels, both within countries over time and across countries
- **Progressivity** of EIT systems.

In terms of PIT, we find that, in the past 25 years, both the average top rate and average number of bands in Africa have decreased, but that reform is infrequent, with the average country making reforms to personal income taxes bands just once in every five and a half years.[1] The result of infrequent reform is that large corrections often occur whereby effective tax rates can change dramatically following reform. For an individual earning a wage equal to per capita gross domestic product (GDP), we find that the effective tax rate following PIT reform is, on average, 18% lower than before the reform.

We find that personal income taxes *kick in* (i.e. the income level at which individuals are liable to pay tax) at quite a low level in many African countries. Indeed, in one in four countries, an individual who earned a salary less than or equal to the international poverty line of $1.90 (purchasing power parity (PPP)) a day would be liable to pay income tax. In the median country, PIT kicks in at around 5.9 times the $1.90 per day. We also find that the top marginal PIT rate kicks in at just over five times GDP per capita, at the median – this is slightly higher than in members of the Organisation of Economic Co-operation and Development (OECD), where the same value stands at 3.4 times GDP per capita.

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1   Sabirianova Peter et al. (2010), for example, found that during the period 1981–2005, high-income countries were much more likely to annually reform their PIT systems compared to other income groups.

We also estimate effective tax rates for individuals earning a wage from formal employment in our sample of African countries. We consider a number of proxies for average earnings, such as GDP per capita or wage data from the International Labour Organization (ILO). We also estimate effective tax rates at set intervals of PPP US dollars. None of these approaches is perfect for any one country, yet in the absence of high-quality, cross-country data on wages, we feel they offer appropriate proxies for the present analysis. We find that on average in Africa, in 2019, an individual earning a wage equal to GDP per capita would face an effective PIT burden of 4.5%, rising to 8.6% when employees' social security contributions (SSCs) are taken into account.

We find that personal and employment income taxes are progressive in African countries, but that their progressivity declines as income increases; this finding is in line with earlier studies that made similar calculations for a sample of OECD countries. However, at the very lowest of incomes (between 0.5 and 0.67 times GDP per capita), we find that employment income taxes are slightly less progressive. This is likely driven by a number of outlying countries where lump-sum social security countributions actually lead to regressive systems at the lowest end of the income distribution.

Our analysis is deliberately high-level and descriptive in nature; we do not study any one specific country or reform episode in detail and avoid making normative judgements of income tax systems. Rather, we offer a broad overview of PIT burdens, reform and progressivity in Africa. The paper also provides a snapshot of the kind of analysis that can be carried out with the EITD and it is hoped that further studies will examine particular areas, such as tax burdens, progressivity, and EIT reform, in greater detail.

1 Introduction

It is well known that in many low- and middle-income countries (LMICs), a large share of the workforce operates informally, outside the purview of the PIT and social security nets. Reform efforts – and academic research studying them – are often focused on the administration side (e.g. attempts to increase the size of the tax base by expanding registration, encouraging formalisation and monitoring compliance), rather than the policy side.[2] We know comparatively little about – and there is comparatively less research on – the tax burdens facing those in formal employment in LMICs where taxes on employment income – usually termed personal income tax or Pay As You Earn (PAYE) – are often characterised by complexity, high marginal rates and ad hoc reform.[3] PIT often 'kicks in' at low levels of income and the rates can climb steeply meaning that, all else equal, an individual in formal employment in a low-income country (LIC) can be faced with relatively high effective tax rates (ETRs).[4,5] Due to narrow PIT bases in most LMICs, PIT collections as a percentage of GDP are comparatively low, at around 2.55% in LICs compared to 6.93% in high-income countries, on average (UNU-WIDER, 2021).[6] Concurrently, there is perhaps a temptation for policymakers to then set high rates in order to squeeze as much revenue as possible from a small base. But this has important implications for taxpayer behaviour on the intensive and extensive margins, morale and perceptions of (or trust in) the revenue authority and the fiscal contract between state and citizens overall.

Yet when considering the appropriate design of employment income taxes, there are few guiding principles – such as the rates at which taxes should be levied, the appropriate level of progressivity, or the frequency of reform – appropriate for LMICs. Optimal tax theory tells us that the optimal marginal tax rate is between zero and one, and should be zero at the bottom end of the distribution (Shome, 1995). This suggests the presence of some kind of tax-free allowance, zero rate or rebate and positive rate(s) thereafter, leading to a broadly progressive system. But beyond this finding, there is little guidance on the exact 'optimal' structure of a PIT schedule. One might look to, for example, Mirrlees et al. (2011) for suggestions on income tax design appropriate to high-income countries, but the underlying conditions for 'first best' policy design are simply not present in many lower-income countries; for example, the small tax base due to widespread

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2   Gupta and Jalles (2020), in a sample of 45 developing countries, show that revenue administration reforms outnumbered reforms to PIT and that in 119 reform years, only 17 involved a policy reform that was not accompanied by an administration reform.

3   PAYE is a form of withholding tax for collection on individual employment income, which may contribute to PIT, and is typically imposed on all sources of income.

4   The term 'kicks in' refers to the point at which a positive amount of tax is imposed on the income scale.

5   Even if, on average, marginal income tax rates are lower in African than in OECD countries (see Figure 2), the fact that government spending is often both lower in absolute terms and less well targeted means that in real terms, many employed individuals are left worse off by the fiscal system as a whole.

6   By 'narrow' PIT bases, we refer to the small proportion of workers with a formal contract of employment and hence employment income, and the level of evasion and avoidance on both the intensive margin and extensive margin across income sources, including earned and capital income.

informality, inefficiencies in revenue administration and pressure to raise as much revenue as possible to fund pressing development needs. Bird and Zolt (2005: 1694) even suggest that in the context of LMICs, a progressive personal income tax is often '...neither progressive, nor personal or nor often [even] levied on income (but rather on some presumptive basis)'.

In the absence of appropriate guiding principles for tax design, a policymaker will often, as a first step, look to neighbouring countries for comparison or guidance. Yet, there is little cross-country evidence on PIT design, reform patterns, or tax burdens faced by individuals, beyond the OECD countries.[7] Although cross-country comparisons cannot, in and of themselves, identify 'best practice' (or *optimality*), they can help identify 'current practice'. Ultimately, in order to best design an income tax system for a specific country, key requirements include rich information on (i) the shape of the income distribution, (ii) individuals' responses to tax reforms, and (iii) the policy environment.

With this in mind, this working paper addresses the policy environment and presents the first set of findings from the Centre for Tax Analysis in Developing Countries (TaxDev) employment income taxes dataset (EITD). The EITD compiles information on all mandatory taxes and social security contributions levied on the earnings of individuals in formal (wage) employment in African countries.[8] The taxes covered mostly constitute PAYE or PIT (the exact terminology depends mainly on the system in place in a particular country, but we are concerned with the income tax collected on employment earnings) but also cover any additional surtaxes or mandatory charges that an individual in formal employment might face; we thus adopt the term *employment income taxes* (EIT).[9] The EITD includes data on marginal tax rates, thresholds, allowances, deductions and credits, as well as mandatory surtaxes and employee social security contribution rates, for 53 African countries between 1995 and 2020. The data is comprehensively described in EITD (forthcoming) and is available online as a public good.

The study of cross-country employment income tax burdens is well documented in OECD countries (see, for instance, the annual *Taxing Wages* publication), but to the best of our knowledge this study presents the first cross-country evidence from (i) the African continent and (ii) a large sample of LMICs.

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7   An exception comes from Abramovsky et al. (2013), who study the implications of the Mirrlees Review for middle-income countries (MICs; specifically, Turkey). Regarding the taxation of employment income, they suggest that avoiding complexity (in the form of partial exemptions for certain kinds of remuneration, or deductions for certain kinds of spending such as health insurance or private education) would help to avoid distortions and improve progressivity of income tax systems. Similarly, they suggest that the greater ability for wealthier individuals to evade or avoid taxes in MICs suggests that increases marginal income tax rates should be avoided.

8   We acknowledge that it might be inappropriate to refer to social security contributions as a 'tax', especially in cases where the contributions give rise to actuarially fair social security entitlements.

9   The taxes considered therefore constitute a subset of a 'global' PIT, which could include income from other sources, e.g. dividends, interest, capital gains etc., not covered in this dataset or the current paper.

We find that:

- Average top marginal PIT rates have fallen in Africa between 1995 and 2019 and remain, on average, lower than those in the OECD. The average top marginal PIT rate faced by individuals in Africa in 2019 was around 13 percentage points lower than that faced by those in OECD countries.
- In 25% of African countries, an individual earning a formal-sector wage less than or equal to the PPP $1.90 a day international poverty line would be subject to some form of employment income tax.
- PIT reform is infrequent in Africa, with an average of just one in five countries reforming rates or bands in any given year. Over the period 1995–2020, countries implemented reforms, on average, just once every five and a half years.
- Regarding effective tax rates, in 2019, an individual in Africa earning an income equal to GDP per capita is liable to (an effective) employment income tax rate of around 9.15% on average, but this ranges from 0% in Malawi to just below 24% in Algeria.
- PIT reform between 1995 and 2020 has, on average, lowered EIT burdens.
- EIT systems are more progressive at lower levels of income and are, broadly, less progressive when employee social security contributions are considered.
- EIT systems have become more progressive over the past 20 years, although not for those earning higher incomes.

There are, naturally, a number of limitations to cross-country work of this nature. Most importantly, it is inherently difficult to find reliable measures of wage earnings in most African countries. Although work such as the OECD's *Taxing Wages* can draw from labour force surveys, administrative tax data or national statistical offices for a measure of average earnings, this is not possible for the majority of African countries. We propose a number of solutions to address this issue and our results thus offer a first snapshot of the range of tax burdens across the continent.

When evaluating the effects of fiscal policy on outcomes such as welfare or inequality, research that takes account of both tax and spending policies would provide a more complete picture. This study focuses purely on the tax system. In particular, it offers a more detailed look at employment income tax systems across the African continent than has previously been carried out, but it should be underlined that some of the ultimate impacts of fiscal policy can only truly be measured when accounting for spending policies and evaluating the system as a whole, including how tax and benefit systems interact.

This working paper is deliberately more descriptive than prescriptive in nature, and avoids normative judgements on the tax systems in question. Many of the findings presented are the first of their kind and it is hoped that the simple expositions explored will be informative and inspire more detailed research using the EITD, which might shed light on areas such as bracket creep, complexity of EIT systems and the kinds of data gaps that might hinder more effective policy design.

The paper proceeds as follows: Section 2 presents a literature review, and Section 3 introduces the EITD and summarises high-level findings on trends and frequency of reform. In Section 4, we analyse employment income tax burdens in Africa. Section 5 considers the structural progressivity of tax systems across countries and over time. In Section 6, we examine employment income tax burdens using wage data from the ILO and PPP USD values. Section 7 concludes.

2 Literature review

Cross-country work that examines EIT in LMICs, or in African countries more specifically, is scant. To the best of our knowledge, only one study has analysed PIT across a wide range of LMICs, namely Sabirianova Peter et al. (2010), who analysed personal income taxes across a panel of 189 countries between 1981 and 2005.[10] They found that low-income countries (LICs) reformed their PIT schedules less frequently than others, that tax schedules in all countries tended to flatten over the study period, and that the average number of brackets also declined. Furthermore, they found no evidence that a higher top marginal PIT rate is associated with higher PIT revenues. More recently, Jensen (2019) has shown that, for a panel of 100 countries, the income tax exemption threshold moves down the income distribution, alongside growth in the share of the workforce employed, but that the income tax rate did not systematically shift as countries develop.

We can also draw links to individual country studies of EIT systems in LMICs. Most often these examine taxpayer behaviour (such as responses on the extensive and intensive margins) surrounding reform episodes and attempt to estimate the elasticity of taxable income.[11] While literature in this vein is rich for high-income countries, only a handful of such studies have been carried out in LMICs. Jouste et al. (2021) examine responses to the introduction of a new top rate of 40% on employment earnings in Uganda in 2012/13. They find that although the revenue implications of the introduction of the higher top rate were positive overall, a small subset of those at the very top of the earnings distribution declared substantially lower taxable incomes following the reform. Kemp (2019) provides similar evidence for South Africa, finding that the majority of behavioural responses to PIT reforms are concentrated among top earners, while Tortarolo et al. (2020) find only small effects on wages and hours worked following an income tax holiday in Argentina. Piketty and Qian (2009) examined the personal income tax in China and India between 1986 and 2010, finding that the tax exemption threshold was initially set very high in China, such that only very few earners were subject to tax and the schedule was reformed only infrequently (two phenomena that we also observe for African countries). Rapid wage growth then saw the share of taxpayers subject to PIT, and the subsequent PIT:GDP ratio, increase in China; in India, where reform was more frequent, both metrics remained fairly constant across the study period.

Turning to literature on progressivity of tax systems, there are several factors affecting the progressivity and redistributive impact of employment income taxes: the tax base, rate structure (income thresholds, bands and marginal rates) as well as any allowances, exemptions, deductions

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10   More limited evidence can be found, for example, in Tanzi and Zee (2000), who document the PIT threshold, number and range of PIT rates for six sub-Saharan African and six Latin American countries. Barreix et al. (2017) consider the PIT rates, deductions and allowances for 20 Latin American and Caribbean countries.

11   The elasticity of taxable income measures the ratio of the change in reported taxable income with respect to change in marginal tax rates.

or credits. Some studies of OECD countries suggest that the progressivity of income tax systems is sometimes offset by exemptions that favour the better-off (e.g. Joumard et al., 2012). Gerber et al. (2020) examine the structural progressivity of employment income tax systems in 35 OECD countries between 2000 and 2017, finding that it has decreased in recent decades and that this is even more pronounced when the taxation of capital income is also considered. The downward trend in progressivity has coincided with a drop in top marginal rates of income tax.

To the best of our knowledge, there is no similar comprehensive cross-country study on progressivity in LMICs. Some more limited studies of MICs have found mixed outcomes. Nyamongo and Schoeman (2007) analysed progressivity of the PIT in South Africa, finding that it was progressive between 1989 and 2004, but that the rates of progressivity varied depending on the year in question. In the South African income tax regime, tax expenditures in the treatment of pensions have been found to be regressive (Redonda and Axelson, 2021). Poorly targeted income tax expenditures were also found in Mexico (Hannan et al., 2020). Direct taxes are found to be progressive and equalising in a sample of LICs and LMICs (Inchauste and Lustig, 2017). A study of four African countries also found that personal income tax was progressive (Gemmell and Morrissey, 2005). Barreix et al. (2017) studied the progressivity of the PIT in Latin America and the Caribbean (LAC), finding that it is broadly progressive, but a poor instrument for redistributing income. Abramovsky et al. (2019) studied the case of Myanmar, again finding that the PIT system is progressive but that there was scope to simplify a number of elements including exemptions and allowances.

A further means to measure progressivity is the estimated average tax burden across the income distribution, or *tax wedges*. The OECD's *Taxing Wages* calculates this annually for all OECD countries (see, for instance, OECD (2021)), for individuals, and those with families, at various intervals across the income distribution. To the best of our knowledge, there is no analogue for tax burdens in LMICs.

Bird and Zolt (2005) reflected on the limited redistributive role played by the PIT in LMICs, highlighting that the small tax base means even progressive systems have failed to make a large redistributive impact, that the benefits of a very progressive system (in terms of equity outcomes) are often outweighed by the costs (in terms of tax revenue) and that many countries would be better to rely on expenditure systems – funded by broad-based taxes such as the Value Added Tax (VAT) in order to support redistributive aims. Even if progressive and equalising, there is little evidence of the impact of employment income taxes on poverty in lower-income countries. Individual country studies suggest that there may be impoverishing effects where the tax-free allowance is very low, or due to a lack of employment income-earned tax credits. Some evidence (Hill et al. (2017) for Ethiopia and Rossignolo (2017) for Argentina) found that households in the poorest income deciles were subject to PIT, suggesting that employment income taxes can increase poverty, thus indicating the need for more consideration of the income tax exemption threshold or tax credits in the design of PITs. The relevant literature thus provides a useful framing of the challenges in designing income tax and identifies gaps in our understanding of the design and reform of EIT systems in LMICs. The analysis that follows aims to fill some of these gaps.

3 Data, concepts and trends

This section introduces the data from the EITD and provides initial descriptive statistics and an overview of trends in EIT in Africa.

3.1 Data

The EITD presents data on all mandatory employment income taxes in African countries over the period 1995–2019/2020. It includes data on PIT and PAYE rates, bands thresholds, exemptions and credits and also includes any data on surtaxes and employee social security contributions. Fifty-three countries are covered, providing around 1,300 observations in total. All of the tax thresholds, floors and ceilings are denominated in (annual) nominal local currency, while the rates, credits, surtaxes etc. are specified either in percentages or nominal local currency. Whilst the EITD is currently complete for African countries, future updates will aim to achieve near-global coverage.

The EITD data on Africa comes primarily from national tax laws, the annual summaries of private professional services providers (Coopers Lybrand, Deloitte, EY, PKF and PwC), International Monetary Fund (IMF) Article IV Staff Reports and Statistical Appendices, and the websites of various ministries of finance and revenue authorities. Some of these resources and websites were accessed in archive form via archive.org. A full description of the data, its construction and limitations is provided in McNabb (forthcoming).

3.2 Concepts

3.2.1 Employment income taxes and effective tax rates

We use the term 'employment income taxes' to refer to any mandatory personal income tax (most often in the form of PAYE), surtax, levy, compulsory contribution and employee social security contribution (SSC) levied on a worker in formal wage employment.[12] We refer to different subsets of EITs in the analysis; the largest tax faced by employees in almost all countries is the PIT, so we give this more attention than some of the other components (namely employee SSCs and additional surtaxes on income). We use a standard tax accounting framework to calculate tax liabilities and tax burdens. While calculations were tailored to the tax laws of individual countries, the following steps illustrate the typical calculations of PIT and EIT burdens.[13]

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12 We prefer the term PIT for taxes on personal employment income. However, it is often called PAYE while in other countries, the PIT and PAYE are distinct, with only the latter referring to employment earnings.

13 McNabb (forthcoming) provides detailed notes on the taxes levied in each country.

Say an employee earns a gross income of Y. To calculate taxable income, tY, often they are allowed to make a number of tax deductions, tD. Many PIT systems also employ a personal allowance, tA, which is distinct from a zero rate:

$$tY = \begin{cases} Y - tD - tA & \text{if } Y > (tD - tA) \\ 0 & \text{if } (tD - tA) \geq Y \end{cases} \quad [1]$$

We then apply the PIT schedule, r, to taxable income to arrive at the provisional amount of PIT owed, t_p:

$$t_p = (r \times tY) \quad [2]$$

In a number of countries, earners can utilise a tax credit or rebate, tC, which is subtracted from t_p, while in others there are ceilings, C, on the amount of tax that can be due under the PIT (often expressed as some share of Y). Credits are subtracted and ceilings applied as follows:

$$t_p = \begin{cases} t_p - tC & \text{if } t_p \leq C \\ C & \text{if } (t_p - tC) > C \\ 0 & \text{if } (t_p - tC) \leq 0 \end{cases} \quad [3]$$

Having calculated final PIT due, we can then express the effective (average) personal income tax rate as:[14]

$$ETR_{PIT} = \frac{t_f}{Y} \quad [4]$$

This is one of the key measures we study in the following section(s).

In order to move from the concept of PIT to EIT, we incorporate two further elements. First, mandatory employee social security contributions, ssc. Social security contributions are also often charged on a distinct base (due to the presence of floors or ceilings), $sscY$ at rates $sscR$.[15] Thus,

$$ssc = (sscR \times sscY) \quad [5]$$

Second, a number of countries charge additional surtaxes on employment income. These are charged at a rate, sR, on 'sur-taxable income', sY, which can also have a different base to tY or $sscY$.

$$s = (sR \times sY) \quad [6]$$

It follows that we can then calculate the total amount of employment income tax (EIT) owed as follows:

$$EIT = t_f + ssc + s \quad [6]$$

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14   The effective tax rates as calculated and discussed in this paper are backward-looking measures (unlike, for example, the marginal effective tax rate, which is a forward-looking measure).

15   Whether the social security contributions are collected by government (and thus akin to a tax) or by a private fund differs from one country to another. The key feature for inclusion in the EITD is if they are mandatory.

Accordingly, the effective EIT rate is calculated as:

$$ETR_{EIT} = \frac{EIT}{Y} \qquad\qquad [8]$$

NB: In many countries, SSCs are treated as a tax deduction (and would thus be incorporated as an element of above). Thus, in these cases incorporating the full range of employment income taxes (SSC) could lead to a lower value of ETR_{PIT}, albeit with a higher value of ETR_{EIT} overall.

3.2.2 Income

Before proceeding to analyse ETRs across countries and over time periods, it is important to discuss the measure of 'income' or 'earnings' used to proxy gross – and calculate taxable – income earned by a worker in their formal job(s). High-quality, high-frequency, cross-country data on wages simply does not exist for most African countries. Country-level wage data may be obtained from individual tax administrations or national household surveys for a limited set of years, but incorporating such data was beyond the scope of this study. Thus, although we can calculate effective tax rates for individuals *at various points in the income distribution*, in order to make the best use of the panel nature of the EITD, we have determined these points exogenously to a country's own income distribution. We choose to anchor our analysis firstly around perhaps the most readily available and comparable measure of income across countries, GDP per capita.[16] The ETRs calculated in Section 4 are therefore expressed as different multiples of a country's GDP per capita. A similar strategy was followed by Sabirianova Peter et al. (2010) and Gerber et al. (2020). It is important to note that GDP per capita is often different to the average earnings of formal employees: the former measure can overestimate or underestimate the latter due to several potential factors. For example:

1. A country with high export earnings from natural resource extraction will have a high GDP per capita, but this will not necessarily be reflected in high average earnings: the benefits are likely to be unevenly spread (including via capital rather than earned income) and may partly accrue to foreign investors.[17] In this case, GDP per capita might *overestimate* the average formal-sector wage.
2. We choose to denote GDP per capita in nominal terms, which captures real growth and inflation according to GDP price indices. This may or may not correspond to the trajectory of nominal wages. Our study, therefore, assumes that wages grow annually at a positive rate. Even if wages *do* stagnate in nominal terms, inflation would imply a lower purchasing power of a constant wage. Either way, the proxy employed for earnings should capture some effect of

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16   The data for GDP per capita is from the IMF's World Economic Outlook, April 2021 edition.
17   Equatorial Guinea, for example, was until recently classified by the World Bank as a high-income country, yet by some measures remains one of the poorest countries in Africa.

price growth.[18] In a country where reform is infrequent, the 'steepness' of the climbing ETRs observed between reform periods would be likely to flatten in the presence of wage growth *lower* than growth in nominal GDP per capita (or even be constant, if wages do not grow at all). For a country where wage growth *outpaces* per capita GDP growth, the steepness of the climbing ETRs would be even more pronounced.

The main analysis of ETRs should, then, simply be considered as answering the question:

'What would the ETR be (or how would the ETR evolve) *if an individual earned a formal wage equivalent to GDP per capita?*'

It is hoped that, in future, more accurate data on the distribution of wage earnings of formally employed individuals in Africa will be available.[19]

We follow two alternative approaches in Section 6, whereby we calculate ETRs (i) using a measure of average wage earnings from the ILO and (ii) at various PPP US dollar amounts. The relative merits of these approaches are discussed in the same section.

3.3 Trends

The first set of metrics we explore aims to provide a snapshot of the design of PIT systems. To begin with, every country taxed employment income during the study period, except the Seychelles until 2010, where no PIT was in operation. Just three countries employed a flat tax during the same period, namely Madagascar, Mauritius and the Seychelles, and only in Madagascar is a flat rate still used.

Figure 1 shows that the average number of bands fell by almost a third, from 7.5 to 5.1, between 1995 and 2019. We find that there has been a trend towards a smaller number of bands and lower top rates by the late 2010s. However, as of 2019 Angola still retained 12 PIT bands, while Niger had nine. The largest number observed over the study period is in Cabo Verde, where there were no fewer than 53 PIT bands between 2009 and 2014.

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18   It is unlikely that wages would stagnate entirely over such a long time period. Even if tax brackets are not adjusted and thus ETRs remain constant, cumulative inflation over a 10- or 15-year period would decrease the purchasing power of wages significantly, meaning that eventually there would be upward pressure on wages. A more accurate proxy for capturing the evolution of ETRs in the face of pervasive missing data might be to set average wage equal to some multiple of GDP per capita in year t=0 and apply the inflation rate annually thereafter. We reserve this exercise for a future study of the effects of fiscal drag on earnings.

19   There are already positive signs in this direction – the Africa Tax Administration Forum's (ATAF) databank, for example, publishes statistics on both the total amounts of PIT collected and number of PIT taxpayers. Coverage, however, is currently limited (around 13 country observations in any one year).

Figure 2 shows that the average top marginal PIT rate in Africa has fallen by around a fifth, from 39% to 31%, over the same period (1995–2019) and in 2019 ranges from 12% in Guinea-Bissau to 60% in Côte d'Ivoire. At the same time, the average mandatory employee SSC rate increased from 3.6% to around 5%. Taken together, the average combined EIT (top marginal PIT and employee SSC) rate has fallen from around 43% to 35% over the past 25 years.

Figure 2 compares these metrics with the same for OECD countries, albeit for a slightly shorter time period (2000–2019), due to more limited data availability of the OECD sample. We can see that, on average, top EIT and PIT rates (both including or excluding SSC) are still substantially lower in Africa than in the OECD countries. Further, the downward trajectory seen in all countries halted in the OECD countries around the time of the 2008–09 Great Recession, after which top marginal rates began to steadily rise again on average, whereas in Africa there was a levelling-off of rates from around 2013. Notably, however, in both regions the gap between the top margin PIT rate excluding and including employee SSCs widens over the period in question.

Figure 1 Average number of PIT bands in Africa, 1995–2019
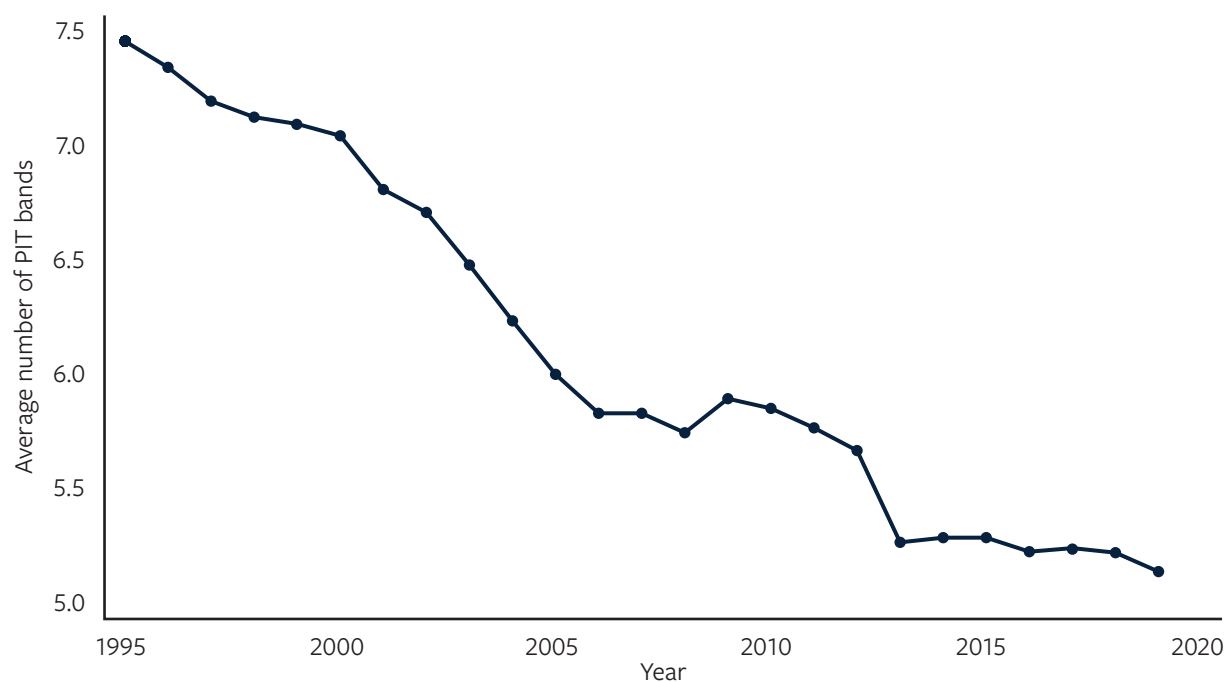
Note: As an extreme outlier, we exclude Cabo Verde as discussed in the text.
Source: EITD (forthcoming)

Figure 2 Top marginal PIT and employee SSC rates, 2000–2019, African and OECD countries
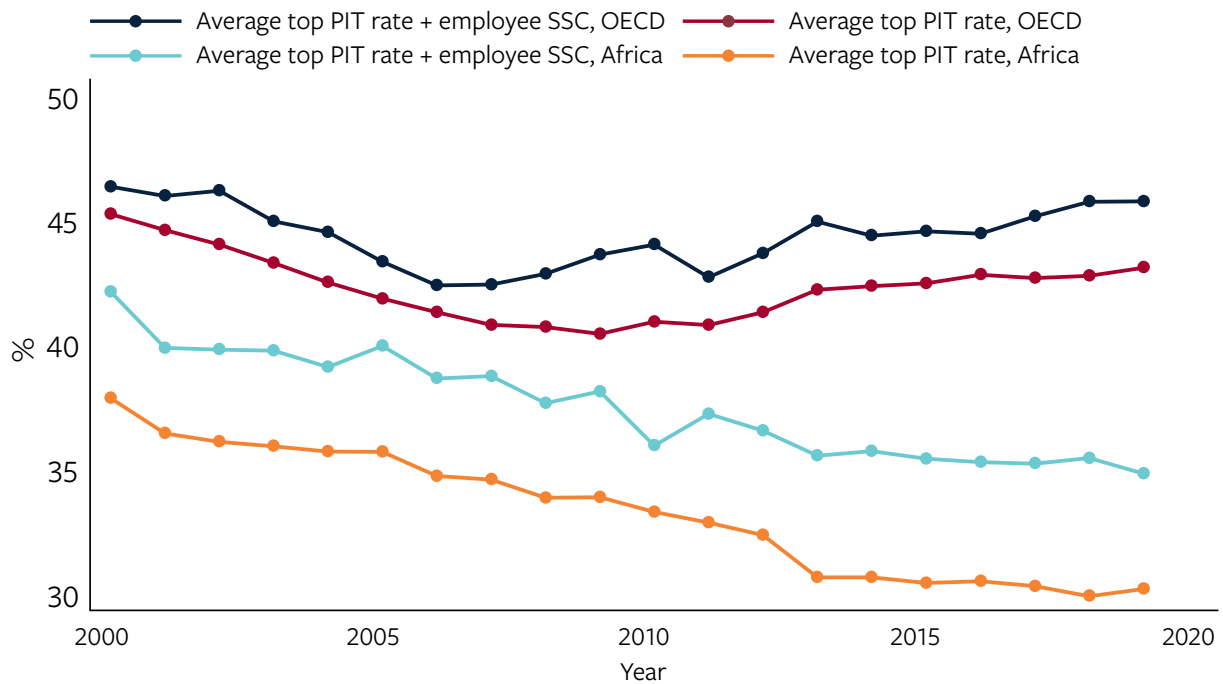
Sources: EITD (forthcoming) and OECD (2021)

3.4 At what level of income does PIT 'kick in'?

The point at which EIT 'kicks in' can have important efficiency and equity implications. Numerous country-specific factors might be considered, such as the underlying income distribution, availability of tax credits or pro-poor expenditure programmes, the capacity and resources of the national revenue authority to collect small amounts of tax from a large number of taxpayers who do not work in large firms that act as withholding agents, or the rates at which self-employment income or income from micro-enterprises is taxed (e.g. via a presumptive regime), which may affect the marginal decision to operate as a sole trader or accept an offer of formal employment.

Nonetheless, a couple of guiding principles might be useful for policymakers to consider in setting the level of income at which PIT applies, specifically:[20]

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20   These principles do not just apply to LMICs, but it is likely that incentive effects on the extensive margin are a more pertinent concern in PIT design when outside options are abundant (i.e. a large informal sector).

1. Some amount of tax-free earnings, either through an allowance, universal rebate, or zero band, can remove a prospective barrier to those entering formal employment for the first time, perhaps at a low wage level.[21,22]

2. In a fiscal system that strives to be progressive, improve equity outcomes and to redistribute income among taxpayers, it might be considered unfair that someone living in (absolute) poverty should contribute PIT if they undertake formal employment.

With the latter point in mind, Figure 3 plots the point at which PIT (not including social security contributions, but including mandatory surtaxes) kicks in relative to the international poverty line of $1.90 PPP a day for 2019.[23] A score of less than one (or below the orange line) implies that an individual earning $1.90 PPP a day would be subject to tax on their employment income; this is the case in 13 countries. In Djibouti, Guinea, Somalia, South Sudan and Sudan the score is less than one (i.e. the tax threshold lies below $1.90 a day), while in Democratic Republic of Congo (DRC), Guinea-Bissau, Libya, Mozambique, Niger, Nigeria, Republic of the Congo and Togo all income is taxed (i.e. there is neither a zero band, universal exemption or threshold; accordingly we set the score to 0).[24] This group represents the only African countries in which someone earning a wage equal to the $1.90 a day poverty line would be subject to PIT. The median score is 3.3, meaning that – in the median country – PIT is levied only on incomes greater than $6.20 per day.[25]

This metric, however, only tells us at what point PIT kicks in. It says nothing about the rates involved, progressivity, or steepness of bands. Indeed, of those countries levying PIT on incomes equal to $1.90 a day, that individual's effective tax rate is on average just 2.5%, although can be as high as 7.4% in South Sudan, or 8.5% in Mozambique.

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21   Indeed, the longer-term gains (in terms of taxpayer filing behaviour, compliance, and the fiscal contract) of bringing individuals into the formal tax net may outweigh the loss of levying a modest marginal rate on those on low incomes.

22   Some recent work has also shown that income taxes are relatively more distortive to economic growth on the whole, so there may be broader positive knock-on effects of having lower PIT rates (e.g. Arnold et al. (2011) or McNabb (2018)).

23   We multiply $1.90 PPP by 365 days and convert to local currency units (LCUs) in order to compare with the tax schedules. It is unlikely that employees would work a full 365 days per year, so this is the upper bound on annual income of someone earning a wage equal to the international poverty line. The qualitative results remained unchanged when we tested $1.90 * 260 days, which is roughly 365 days minus weekends. Universal allowances, credits, surtaxes and rebates are accounted for. Whilst nationally defined poverty lines might be a better marker for computing this metric, they are often not updated on an annual basis, and the use of the $1.90 PPP poverty line allows for a cross-country comparison in any one year.

24   In Nigeria, although the $1.90 a day amount is less than the threshold, a 0.5% minimum tax applies to all employment income. In Libya, the $1.90 wage a day is also below the threshold, but two additional surtaxes apply to employment income, namely the *Jihad tax and Solidarity Contribution*.

25   The average is 8.1, but is skewed by those at the upper end of the distribution, namely Mauritius and South Africa, where PIT kicks in at 59 and 83.2 times the poverty line, respectively.

Figure 3 PIT threshold as share of PPP $1.90 a day poverty line (2019)
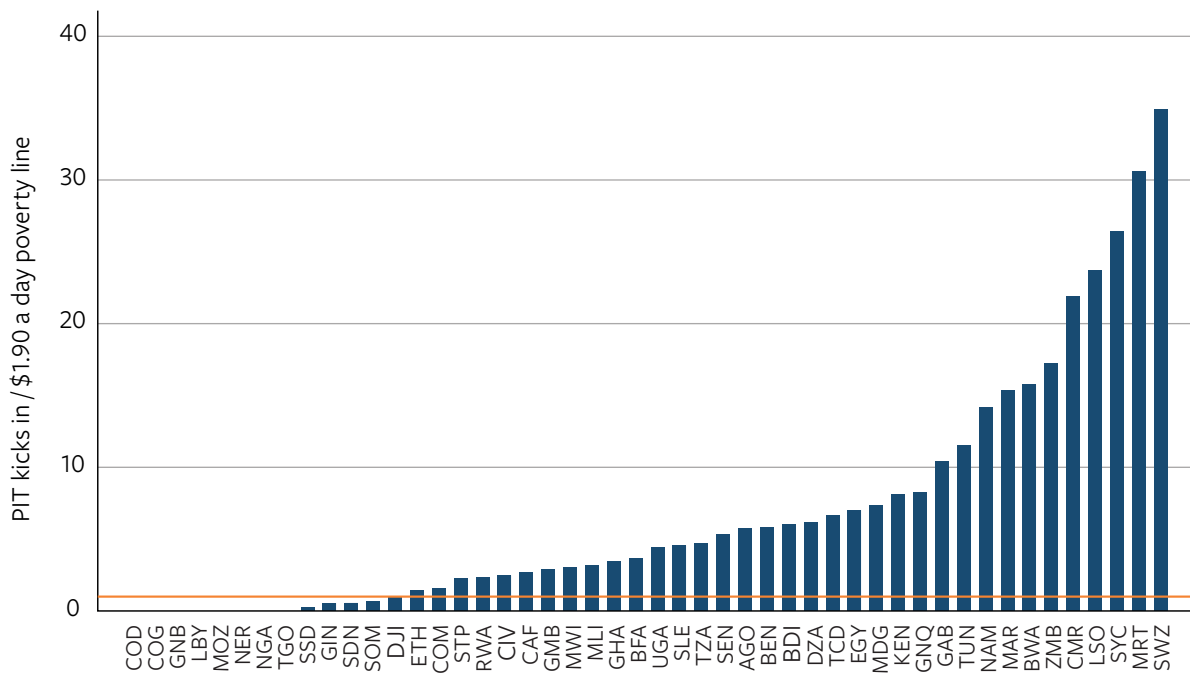
Notes: South Africa not shown, due to scaling; employee SSC not included.
Source: EITD (see McNabb, forthcoming)

It should also be noted that these are hypothetical simulations. It is unlikely that an individual earning so little would be part of the formal economy (and if they were registered to pay tax this would likely be levied on a presumptive basis); our simulations merely show what they *would be liable to pay* if they earned a wage from formal employment. These findings, however, raise the question of whether it would even be efficient to collect so little tax, depending on the mechanism of collection. Coupled with the incentive effects mentioned above, it would appear that some countries might wish to reconsider the wisdom of a PIT system that starts at such a low level.

3.5 **Where does the top marginal PIT rate kick in?**

What, then, of those individuals subject to top statutory PIT rates? Inequality is often high in LMICs, meaning that a large share of earned income is concentrated among a small section of the population, whose (taxable) earned income is often more mobile than those at the lower end of the income distribution.[26] When considering the point at which the top marginal PIT rate should kick in, or the rate at which top incomes are taxed, there are a few points worth considering:

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26   That is, they have the ability to structure their income in different forms (such as, e.g., dividends) which may attract lower tax rates, in order to minimise their tax burden. For example, Jouste et al. (2021) found that, following the introduction of a 40% top rate in Uganda, a number of large firms that recorded a drop in the size of their PAYE expenditure showed a concurrent increase in proposed dividend payments.

1. Top *rates* are not set prohibitively high, as this can have negative impacts on the intensive margin (i.e. workers choose to work fewer hours, or declare fewer hours worked).[27]
2. The top *threshold* is not set at too low a level, as this subjects too large a share of the workforce to the top rate.[28]
3. Where the income tax is based on a schedular structure, top rates of employment income tax are not set at much higher rates than tax on other forms of income (such as self-employment earnings, dividends or corporate profits), as this creates incentives for individuals to find mechanisms to declare their incomes in other forms; in short, it affects the neutrality of the system.

Therefore, the level at which the top PIT rate kicks in – and the rate itself – must balance a number of competing objectives.

Figure 4 charts the point at which the top marginal PIT rate kicks in relative to GDP per capita for our sample of African countries. The top marginal PIT rate kicks in at anywhere from just over one times GDP per capita (1.2 times in South Sudan) to over 100 times GDP per capita in Malawi (not shown due to scaling). The median value stands at just over five times of GDP per capita.[29]

Figure 4 Top marginal PIT threshold / GDP per capita (2019)
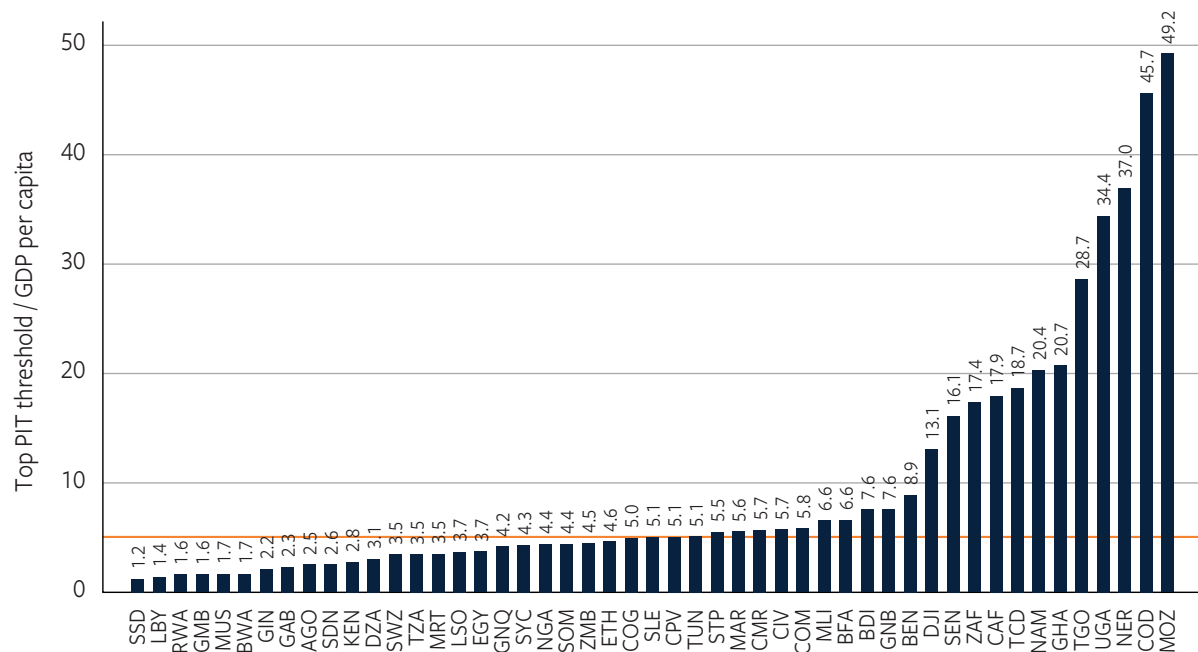
Sources: EITD (forthcoming) and IMF (2021)

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27   Indeed, optimal tax theory suggests that the top income in a distribution should actually be taxed at 0% (e.g., Shome (1995)).
28   Determining the point at which the threshold is 'too low' would require detailed information of country-specific income distributions and may well be grounded in value judgements or societal preferences for redistribution.
29   The same value in OECD countries stands at 3.44 but is as high as 24.4 in Austria.

Figure 5 GDP per capita and top marginal PIT threshold/GDP per capita
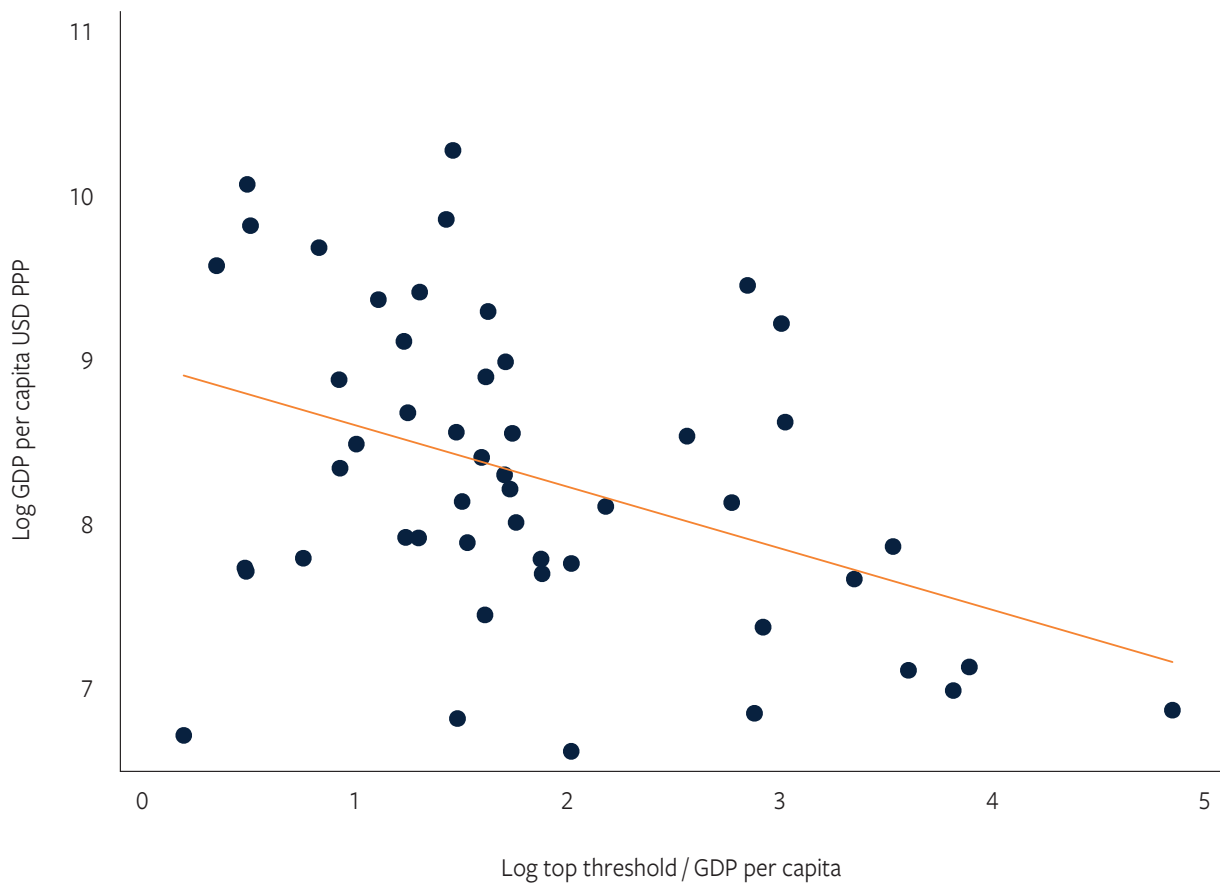
Sources: EITD (forthcoming) and IMF (2021)

Figure 5 plots the relationship between log GDP per capita and the ratio of the top threshold to GDP per capita. It shows an inverse relationship, i.e. as GDP per capita increases, the position of the top threshold of income tax moves closer to it. We can therefore infer that as countries develop, average incomes increase and the size of the formally employed workforce grows, a larger number of taxpayers are subject to the highest PIT rate. The EITD also shows, over the period 1995–2019, a negative correlation between top marginal tax rates and GDP per capita (see Appendix 1). A further explanation of the pattern observed in Figure 5 is that as countries develop, they are more likely to reform their PIT bands more frequently, in order to stave off the effects of bracket creep, which would likely see the top threshold move closer to GDP per capita over time.

3.6 EIT reform

Thus far we have largely analysed EIT or PIT at one point in time. However, the EITD also contains detailed information on reform episodes. It is uncommon in LMICs that income tax schedules are indexed to annual inflation; indeed, the data from the EITD shows that only South Africa has done this (almost) annually for the period 1995–2019. At the opposite end of the scale, a PIT reform in 2018 was the first revision to the schedule in Chad we observed since 1995.

Where earnings grow in line with inflation (or at any positive rate) and income tax thresholds go unchanged, so-called *bracket creep* or *fiscal drag* mean that taxpayers will be faced with higher income tax burdens and lower purchasing power. Whether or not the lack of reform in many LMICs is a salient policy decision is debatable, but either way, bracket creep allows a government to gradually collect a larger amount in PIT each year, assuming some nominal wage growth. Governments that do not frequently reform PIT schedules can then find themselves in a difficult position where reform of the schedule is overdue (and individual tax burdens have burgeoned), but this would entail a significant revenue loss in the short term which many cannot afford.[30]

In this paper, we do not conduct an in-depth study of the issue of bracket creep and its knock-on effects, but focus instead on simply documenting the frequency and trends in reform of EIT across Africa.

We focus here on reform of the PIT or PAYE schedules of African countries across the two most obvious parameters, namely rates and bands. Table 1 summarises the frequency of reform across these parameters.

Table 1 PIT reform episodes in Africa 1995–2020

Dimension	Average number of reforms per country 1995–2020	Minimum number of reforms per country 1995–2020	Maximum number of reforms per country 1995–2020
PIT rates	3.46	0	11
PIT bands	4.53	0	24
Employee SSC rates	1.50	0	4

Note: The number of reforms is defined as average number of years in which at least one reform takes place by country, i.e. in any one year, one country may adjust several bands or marginal rates, but these are counted as one 'reform'. We do not show data surtaxes as these occur only in a small number of countries over a limited time period.
Source: EITD (forthcoming)

We see that countries made reforms to income tax bands more frequently than rate reforms, but still just an average of 4.5 times over the 25-year period. This is equivalent to an average frequency of one reform every five and a half years. In fact, in the last 10 years, the average number of years in which reforms occurred per country was just 1.6, suggesting that reforms have become less frequent in more recent years. Rate changes have occurred on average 3.5 times, or equivalent

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30 Ultimately, the longer-term effects on economic activity and growth due to consumers having a higher purchasing power may yield just as much additional tax revenue (e.g. via VAT) as is collected in the short term via bracket creep, but the reality is that policymakers in LMICs often need revenue today, not in the 'long run'.

to once every 7.5 years. The average over the last 10 years was also less frequent, at just 1.2 times. Within this, there is a lot of variation across countries. As mentioned previously, South Africa has implemented the most frequent changes, adjusting income tax bands annually. By contrast, Côte d'Ivoire and Comoros made no changes to bands in over 20 years.

Another way to view this data is by assessing the share of countries that made (no) changes to rates or bands in any one year. Over the period 1995–2020, an average of 79.3% of countries made no reforms to rates or bands in any given year. Where there have been reforms to rates and bands, changes to bands are generally positive (i.e. thresholds have increased in value), while there was a mixture of rate changes up and down. As alluded to in Figure 2, however, the trend has been for top rates to decrease over the period in question.

Regarding employee social security contributions, we consider only reforms to the rates; the EITD also contains information on earnings ceilings and floors, however this is less complete than that on rates and so we cannot present full information on reforms here.[31] Unsurprisingly, SSC rates are reformed much less frequently than PIT rates, at just an average of 1.5 times in the 25-year period, per country. As many as 30 countries have not reformed their SSC rates during the period 1995–2020.

The next section focuses on calculating EIT burdens for hypothetical individuals in African countries.

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31   However, a high-level examination of the data suggests that a number of countries reform their SSC earnings ceilings relatively frequently, and some annually.

4   The EIT burden in Africa

4.1 Effective tax rates across countries and over time

We begin by calculating the effective tax burden for a hypothetical individual earning a gross income from a formal job equivalent to GDP per capita (call this Y1). ETRs are calculated for a resident person, unmarried and with no dependants.[32] First, we consider PIT. The results for 2019 (the most recent year for which the EITD contains complete data) are shown in in Figure 6.

Figure 6 PIT ETR as a percentage of Y1 for an individual (2019)
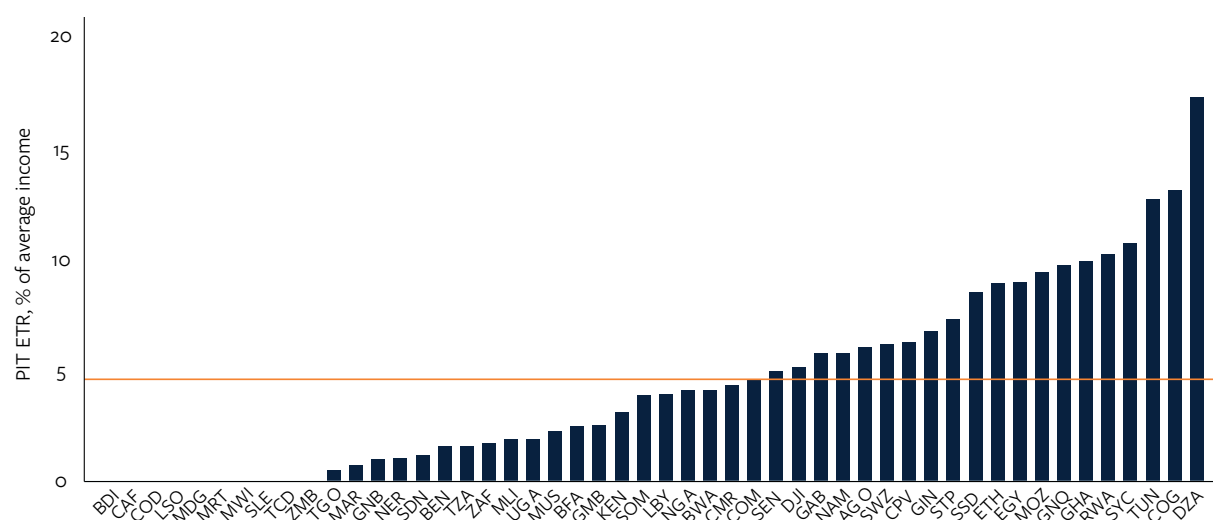
Note: Liberia (LBR), Eritrea (ERI) and Côte d'Ivoire (CIV) not shown due to insufficient data.

Source: EITD (forthcoming)

The average PIT ETR at Y1 is 4.53%. In 10 countries, someone earning an income equivalent to Y1 would not be subject to any PIT (ETR=0%) while the burden is as high as 17.25% of gross income (Algeria). But how has this evolved over time? Figure 7 plots the ETR at Y1 in 2000 against that in 2019 for 50 African countries. It shows that 25 had a higher ETR in the year 2019 than in 2000 (points below the 45% line), 21 countries had a lower rate in 2019 than in 2000 (points above the 45% line), while in Burundi, Lesotho, Malawi and Sierra Leone, the ETR was zero in both 2000 and 2019. We do not, thus, observe any systematic pattern of increase or decrease in tax burdens over the decade. The patterns observed in Figure 7 are equally likely to merely reflect the points in time at which the ETR is being measured relative to the most recent (next) reform to PIT.

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32   The EITD also contains information on allowances and deductions for marriage, disability, health expenditures and dependants, but the data is less complete over time and thus we do not study this in depth here. If an individual were to benefit from these deductions, it would affect the ETRs and progressivity of the system.

Figure 7 ETR as a percentage of Y1, 2000 and 2019
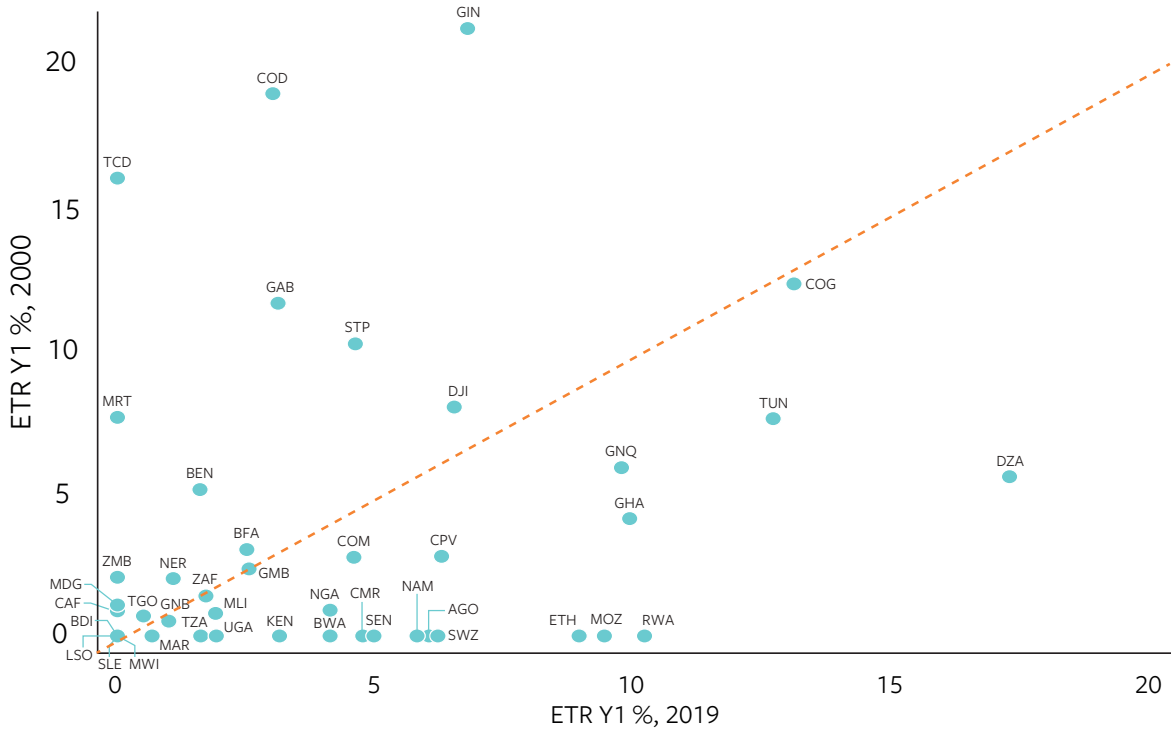
Source: EITD (forthcoming)

The picture presented in Figure 8, however, changes somewhat when we incorporate mandatory employee social security contributions and other surtaxes to obtain the EIT ETR.

Figure 8 EIT ETR as a percentage of Y1 for an individual (2019)
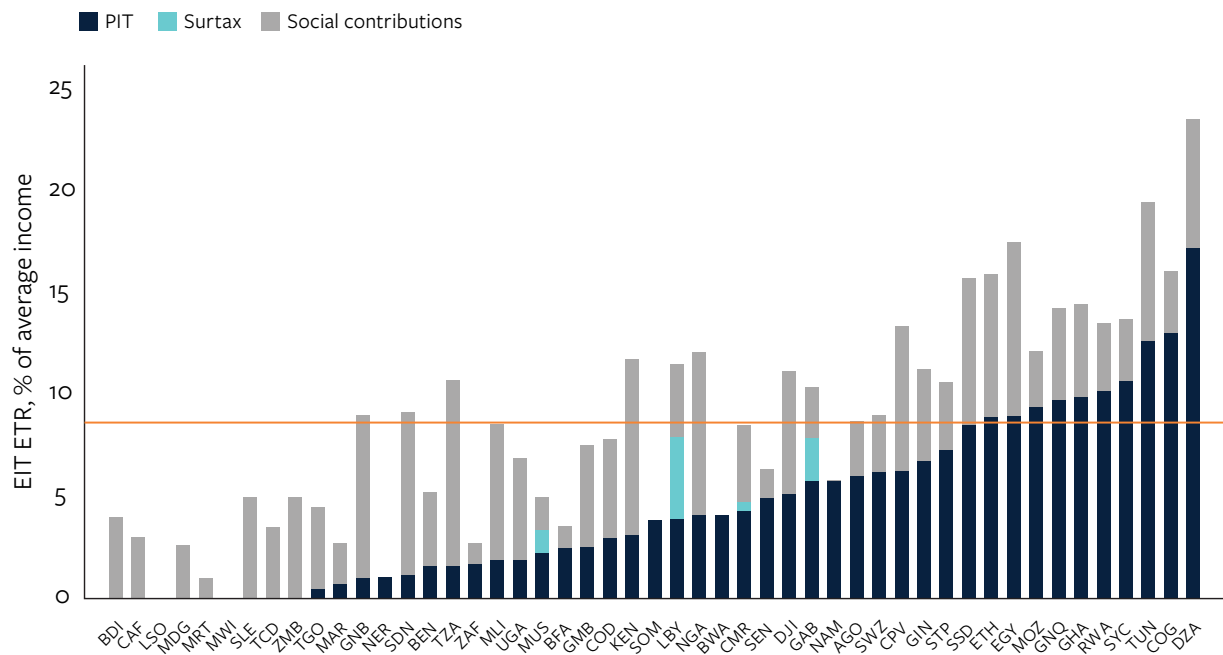
Source: EITD (forthcoming)

Figure 8 highlights that in a significant number of countries, the addition of mandatory social security contributions substantially increases the effective tax burden facing an individual earning Y1. Only in Lesotho and Malawi does such an individual still face an ETR of 0%. The average ETR across African countries, including mandatory employee SSCs, is 8.6%. The burden is again highest in Algeria, at 23.5%. In 21 countries, the burden from mandatory employee SSCs outweighs that from other forms of tax on employment income for an individual earning Y1.

We also compute the average ETR (or both PIT and EIT) for the year 2019 for an individual earning 0.5-, 0.67-, 1.33-, 1.67-, 2-, 3-, and 5-times GDP per capita. These are shown in Appendix 2.

4.2 Effective tax rates pre- and post-reform

In this section we examine the effects of EIT reform on tax burdens.

As we have documented above for our sample of African countries, reform is often infrequent. Thus, we might expect that when it does occur, there are significant 'adjustments', which correct for the effects of fiscal drag (whereby earnings increase at a faster pace than tax bands are reformed) in the years since the last reform. Take, for example, the case of The Gambia, between 1995 and 2019. During this period, we observe two distinct reforms to PIT, one in 2013 and another in 2018 (see Table 2).

We see that, in the 2013 reform, both rates and bands were altered, with 5 percentage points cut from each marginal rate and an increase in the zero band, which more than doubled. Interestingly, the width of the bands remained constant in both reform episodes, at 10,000 Gambian dalasi (GMD).[33] The 2018 reform saw only a change in the size of the zero band, which increased by a third, from 18,000 GMD to 24,000 GMD and the top rate, which fell further to 25%.

Table 2 Marginal PIT rates and bands in The Gambia, 1995–2019

1995–2012[34]		2013–2017		2018–2019	
Band (GMD)	**Rate (%)**	**Band (GMD)**	**Rate (%)**	**Band (GMD)**	**Rate (%)**
0–7,500	0%	0–18,000	0%	0–24,000	0%
7,501–17,500	10%	18,001–28,000	5%	24,001–34,000	5%
17,501–27,500	15%	28,001–38,000	10%	34,001–44,000	10%
27,501–37,500	20%	38,001–48,000	15%	44,001–54,000	15%
37,501–47,500	25%	48,001–58,000	20%	54,001–64,000	20%
Above 47,500	35%	Above 58,000	30%	Above 64,000	25%

Source: EITD (forthcoming)

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33   We also observe in the EITD a tendency for reform to increase thresholds for each band but keep constant the *width* of bands. Over time, this implies that the bands, in real terms, get narrower and rates climb more steeply.

34   These rates and bands likely existed before 1995, however this is the first data point in the EITD.

We can use the above ETR analysis to assess how these reforms affected the effective tax rates of different hypothetical taxpayers in The Gambia. In Figure 9, we plot the PIT ETR faced by an individual earning 0.5-, 0.67-, 1-, 1.33-, 1.67-, 2-, 3- and 5-times GDP per capita in The Gambia over the period 1995–2019. The dashed red lines indicate the two reform episodes described above.

Figure 9 PIT ETRs in The Gambia, 1995–2019
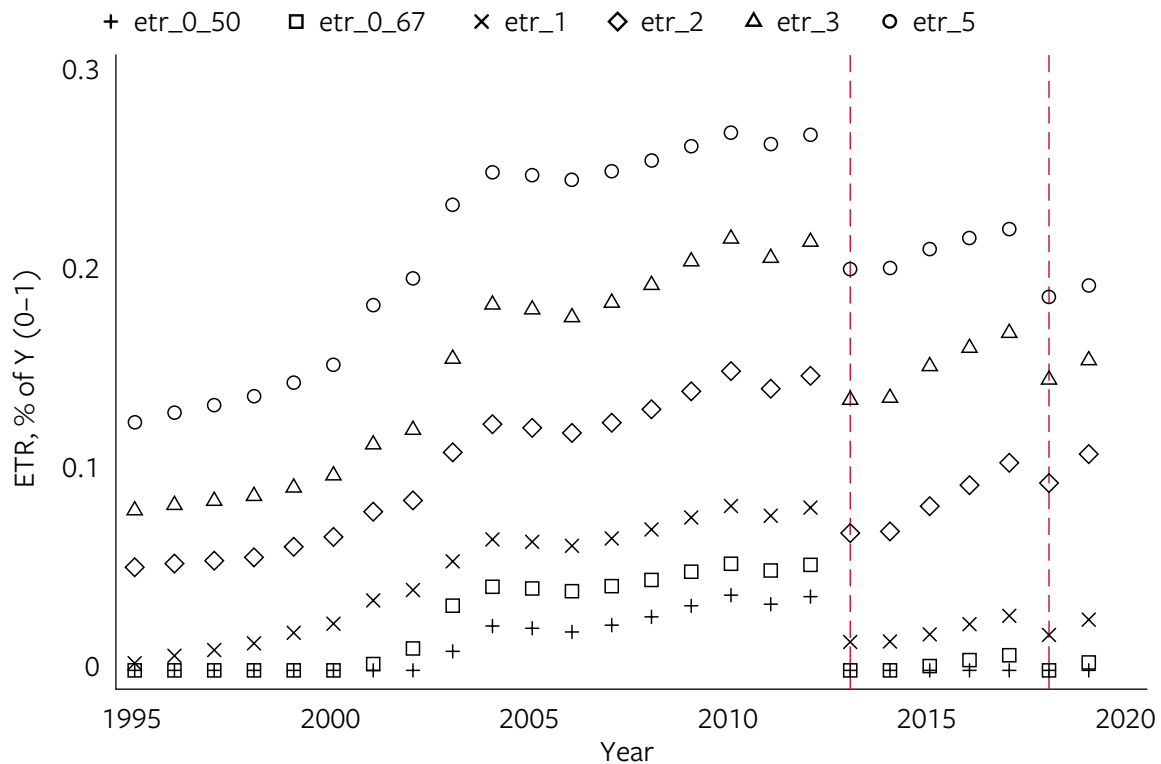
Source: EITD (forthcoming)

We see that the effective tax rates for individuals at each of the specified income intervals fell following the two reforms. For example, the 2013 reform saw the ETR of those earning 0.5- and 0.67-times GDP per capita fall to zero, representing a 100% reduction and the proportional reduction in ETR faced decreases as we move up through the income intervals, with those earning a salary equivalent to five-times GDP per capita seeing their ETR fall by 25%. We enquire further into the progressivity of reforms in Section 5.

It is no accident that we have chosen to highlight the case of The Gambia, since it shows a quite stark adjustment in ETRs following reform episodes. Effects of reform on ETRs in other countries are not always so pronounced. The EITD also allows us to examine the effects of reform on average ETRs both across time and countries. In Table 3, we examine the ETRs at the same six levels of income as above, expressed as the average ETR in the two years before and two years following reform. We divide the exposition according to reforms to PIT and reforms to EIT (where the latter also captures reform to surtaxes or employee social security contributions). We define here a reform as any reform at all to EIT, be it to marginal rates, position or width of bands or tax-free thresholds.

We see that, on average, reforms reduced ETRs from PIT in the years immediately following them.[35] The average reform had a proportionately larger impact on those on the lowest incomes (at around an 18% reduction in the PIT burden for those earning less than or equal to Y1), with a progressively smaller effect on those on higher incomes (an average 9% reduction in the PIT burden for those earning Y5). We also examined the cases where a country reformed *only* its rates or *only* its bands in a given year, however the results did not yield significant effects on ETRs.

Table 3 Average ETRs pre- and post-reform, across countries

	Income level	Average pre-reform ETR	Average post-reform ETR	%Δ
PIT	Y0.5	2.11%	1.73%	−18.3%
	Y0.67	2.71%	2.22%	−18.1%
	Y1	4.13%	3.37%	−18.4%
	Y1.33	5.88%	4.85%	−17.5%
	Y1.67	7.58%	6.36%	−16.1%
	Y2	9.00%	7.65%	−15.0%
	Y3	12.62%	11.10%	−12.0%
	Y5	17.35%	15.79%	−9.0%
EIT	Y0.5	6.03%	5.75%	−4.6%
	Y0.67	6.51%	6.19%	−4.9%
	Y1	7.84%	7.26%	−7.4%
	Y1.33	9.42%	8.61%	−8.6%
	Y1.67	11.04%	10.05%	−9.0%
	Y2	12.42%	11.37%	−8.5%
	Y3	16.05%	14.89%	−7.2%
	Y5	20.73%	19.57%	−5.6%

Source: EITD (forthcoming)

Turning to EIT ETRs, we see a somewhat different story. First, the effect of reform on ETRs is much smaller in magnitude, with an average reduction of between 4.6% and 9.0%, depending on the level of income. Second, the largest average reductions in ETR accrue not to those on the lowest levels of income, but to those in the middle, earning between one and three times GDP per capita. There are a number of plausible explanations for what is being observed.

1. We often observe that reform to employee SSC rates has seen them increase rather than decrease.
2. A number of countries employ a SSC floor, meaning that those earning incomes below that floor would not be subjected to employee SSC and thus not affected by reform.

35   In fact, there are only scattered examples in the EITD where a reform has led to higher ETRs: usually this occurs with the introduction of a higher top marginal rate or removal of a zero rate.

5 The progressivity of EIT

5.1 Average rate progression

In this section, we study the progressivity of EIT in Africa both across countries and over time. Whilst the concept of progressivity – that the average tax rate paid should rise with income, or earnings – is well understood, there is considerably less agreement on how best to *measure* progressivity. Gerber et al. (2020) note that an ideal measure would capture the degree of progressivity of a tax system in one figure and also be unaffected by the (pre-tax) income distribution. The most straightforward – and easily understood – measure of progressivity is that which originated in Pigou (1928), called the average rate progression (ARP). This is a 'local' measure of progressivity, calculated around two levels of income and is calculated simply as:

$$p = \frac{(ETR_{Y_2} - ETR_{Y_1})}{(Y_2 - Y_1)} \tag{9}$$

The ARP, p, is thus the ratio of the difference in ETR paid between two points on the income distribution, Y_2 and Y_1, and the difference in the multiples of income Y_2 and Y_1 themselves.[36] Interpretation of p is as follows:

$p = 0$ indicates the presence of a proportional tax

$p > 0$ indicates a progressive tax (the more positive the value of p, the more progressive the tax)

$p < 0$ indicates a regressive tax (the more negative the value of p, the more regressive the tax).

Progressivity of EIT can be affected by a number of parameters. First, 'structural' features of PIT systems such as the difference between top and bottom rates and the number and width of bands. Second, specific provisions such as tax-free allowances, rebates, universal credits, exemptions and surtaxes also affect progressivity. Employee SSCs, which are often levied at flat rates and therefore less progressive than PIT systems, also affect the progressivity of EIT overall.

We follow Paturot et al. (2013) and OECD (2014) and calculate the ARP using the multiples of Y defined above: 0.5-, 0.67-, 1.33-, 1.67-, 2-, 3-, and 5-times GDP per capita. Thereby, we are able to capture ARP between these points in the hypothetical income distribution. Given the equation above, to calculate p between, e.g., someone earning 1- and 1.33- times GDP per capita, the calculation would be $((ETR_{Y_{1.33}} - ETR_{Y_{1.0}}) / 0.33)$.

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36   Other measures of progressivity, such as the Kakwani index, rely on the presence of detailed information on the underlying pre-tax income distribution, to which we do not have access for our cross-country sample.

Figure 10 Average rate progression for individuals, 2019
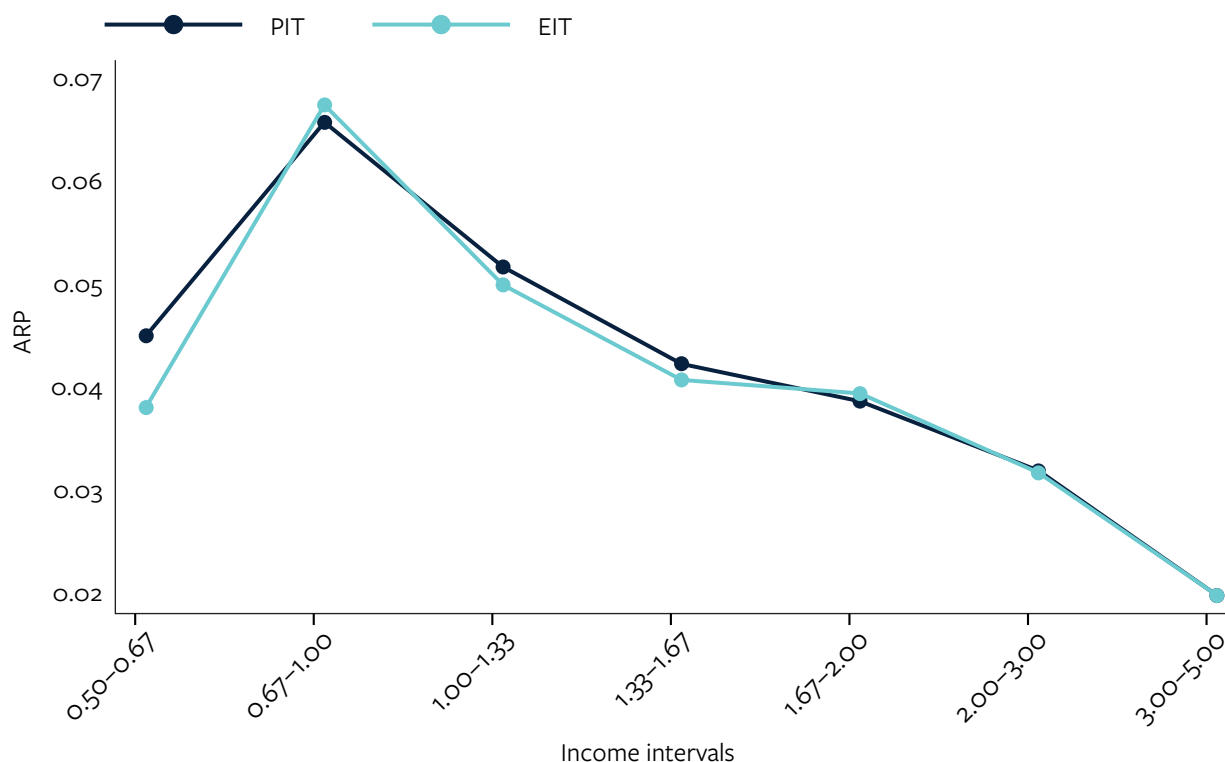
Source: EITD (forthcoming)

In Figure 10, we plot the average ARP for individuals across African countries in 2019. The dark blue line illustrates the ARP purely for PIT, whilst the light blue line illustrates the ARP for EIT including employee social security contributions and other taxes and surcharges.

A simple interpretation of the ARP score is as follows:

We see that at between 1.0*Y–1.33*Y, the ARP (PIT) is equal to 0.052. Plugging this into [9], we find that:

$$0.052 = \frac{(ETR_{Y_{1.33}} - ETR_{Y_{1.0}})}{(0.33)} \qquad [10]$$

Rearranging, and solving for $(ETR_{Y_2} - ETR_{Y_1})$, we find that:

$$0.052 * 0.33 = (ETR_{Y_{1.33}} - ETR_{Y_{1.0}}) \qquad [11]$$

$$(ETR_{Y_{1.33}} - ETR_{Y_{1.0}}) = 0.01716 \qquad [12]$$

Thus, on average, as an individual's income increases from 1- to 1.33-times GDP per capita, their ETR increased by 1.72%. The average PIT ETR at Y1 in Africa in 2019 is 4.04%, and at Y1.33 is 5.56%. So for a 33% increase in income, PIT due increases by 37.6% on average.

A number of findings stand out:

1. EIT systems in Africa are progressive over all of the income levels we use to calculate the ARP. At no point are they, on average, regressive (*p* is never negative on average).
2. The systems are relatively less progressive at our lowest chosen income interval, 0.50–0.67 times GDP per capita. This is likely due to the fact that, in many countries, incomes at both these levels are exempted from PIT / EIT and thus many observations are equal to zero, or incomes at both 0.5- and 0.67-times GDP per capita are subject to the same rate. In such cases, the numerator of [9] would be zero or very small. There are also some cases where the systems are *regressive* at low levels of income. In Kenya, for example, an individual earning 0.5Y would earn 102,315 Kenyan shillings (KES) per year, whilst someone earning 0.67Y would earn 137,102 KES per year. However, the Kenya National Hospital Insurance Fund contributions and National Social Security Fund contributions are owed as lump sums on a graduated scale (as opposed to a percentage). Both of these incomes lie below the PAYE threshold in Kenya, but fall within the same lump-sum bands. Thus, the individual earning 0.5Y ends up paying an EIT ETR of 7.1%, while the individual earning 0.67Y pays just 5.2%.
3. At most income intervals, the ARP of EIT including SSC is marginally lower than that excluding SSC. This is expected, and indeed follows what emerges in OECD (2014) and Gerber et al. (2020). This is likely due to the fact that SSC rates are not usually graduated.

Compared to similar estimates from OECD (2014), however, the average ARP in 2012 for a single individual in OECD countries was somewhat higher than what we have observed here for Africa. This study found that for singles (here: individuals), the ARP of the PIT between 0.5–0.67Y of the average wage in OECD countries was around 0.2, falling to less than 0.05 between Y3 and Y5.

The finding that tax systems are *more progressive* at lower levels of income is also in line with existing evidence from, for instance, OECD countries. However, the suitability of such a system for LMICs might warrant further examination. We have already documented above that in many African countries, EIT kicks in at very low levels (even below the international poverty line), which can affect decisions on the extensive margin. However, if, once an individual is in formal employment, the amount of tax they must pay climbs steeply even below average incomes, then this also has disincentive effects on the intensive margin.

How, then, has the ARP evolved over time in our sample? In Figure 11, we plot the ARP for PIT for a sample of 43 countries for which there were data points in each year between 2000 and 2019. A number of interesting patterns emerge.

1. We see that, overall, the 'range' of PIT ARPs across different parts of the income distribution has widened over time. In 2000, the range was from 0.022 to 0.041, whille in 2019 the ARPs ranged from 0.020 to 0.066.

2. The ARPs of certain intervals have grown at dramatically faster rates than others. For example, the ARP for the interval 0.67-1*Y has more than doubled (117% growth) from 0.3 to 0.66, that of 0.5–0.67*Y has grown by 78% and that of 1.00–1.22*Y has grown by 40% over the period in question. The other three intervals considered have remained almost constant over the same period.

A similar exposition in Gerber et al. (2020) for OECD countries showed that by 2017, ARPs for an individual between 1- and 1.67-times average income was around 0.09 for PIT. The ARP for the same interval in our sample stands at almost exactly half: 0.045. This, along with our results for 1.0–1.33*Y and 1.33–1.67Y below, suggests that ARP is somewhat lower amongst African countries.

This exposition should not be taken as an indication of how the progressivity of the PIT system *as a whole* has been evolving over time, rather that the progressivity of PIT *at certain points in the income distribution* has been increasing, while at others it has stagnated. It is unclear whether or not the fact that EIT is becoming more progressive at relatively lower levels of income (and is more progressive relative to those on higher incomes) is a positive development. For example, it may reflect the fact PIT bands have not been 'widened' over time, and thus rates now climb quite steeply (as the 'real' width of the bands has narrowed with inflation). It may also reflect a PIT system with a large number of rates and bands, which might be perceived as complex.

Figure 11 PIT ARP for an individual, 2000–2019
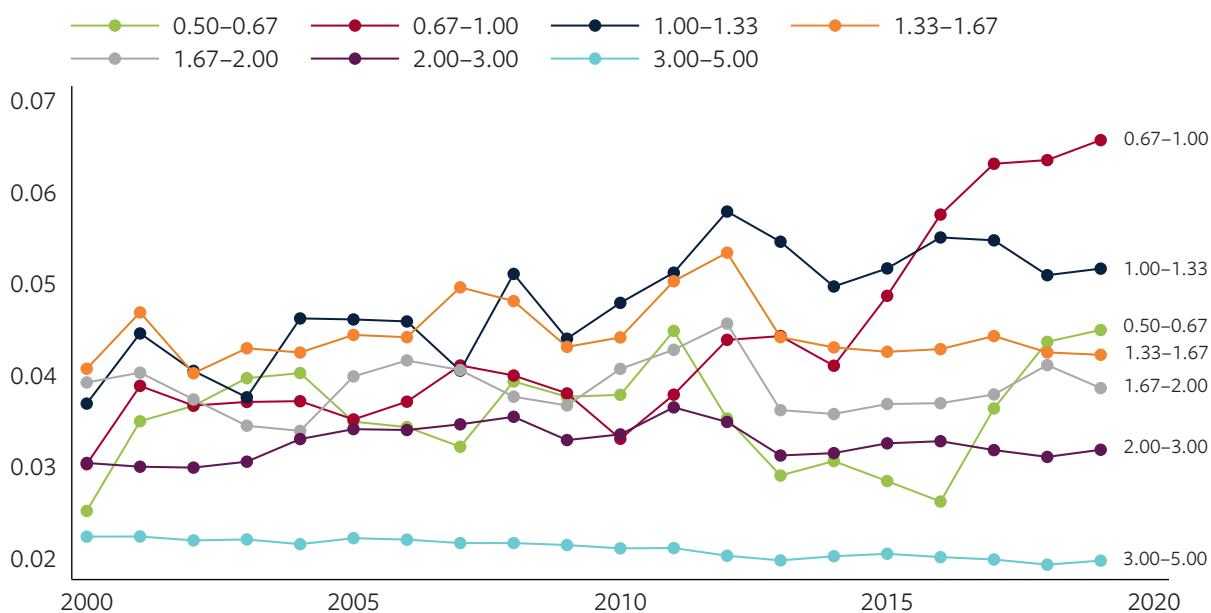
Source: EITD (forthcoming)

6 Effective tax rates using alternative earnings proxies

So far, our analysis has employed GDP per capita as a proxy for average earnings in the sample of countries covered. The limitations of this approach were discussed in Section 3.2.2. Here, we adopt two alternative approaches. The first considers data on average wage earnings from the International Labour Organization (ILO), and the second estimates ETRs at various PPP US$ amounts.

6.1 ILO data

We employ data on average earnings from the ILO (2021a) in order to attempt to better approximate the EIT burdens facing those in salaried employment in Africa. Specifically, we use the series 'Mean nominal monthly earnings of employees', which is drawn from labour force and household surveys across countries.[37] For African countries, this series contains just 72 observations between 2000 and 2020, for 30 countries. Figure 12 shows the PIT ETR calculations for an individual earning a wage equal to average earnings.

Figure 12 PIT ETR as a percentage of average wage
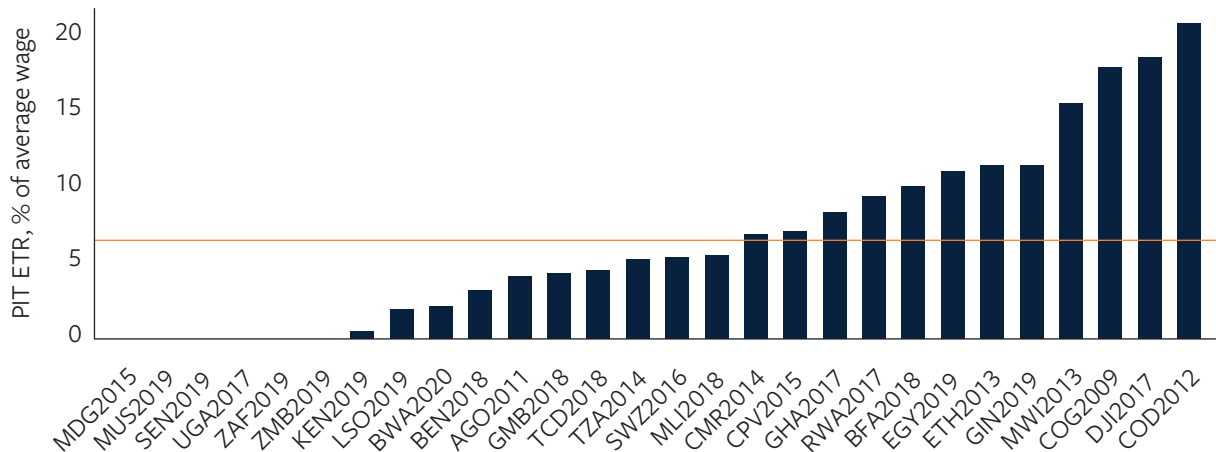
Sources: EITD (forthcoming) and ILO (2021a)

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37   Specifically, we use data from the series 'EAR_4HRL_SEX_OCU_CUR_NB_A' at the 'ISCO-08 (Total)' employment level. The ILO (2021b) defines earnings as '… gross remuneration in cash and in kind paid to employees, as a rule at regular intervals'. The concept does not, to the best of our knowledge, distinguish between employment in the formal and informal sectors, although the share of employees versus self-employed persons in the informal sector is likely to be comparatively lower. However, as we suspect, informal earnings from employment are captured in the ILO's measure, then it may well be biased downward versus the average formal sector (and tax-paying) wage.

The average ETR stands at 6.53% of the average wage across African countries. In six countries, an individual earning the average wage would face an ETR of 0%, rising to as high as 21% in DRC. In Figure 13, we include employee social security contributions. The average EIT ETR including SSCs stands at just over 10.49%, and in only one country (Senegal), would an employee earning average wage face an ETR of zero.

In Figure 14, we recalculate the ARP for individuals for PIT and EIT. We see a broadly similar trend to that observed when calculating ARP at intervals of GDP per capita in Section 5, with EIT systems being most progressive at lower levels of wages. However, the ARP at most intervals is greater when employing the ILO wage data.

Figure 13 ETR plus employee SSC as percentage of average wage
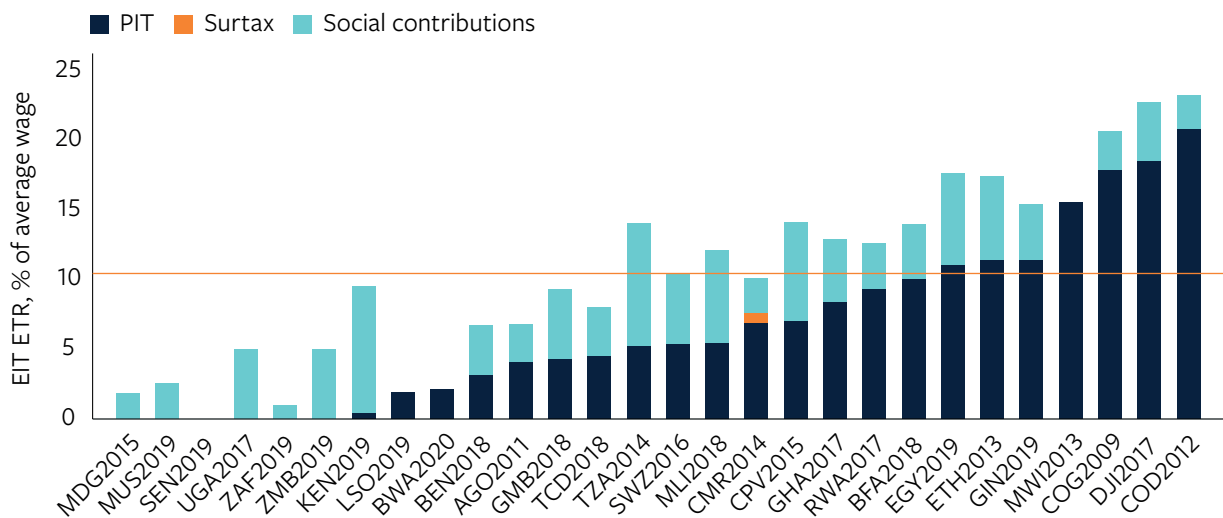
Sources: EITD (forthcoming) and ILO (2021a)

Figure 14 Average rate progression for individuals, ILO wage data
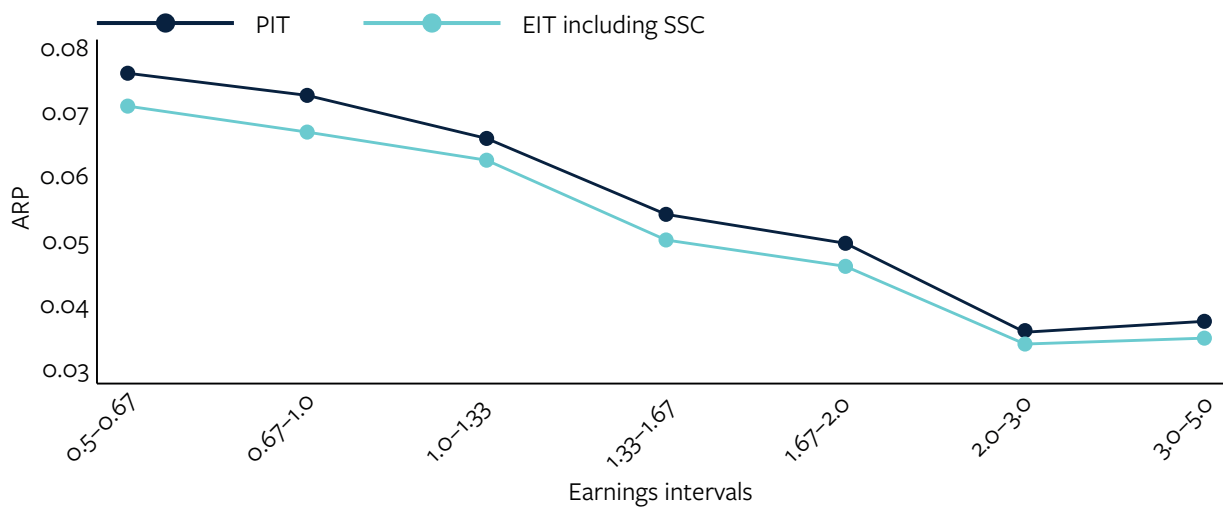
Source: Authors' calculations from EITD (forthcoming) and ILO (2021a)

The main takeaway from employing the ILO wage data is that GDP per capita, on average, under-estimates average earnings and the associated tax burdens. This is not surprising; those in salaried employment are likely to be, on average, better off than those not and therefore incomes will be higher for this group. Unfortunately, it is not possible to study the evolution of ETRs or ARP over time using this data due to the limited number of observations. There is, then, a trade-off. The ILO data is, undoubtedly, a better measure of average (formal sector) earnings in African countries, but the irregularity of household or labour-force surveys on the continent makes it difficult to study trends in depth over time. The availability of such data will surely improve in the future.

6.2 Effective tax rates at PPP USD amounts

The second alternative approach we follow is to calculate ETRs for individuals across countries at various PPP US dollar values. The analysis in this section focuses on the ETR for earnings of $5,000 PPP per year, while calculations for $500, $1,000, $2,500, $5,000, $10,000, $12,500, $25,000, $50,000 and $100,000 PPP are shown in Appendix 3.

Specifying earnings in PPP USD amounts allows for fairly straightforward comparisons of ETRs across countries as we are comparing amounts that have equivalent purchasing power in each country. The PIT ETR at $5,000 PPP is shown in Figure 15, and the EIT ETR for the same amount in Figure 16.[38]

Figure 15 PIT ETR at $5,000 PPP for an individual, 2019
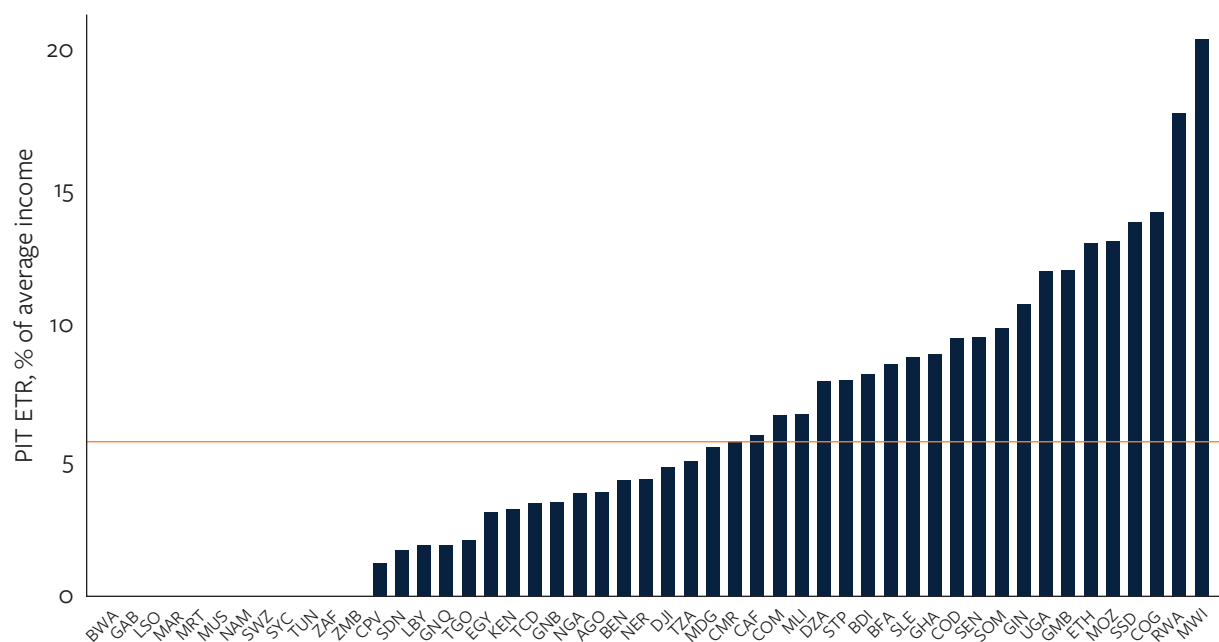
Source: Authors' calculations from EITD (forthcoming)

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38   The average GDP per capita in USD PPP for our sample in 2019 was $6,043, although this ranged from $738 (Burundi) to $29,222 (Seychelles).

Figure 16 EIT ETR at $5,000 PPP for an individual, 2019
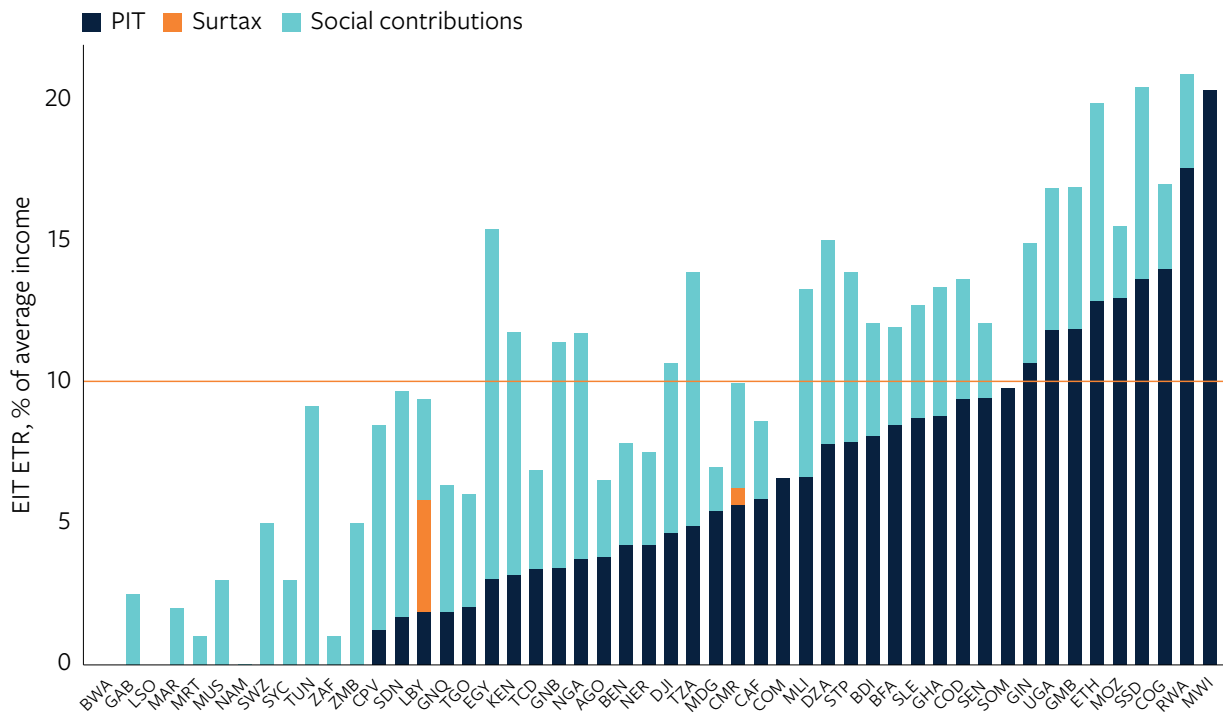
Source: Authors' calculations from EITD (forthcoming)

We see that, at $5,000 PPP, the average PIT ETR is 5.65%, though this ranges from 0% in 12 countries, to just over 20% in Malawi. When we incorporate mandatory employee social security contributions, the average EIT ETR at $5,000PPP rises to 10.21% and is now highest in Rwanda, at 20.94%.

In terms of progressivity, we perform the same ARP calculations as before. We see again in Figure 17 that, at all levels of earnings, the PIT and EIT systems of Africa are, on average, progressive in 2019. However, the ARP at intervals $500–$1,000 and $1,000–$2,500 is lower than that at between $2,500 and $5,000. This mirrors some of the findings seen in Section 5.1. However, we do see that the absolute value of the ARP at some of the lower income intervals (up to around $7,500) is higher in these calculations, than in those carried out above.[39]

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39   Looking at the country-by-country ARP calculations, the result that the ARPs are higher at low-earning intervals is not unexpected. This is due to the fact that at low levels of income, the ETR of the 'lower' income level is often zero. Thus, the second argument of the numerator in equation [9] will be zero.

Figure 17 Average rate progression for individuals, 2019, USD PPP
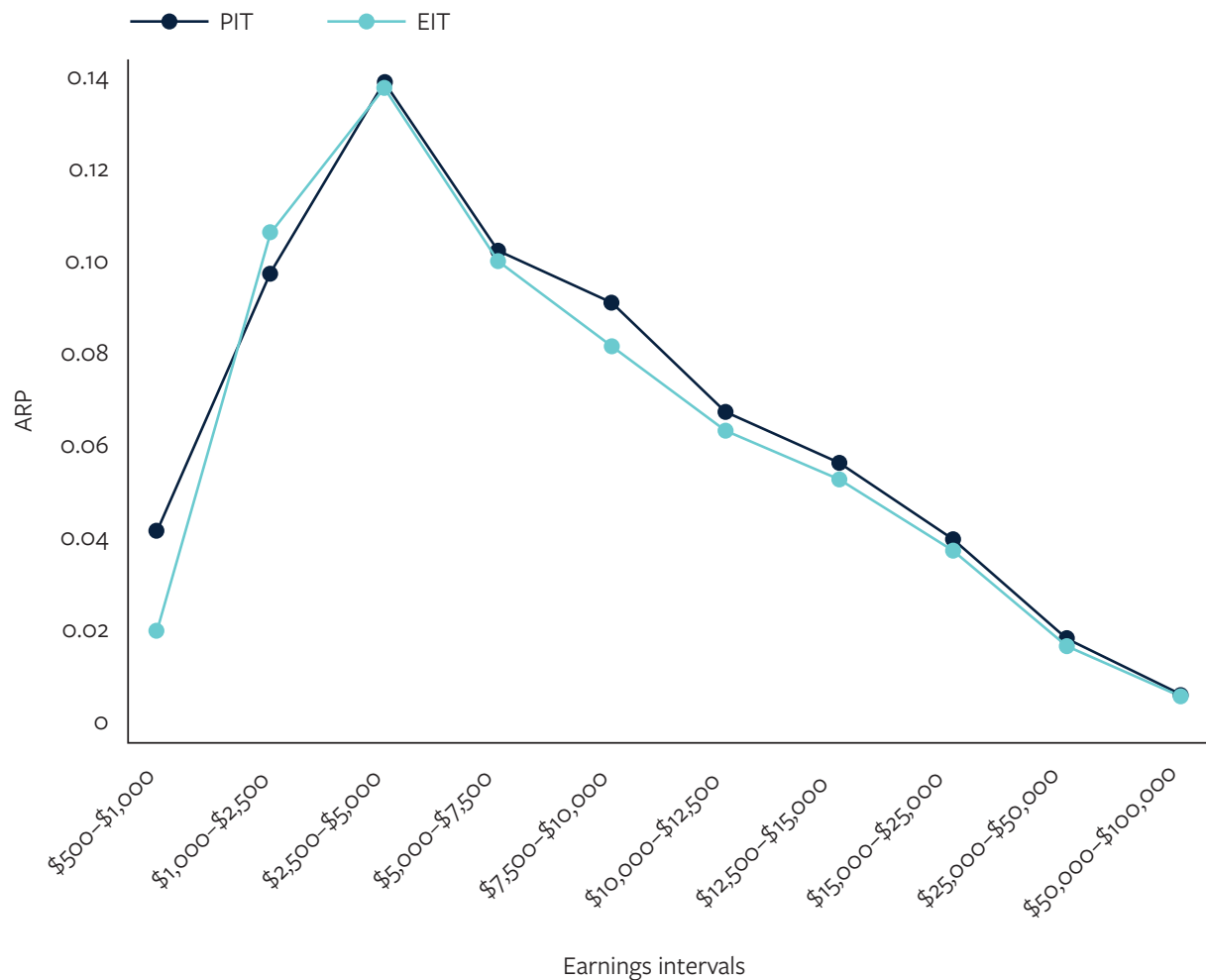
Source: Authors' calculations from EITD (forthcoming)

As discussed previously, each of these different proxies for earnings across Africa is imperfect. Each has distinct strengths and weaknesses, but we hope that by taking three differing approaches, we have provided a number of perspectives that begin to allow us to piece together a picture of employment income tax burdens faced across the continent.

7   Conclusion

This study has presented the first set of findings from the TaxDev EITD, a new, freely available dataset which for the first time allows researchers and policymakers to study personal and other mandatory employment income taxes across the African continent for the most recent 20 to 25 years. Much research to date on employment and personal taxation in LMICs has focused on questions of taxpayer registration, formalisation and compliance, or studied the behavioural responses of taxpayers to specific reform episodes. Comparatively little work has attempted to understand what EIT systems look like across countries and the tax burdens faced by those in formal employment.

We find that in some of the world's poorest countries, income taxes bite at a punitively low level, below internationally defined poverty lines. This creates significant disincentives for workers to enter the formal workforce. We also find that PIT reform in Africa is infrequent, and this raises questions over the role of bracket creep on employees' purchasing power. On average, since 1995, African countries reformed their PIT systems just once every five and a half years. These reforms have on average, however, led to significant reductions in the tax burdens faced by individuals. The average employment income tax burden for an individual earning a wage equal to GDP per capita is relatively modest in Africa, at around 8.6%, although this ranges across the continent, from 0% to around 24%. This is the first such cross-country evidence on EIT burdens for Africa. Turning to the progressivity of EIT systems, we find that except for those on *very* low incomes (between 0.5- and 0.67-times GDP per capita), EIT systems are, on average, most progressive for those on low incomes, gradually declining as they move up the income distribution. However, employment income taxes are regressive in a small number of countries at very low levels of income. The absolute values of progressivity are somewhat lower than those observed for individuals in OECD countries in earlier work.

We hope that the unique findings presented in this study are informative and inspire more detailed research into personal and employment income taxes in LMICs. Our first, simple expositions are deliberately high-level (each of the sections on reform, EIT burdens or progressivity could have been entire studies in and of themselves), aiming to offer a 'broad sweep' of the kinds of cross-country analysis that can make use of the EITD to further our understanding of EIT systems in LMICs. In the future, we hope that improvements in data – including, but not limited to, how formal earnings are measured and understood – will facilitate a deeper understanding of the role of employment income taxation on the African continent. Furthermore, future iterations of the EITD will extend coverage to a global level, enabling comparisons of EIT systems that were not previously possible.

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Appendix 1 Marginal PIT rates and GDP per capita

Figure 18 Top marginal PIT rates and GDP per capita, 1995–2020
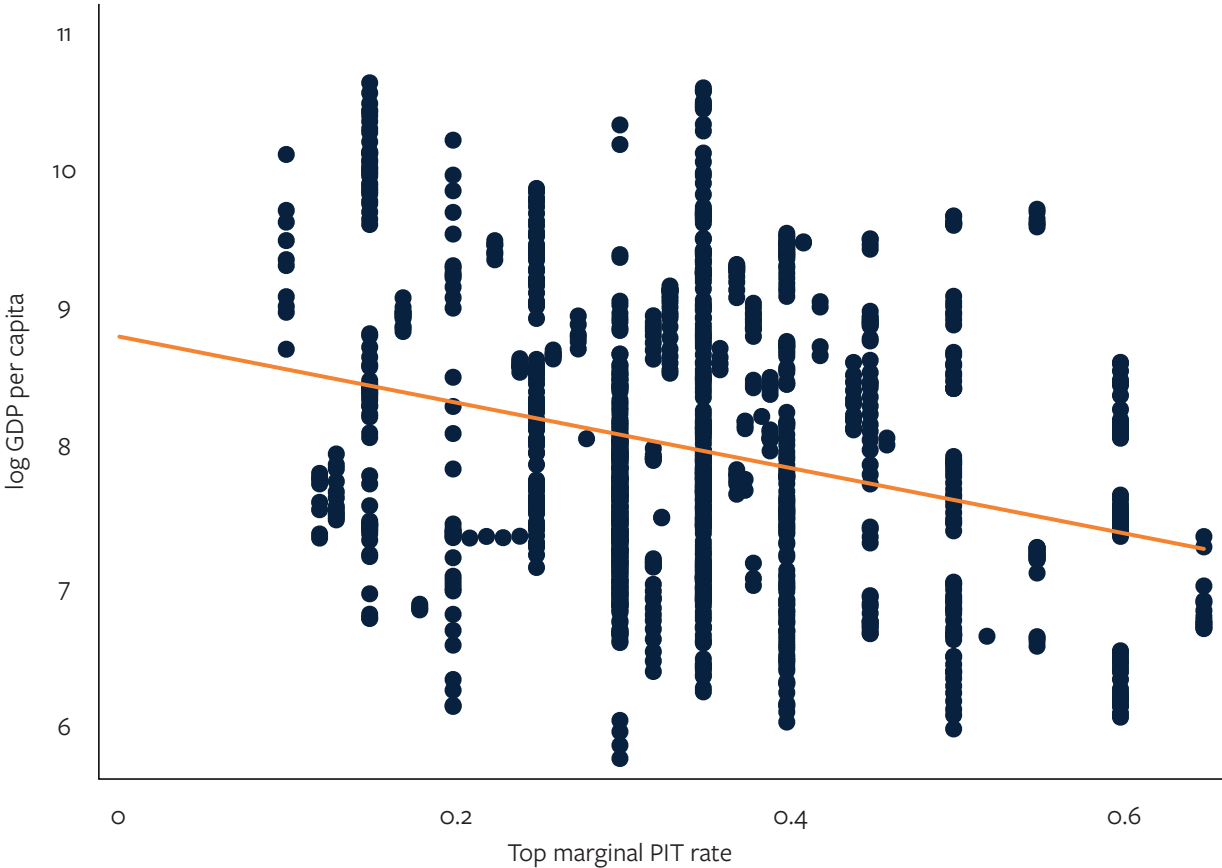
Sources: EITD (forthcoming) and IMF (2021)

Appendix 2   Effective tax rates at Y0.5 – Y5 (2019)

Country	Y0.5	Y0.67	Y1	Y1.33	Y1.67	Y2	Y3	PIT ETR Y5	GDP per capita (current LCU)
Angola	1.70%	3.73%	6.03%	7.59%	8.77%	9.69%	11.88%	13.93%	1,085,040
Burundi	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.85%	475,100
Benin	0.00%	0.00%	1.59%	3.68%	4.97%	5.80%	8.56%	11.43%	713,772
Burkina Faso	0.00%	0.00%	2.51%	4.90%	6.73%	7.91%	10.44%	13.87%	453,987
Botswana	0.81%	1.87%	4.11%	6.53%	9.02%	11.63%	16.09%	19.65%	85,831
Central African Republic	0.00%	0.00%	0.00%	0.00%	1.56%	2.62%	4.41%	5.85%	281,135
Cameroon	0.00%	1.52%	4.32%	5.73%	6.60%	7.16%	8.37%	13.07%	879,924
Congo, D.R.	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	946,297
Congo, Rep.	4.81%	7.21%	13.08%	16.04%	17.86%	20.05%	26.70%	32.05%	1,608,726
Comoros	2.49%	3.13%	4.57%	5.92%	6.75%	8.11%	11.23%	15.56%	598,666
Cabo Verde	0.00%	1.23%	6.27%	8.81%	10.37%	11.38%	13.09%	16.66%	354,753
Djibouti	1.64%	1.73%	5.15%	7.94%	9.99%	11.31%	13.54%	15.98%	551,481
Algeria	9.80%	7.43%	17.25%	20.41%	22.36%	23.62%	25.75%	29.39%	470,438
Egypt	4.43%	5.84%	8.94%	11.69%	13.38%	14.47%	16.31%	18.37%	53,813
Ethiopia	4.88%	6.18%	8.92%	10.43%	12.27%	13.55%	16.97%	22.20%	28,133
Gabon	0.84%	2.63%	5.77%	8.31%	10.63%	12.23%	16.29%	20.98%	4,752,322
Ghana	3.00%	6.15%	9.90%	11.78%	12.95%	13.70%	14.97%	18.00%	11,584
Guinea	3.92%	5.18%	6.77%	8.53%	9.85%	10.70%	13.55%	16.13%	9,298,462
Gambia	0.00%	0.40%	2.55%	5.15%	8.08%	10.87%	15.58%	19.35%	38,921
Guinea-Bissau	1.00%	1.00%	1.00%	2.04%	2.85%	3.37%	4.84%	6.10%	474,895
Equatorial Guinea	5.79%	7.14%	9.74%	12.08%	13.70%	14.74%	17.98%	23.42%	4,749,272
Kenya	0.00%	0.00%	3.14%	6.08%	8.70%	10.57%	15.65%	21.39%	204,629
Libya	2.85%	3.40%	3.93%	4.19%	4.43%	5.35%	6.90%	8.14%	8,389
Lesotho	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.35%	13.82%	16,523
Morocco	0.00%	0.00%	0.73%	3.03%	5.19%	8.36%	16.28%	23.37%	32,348
Madagascar	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.67%	11.40%	1,953,725
Mali	0.00%	0.37%	1.90%	3.94%	5.58%	6.64%	10.00%	16.33%	531,526
Mozambique	8.83%	9.13%	9.41%	9.56%	10.38%	11.14%	12.43%	13.46%	30,709
Mauritania	0.00%	0.00%	0.00%	3.67%	5.98%	7.47%	11.61%	18.41%	716,966
Mauritius	0.00%	0.00%	2.25%	4.17%	5.36%	6.12%	8.37%	11.02%	393,417

Country							PIT ETR		GDP per capita (current LCU)
	Y0.5	Y0.67	Y1	Y1.33	Y1.67	Y2	Y3	Y5	
Malawi	0.00%	0.00%	0.00%	0.00%	1.60%	6.02%	14.01%	20.41%	281,470
Namibia	0.00%	0.00%	5.79%	8.82%	12.00%	14.15%	17.76%	21.22%	73,704
Niger	1.00%	1.00%	1.08%	1.30%	1.45%	1.84%	3.23%	6.16%	324,527
Nigeria	1.74%	2.72%	4.11%	5.27%	6.03%	6.52%	7.72%	9.51%	724,703
Rwanda	0.39%	5.36%	10.19%	12.63%	14.34%	16.93%	21.28%	24.77%	734,274
Sudan	0.00%	0.00%	1.17%	2.12%	3.11%	4.25%	6.91%	10.14%	46,961
Senegal	0.00%	0.00%	4.96%	8.69%	11.00%	13.53%	19.02%	23.64%	837,940
Sierra Leone	0.00%	0.00%	0.00%	0.76%	3.66%	5.53%	9.48%	14.90%	4,751,884
Somalia	1.74%	2.82%	3.87%	4.40%	4.73%	4.94%	6.56%	9.41%	338
South Sudan	7.06%	7.80%	8.53%	9.29%	10.45%	11.20%	12.47%	13.48%	48,951
São Tomé and Príncipe	4.60%	5.97%	7.30%	8.37%	9.31%	9.92%	11.41%	14.38%	43,300,000
Eswatini	0.00%	0.00%	6.20%	9.62%	11.73%	13.78%	18.21%	23.85%	57,951
Seychelles	1.62%	6.12%	10.70%	13.01%	14.43%	15.35%	16.90%	19.45%	230,188
Chad	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	3.36%	6.02%	401,729
Togo	0.50%	0.50%	0.50%	0.50%	0.50%	1.41%	3.27%	4.76%	523,302
Tunisia	0.00%	6.11%	12.67%	15.98%	18.02%	19.34%	22.19%	26.05%	9,754
Tanzania	0.00%	0.00%	1.61%	3.44%	4.57%	6.74%	11.81%	18.61%	2,483,800
Uganda	0.00%	0.00%	1.92%	5.26%	9.81%	13.15%	18.76%	23.26%	3,488,578
South Africa	0.00%	0.00%	1.72%	5.76%	8.25%	9.86%	14.53%	20.68%	86,391
Zambia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.88%	15.62%	16,399

Note: Liberia (LBR), Eritrea (ERI) and Côte d'Ivoire (CIV) not shown here and in subsequent tables due to insufficient data.

LCU: local currency unit.

Sources: EITD (forthcoming) and IMF (2021)

Country	Y0.5	Y0.67	Y1	Y1.33	Y1.67	Y2	Y3	EIT ETR Y5	GDP per capita (current LCU)
Angola	4.5%	6.4%	8.7%	10.2%	11.3%	12.2%	14.4%	16.4%	1,100,000
Burundi	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	8.8%	475,100
Benin	3.6%	3.6%	5.2%	7.3%	8.6%	9.4%	12.2%	15.0%	713,772
Burkina Faso	0.0%	0.0%	3.5%	7.0%	9.6%	11.2%	14.5%	18.5%	453,987
Botswana	0.8%	1.9%	4.1%	6.5%	9.0%	11.6%	16.1%	19.7%	85,831
Central African Republic	3.0%	3.0%	3.0%	3.0%	4.3%	5.4%	7.2%	8.6%	281,135
Cameroon	4.2%	5.4%	8.5%	10.0%	11.0%	11.6%	12.7%	17.4%	879,924
Congo, D.R.	7.9%	7.9%	7.9%	7.9%	7.9%	7.9%	11.0%	14.3%	946,297
Congo, Rep.	8.4%	10.2%	16.1%	19.0%	20.9%	22.5%	29.1%	34.4%	1,600,000
Comoros	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	598,666
Cabo Verde	8.5%	8.5%	13.4%	15.9%	17.5%	18.5%	20.2%	23.2%	354,753
Djibouti	6.0%	8.3%	12.5%	15.2%	17.0%	18.1%	20.1%	22.3%	551,481
Algeria	17.0%	15.4%	23.5%	26.7%	28.7%	29.9%	32.0%	35.2%	470,438
Egypt	16.3%	17.2%	17.5%	20.8%	20.6%	20.5%	20.3%	20.7%	53,813
Ethiopia	11.9%	13.2%	15.9%	17.4%	19.3%	20.5%	24.0%	29.2%	28,133
Gabon	3.7%	4.7%	5.6%	7.5%	8.2%	13.0%	18.5%	27.5%	4,800,000
Ghana	7.9%	10.7%	14.4%	16.3%	17.5%	18.2%	19.5%	22.1%	11,584
Guinea	8.7%	9.7%	11.3%	12.8%	14.1%	14.9%	17.5%	18.7%	9,300,000
Gambia	5.0%	5.4%	7.5%	10.1%	13.1%	15.9%	20.6%	24.3%	38,921
Guinea-Bissau	9.0%	9.0%	9.0%	8.0%	8.0%	8.7%	9.7%	12.2%	474,895
Equatorial Guinea	10.3%	11.6%	14.2%	16.6%	18.2%	19.2%	22.5%	27.9%	4,700,000
Kenya	10.7%	9.5%	11.2%	12.9%	14.1%	15.2%	18.8%	23.5%	204,629
Libya	10.4%	11.0%	11.5%	11.8%	11.9%	12.7%	14.3%	15.5%	8,389
Lesotho	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.4%	13.8%	16,523
Morocco	2.0%	2.0%	2.7%	5.9%	8.3%	11.3%	18.8%	25.4%	32,348
Madagascar	2.0%	2.0%	2.6%	2.2%	2.0%	1.8%	7.2%	12.7%	2,000,000
Mali	3.1%	3.4%	8.6%	10.6%	12.2%	13.3%	16.7%	23.0%	531,526
Mozambique	11.5%	11.8%	12.1%	12.3%	12.9%	13.7%	15.0%	16.0%	30,709
Mauritania	1.0%	1.0%	1.0%	4.7%	7.0%	8.5%	12.6%	19.4%	716,966
Mauritius	3.0%	2.4%	5.0%	7.5%	9.0%	10.0%	12.6%	15.6%	393,417
Malawi	0.0%	0.0%	0.0%	0.0%	1.6%	6.0%	14.0%	20.4%	281,470
Namibia	0.0%	0.0%	5.8%	8.8%	12.0%	14.1%	17.8%	21.2%	73,704
Niger	1.0%	1.0%	1.1%	2.2%	3.2%	4.0%	6.3%	9.7%	324,527
Nigeria	9.7%	10.7%	12.1%	13.3%	14.0%	14.5%	15.7%	17.5%	724,703
Rwanda	3.7%	8.7%	13.5%	15.9%	17.6%	20.2%	24.6%	28.1%	734,274
Sudan	8.0%	8.0%	9.2%	10.1%	11.1%	12.3%	14.9%	18.1%	46,961

Country	Y0.5	Y0.67	Y1	Y1.33	Y1.67	Y2	EIT ETR Y3	Y5	GDP per capita (current LCU)
Senegal	0.0%	0.0%	6.4%	11.1%	14.1%	17.0%	23.2%	28.4%	837,940
Sierra Leone	5.0%	5.0%	5.0%	5.0%	7.9%	9.8%	13.5%	18.6%	4,800,000
Somalia	1.7%	2.8%	3.9%	4.4%	4.7%	4.9%	6.6%	9.4%	338
South Sudan	14.3%	15.0%	15.7%	16.1%	17.2%	18.0%	19.3%	20.3%	48,951
São Tomé and Príncipe	6.0%	7.9%	10.6%	9.7%	11.6%	12.8%	13.8%	14.8%	43,000,000
Eswatini	5.0%	4.2%	9.0%	11.7%	13.4%	15.2%	19.1%	24.4%	57,951
Seychelles	4.6%	9.1%	13.7%	16.0%	17.4%	18.4%	19.9%	22.5%	230,188
Chad	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	6.9%	9.5%	401,729
Togo	0.5%	0.5%	4.5%	4.5%	4.5%	5.4%	7.3%	8.8%	523,302
Tunisia	9.2%	12.9%	19.5%	22.8%	24.8%	26.1%	28.8%	32.3%	9,754
Tanzania	10.0%	10.0%	10.7%	12.5%	13.7%	14.7%	19.3%	25.6%	2,500,000
Uganda	5.0%	5.0%	6.9%	10.3%	14.8%	18.1%	23.8%	28.3%	3,500,000
South Africa	1.0%	1.0%	2.7%	6.8%	9.2%	10.9%	13.6%	19.2%	86,391
Zambia	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	8.6%	18.7%	16,399

Note: LCU, local currency unit.

Sources: EITD (forthcoming) and IMF (2021)

Appendix 3 PIT and EIT effective tax rates; PPP$

PIT ETR									
Country	**$500**	**$1,000**	**$2,500**	**$5,000**	**$10,000**	**$12,500**	**$25,000**	**$50,000**	**$100,000**
Algeria	0.0%	0.0%	0.0%	7.9%	14.8%	17.9%	23.9%	28.3%	31.7%
Angola	0.0%	0.0%	0.0%	3.8%	7.7%	8.9%	12.5%	14.7%	15.9%
Benin	0.0%	0.0%	0.0%	4.2%	8.4%	9.7%	14.1%	21.0%	25.5%
Botswana	0.0%	0.0%	0.0%	0.0%	1.1%	1.9%	6.7%	15.1%	20.0%
Burkina Faso	0.0%	0.0%	3.3%	8.5%	12.8%	14.5%	19.4%	22.2%	23.6%
Burundi	0.0%	0.0%	0.0%	8.1%	18.1%	20.5%	25.3%	27.6%	28.8%
Cabo Verde	0.0%	0.0%	0.0%	1.2%	8.9%	10.4%	13.5%	18.9%	23.2%
Cameroon	0.0%	0.0%	1.4%	5.7%	7.8%	9.0%	16.4%	25.7%	30.4%
Central African Republic	0.0%	0.0%	3.8%	5.9%	9.8%	11.6%	23.3%	31.7%	35.8%
Chad	0.0%	0.0%	0.0%	3.4%	6.7%	9.1%	14.6%	21.1%	25.6%
Congo, Dem. Rep.	3.0%	3.0%	3.9%	9.4%	12.2%	12.8%	13.9%	21.7%	30.0%
Congo, Rep.	1.0%	1.0%	5.2%	14.0%	21.6%	25.3%	33.1%	39.0%	42.0%
Djibouti	0.1%	1.1%	1.6%	4.7%	11.0%	12.4%	15.8%	17.9%	22.1%
Egypt	0.0%	0.0%	0.0%	3.1%	7.3%	9.0%	14.5%	17.4%	19.9%
Equatorial Guinea	0.0%	0.0%	0.0%	1.9%	5.9%	6.9%	11.9%	16.9%	23.8%
Eswatini	0.0%	0.0%	0.0%	0.0%	7.2%	9.8%	16.9%	24.5%	28.8%
Ethiopia	0.0%	3.0%	8.3%	12.9%	18.8%	21.0%	28.0%	31.5%	33.2%
Gabon	0.0%	0.0%	0.0%	0.0%	2.1%	3.6%	9.8%	16.6%	22.3%
Gambia	0.0%	0.0%	3.1%	11.9%	18.5%	19.8%	22.4%	23.7%	24.3%
Ghana	0.0%	0.0%	2.0%	8.9%	13.2%	14.0%	17.0%	21.0%	23.0%
Guinea	2.3%	3.7%	6.8%	10.7%	15.1%	16.1%	18.1%	19.0%	19.5%
Guinea-Bissau	1.0%	1.0%	1.0%	3.4%	5.7%	6.2%	8.6%	10.3%	11.1%
Kenya	0.0%	0.0%	0.0%	3.2%	10.6%	13.3%	21.4%	25.7%	27.9%
Lesotho	0.0%	0.0%	0.0%	0.0%	7.6%	11.7%	20.8%	25.4%	27.7%
Libya	0.0%	0.0%	0.0%	1.9%	3.4%	3.7%	4.6%	7.3%	8.6%
Madagascar	0.0%	0.0%	0.0%	5.4%	12.7%	14.2%	17.1%	18.5%	19.3%
Malawi	0.0%	0.0%	10.7%	20.4%	25.2%	26.1%	28.1%	29.0%	29.5%
Mali	0.0%	0.0%	1.9%	6.7%	13.3%	16.4%	25.7%	31.4%	34.2%
Mauritania	0.0%	0.0%	0.0%	0.0%	5.9%	7.7%	15.3%	27.0%	33.5%
Mauritius	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%	6.3%	10.3%
Morocco	0.0%	0.0%	0.0%	0.0%	2.4%	3.9%	16.6%	25.7%	31.8%

PIT ETR									
Country	$500	$1,000	$2,500	$5,000	$10,000	$12,500	$25,000	$50,000	$100,000
Mozambique	8.5%	9.2%	11.0%	13.0%	15.4%	16.3%	18.9%	21.9%	26.0%
Namibia	0.0%	0.0%	0.0%	0.0%	5.4%	7.9%	16.1%	21.0%	25.1%
Niger	1.0%	1.0%	1.8%	4.3%	12.1%	14.7%	22.5%	28.0%	31.5%
Nigeria	0.5%	0.5%	1.5%	3.8%	6.3%	6.9%	9.3%	11.3%	12.9%
Rwanda	0.0%	0.0%	10.7%	17.6%	23.8%	25.1%	27.5%	28.8%	29.4%
São Tomé and Príncipe	0.0%	0.0%	5.5%	7.9%	10.5%	11.4%	15.8%	20.4%	22.7%
Senegal	0.0%	0.0%	0.0%	9.5%	18.5%	20.8%	27.0%	31.7%	35.6%
Seychelles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	9.1%	14.6%	17.3%
Sierra Leone	0.0%	0.0%	1.5%	8.8%	16.5%	19.2%	24.6%	27.3%	28.7%
Somalia	1.9%	4.0%	5.8%	9.8%	13.9%	14.7%	16.4%	17.2%	17.6%
South Africa	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	9.6%	17.5%	26.6%
South Sudan	7.5%	8.7%	12.4%	13.7%	14.3%	14.5%	14.7%	14.9%	14.9%
Sudan	0.0%	0.0%	0.0%	1.7%	5.0%	6.6%	10.8%	12.9%	14.0%
Tanzania	0.0%	0.0%	0.6%	4.9%	13.8%	17.1%	23.5%	26.8%	28.4%
Togo	0.5%	0.5%	0.5%	2.1%	4.5%	5.0%	8.6%	17.5%	25.6%
Tunisia	0.0%	0.0%	0.0%	0.0%	11.2%	14.2%	20.3%	25.4%	30.0%
Uganda	0.0%	0.0%	1.3%	11.9%	20.9%	22.7%	26.4%	28.2%	29.8%
Zambia	0.0%	0.0%	0.0%	0.0%	3.7%	8.7%	22.1%	29.8%	33.6%

Source: Authors' calculations from EITD (forthcoming)

EIT ETR									
Country	$500	$1,000	$2,500	$5,000	$10,000	$12,500	$25,000	$50,000	$100,000
Algeria	9.0%	9.0%	9.0%	15.1%	21.1%	24.2%	30.2%	34.2%	37.5%
Angola	3.0%	3.0%	3.0%	6.5%	10.3%	11.4%	15.0%	17.2%	18.4%
Benin	3.6%	3.6%	3.6%	7.8%	12.0%	13.3%	17.7%	24.6%	29.1%
Botswana	0.0%	0.0%	0.0%	0.0%	1.1%	1.9%	6.7%	15.1%	20.0%
Burkina Faso	0.0%	0.0%	4.8%	12.0%	17.3%	19.2%	24.5%	26.0%	25.5%
Burundi	4.0%	4.0%	4.0%	12.1%	21.7%	23.4%	26.7%	28.3%	29.2%
Cabo Verde	8.5%	8.5%	8.5%	8.5%	16.0%	17.5%	20.5%	25.1%	29.4%
Cameroon	4.2%	4.2%	5.2%	10.0%	12.4%	13.4%	20.6%	30.3%	34.4%
Central African Republic	3.0%	3.0%	6.5%	8.6%	12.4%	13.8%	24.2%	32.1%	36.1%
Chad	3.5%	3.5%	3.5%	6.9%	10.2%	12.6%	18.0%	22.8%	26.4%
Congo, Rep.,	5.0%	5.0%	8.8%	17.0%	24.0%	27.7%	35.3%	41.2%	44.2%
Congo, Dem. Rep.	7.8%	7.8%	8.1%	13.7%	16.5%	17.0%	18.1%	25.2%	33.7%
Djibouti	4.1%	5.1%	5.6%	10.7%	17.0%	18.4%	21.8%	21.9%	26.1%
Egypt	14.0%	14.0%	14.0%	15.5%	17.8%	17.5%	20.5%	20.3%	21.4%
Equatorial Guinea	4.5%	4.5%	4.5%	6.4%	10.4%	11.4%	16.4%	21.4%	28.3%
Eswatini	5.0%	5.0%	5.0%	5.0%	9.8%	11.8%	17.9%	25.1%	29.0%
Ethiopia	7.0%	10.0%	15.3%	19.9%	25.8%	28.0%	35.0%	38.5%	40.2%
Gabon	2.5%	2.5%	2.5%	2.5%	5.6%	7.7%	15.1%	22.5%	27.5%
Gambia	5.0%	5.0%	8.1%	16.9%	23.5%	24.8%	27.4%	28.7%	29.3%
Ghana	5.5%	5.5%	7.0%	13.4%	17.7%	18.6%	21.2%	25.1%	27.1%
Guinea	7.1%	8.4%	11.3%	14.9%	18.4%	18.7%	19.4%	19.7%	19.8%
Guinea-Bissau	9.0%	9.0%	9.0%	11.4%	13.7%	14.2%	16.6%	18.3%	19.1%
Kenya	14.8%	10.4%	10.7%	11.8%	15.8%	17.6%	24.1%	27.1%	28.6%
Lesotho	0.0%	0.0%	0.0%	0.0%	7.6%	11.7%	20.8%	25.4%	27.7%
Libya	5.8%	5.8%	7.8%	9.4%	11.0%	11.3%	11.9%	14.7%	16.0%
Madagascar	2.0%	2.0%	2.1%	7.0%	14.0%	15.4%	18.2%	19.6%	20.3%
Malawi	0.0%	0.0%	10.7%	20.4%	25.2%	26.1%	28.1%	29.0%	29.5%
Mali	3.1%	3.1%	8.6%	13.3%	20.0%	23.0%	32.4%	38.0%	40.8%
Mauritania	1.0%	1.0%	1.0%	1.0%	6.9%	8.7%	16.3%	28.0%	34.5%
Mauritius	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	5.4%	10.2%	14.7%
Morocco	2.0%	2.0%	2.0%	2.0%	5.1%	7.2%	19.1%	27.5%	33.3%
Mozambique	11.2%	11.9%	13.5%	15.5%	17.8%	18.7%	21.1%	24.2%	28.0%
Namibia	0.1%	0.0%	0.0%	0.0%	5.4%	7.9%	16.1%	21.0%	25.1%
Niger	1.0%	1.0%	3.9%	7.5%	15.5%	18.2%	25.7%	29.5%	32.3%
Nigeria	8.5%	8.5%	9.5%	11.8%	14.3%	14.9%	17.3%	19.3%	20.9%
Rwanda	3.3%	3.3%	14.0%	20.9%	27.1%	28.4%	30.8%	32.1%	32.7%
São Tomé and Príncipe	6.0%	6.0%	11.5%	13.9%	16.5%	17.4%	21.8%	26.4%	28.7%

EIT ETR									
Country	$500	$1,000	$2,500	$5,000	$10,000	$12,500	$25,000	$50,000	$100,000
Senegal	0.0%	0.0%	0.0%	12.1%	22.6%	25.2%	30.5%	33.4%	36.5%
Seychelles	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	12.1%	17.6%	20.3%
Sierra Leone	5.0%	5.0%	5.8%	12.8%	20.0%	22.7%	28.1%	30.8%	32.2%
Somalia	1.9%	4.0%	5.8%	9.8%	13.9%	14.7%	16.4%	17.2%	17.6%
South Africa	1.0%	1.0%	1.0%	1.0%	1.0%	2.1%	10.6%	18.5%	27.6%
South Sudan	14.7%	15.9%	19.2%	20.5%	21.1%	21.3%	21.5%	21.7%	21.7%
Sudan	8.0%	8.0%	8.0%	9.7%	13.0%	14.6%	18.8%	20.9%	22.0%
Togo	0.5%	0.5%	4.5%	6.1%	8.5%	9.0%	12.6%	21.5%	29.6%
Tunisia	9.2%	9.2%	9.2%	9.2%	18.0%	21.0%	26.9%	31.7%	36.0%
Uganda	5.0%	5.0%	6.3%	16.9%	25.9%	27.7%	31.4%	33.2%	34.8%
Tanzania	10.0%	10.0%	10.0%	13.9%	21.3%	24.1%	30.5%	33.8%	35.4%
Zambia	5.0%	5.0%	5.0%	5.0%	7.5%	12.2%	25.2%	32.9%	35.4%

Source: Authors' calculations from EITD (see McNabb, forthcoming)