Differential Bunching Impacts Across the Income Distribution

Evidence from Zambian Tax Administrative Data

Samuel Bryson, Kwabena Adu-Ababio, Evaristo Mwale and John Rand

UNIVERSITY OF COPENHAGEN

Introduction and Context

- Zambia – increased DRM critically important.
- Illicit behavior distortions/policies should be minimized.
- Limited knowledge on the link between tax policy changes and behavioral responses of taxpayers.
  - Changes in tax legislation could trigger real economic responses and affect labor supply.
  - It could also give rise to illicit behavior in the form of reporting responses (evasion/avoidance).
- Use comprehensive taxpayer data to examine the consequences of changing tax policies (Saez et al, 2012 and Kleven, 2016) - Evidence from developing countries remain relatively scarce.
- This paper - investigate kinks in the personal income tax using the bunching approaches inspired by Saez (2010) and Chetty et al. (2011)
- The Pay-As-You-Earn (PAYE) income tax in Zambia - graduated system where tax liability increases progressively and each bracket is associated with a fixed marginal tax rate.
  - Produces discontinuous jumps in tax liability at the bracket cutoffs and the kinks in the marginal tax rate therefore create strong incentives for bunching just below these thresholds. Disentangle excess bunching at kinks in the PAYE tax schedule from "round-number bunching“ responses.

Methodology and literature

- Methodologically, closest to Kleven and Waseem (2013) and Bell (2020).
  - Analyze behavioral responses to discontinuous jumps in the personal income tax rate, accounting for the issues related to the reference point problem.
  - Some thresholds are round numbers - natural focal points for reasons other than financial incentives ("round number bunching").
  - Drives a wedge between the structural elasticity (important for long-run welfare analysis) and the observed elasticity that is estimated (Kleven and Waseem, 2013).
  - Reference point effects amplify bunching - observed elasticity overstate the structural elasticity (Kleven, 2016).
- Related Literature (besides Kleven and Waseem (2013) – Pakistan)
  - Bell (2020) - South Africa (small implied elasticities of taxable income from the bunching and that the responsiveness is due to both tax avoidance by income shifting and real labor supply responses).
  - Bergolo et al. (2021) – Uruguay (only small elasticities at the first kink point (around 0.06)).
  - He et al. (2021) – China (find elasticity of taxable income estimates of between 0.09 and 0.41 for middle kinks and no evidence of bunching for bottom or top kinks).
  - Boonzaaier et al. (2019) and Bachas and Soto's (2021) – South Africa and Mexico (elasticities may be larger for firms in developing countries than in developed countries).

Bunching – Methods summary

- Summarizing the developing country bunching literature illustrates several important points to consider when applying bunching methods in a developing country context:

  i) methodological distinction between kinks (marginal tax rate) and notches (average tax rate).

  ii) optimization frictions and reference points, including "number preferences“.

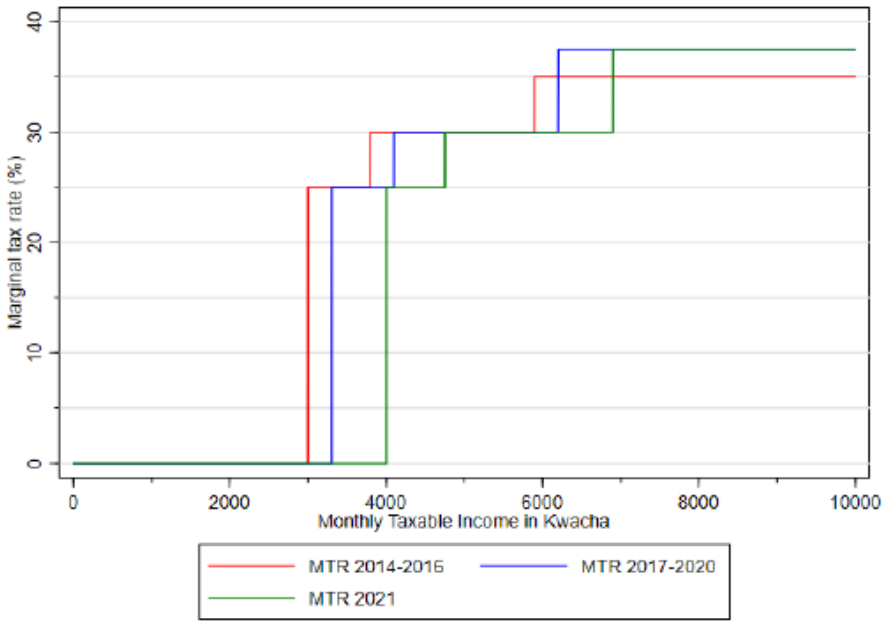
  iii) personal income tax: different behavioral effects for wage earners and the self-employed.

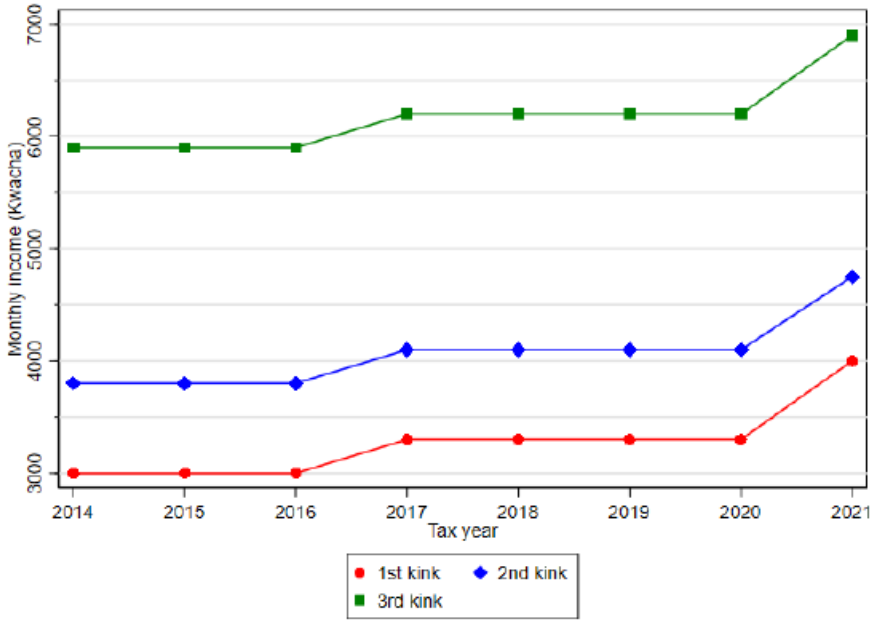
  iv) distinction between changes in reporting behavior and real responses (changes in labor supply/production).

Contribution and summary of results

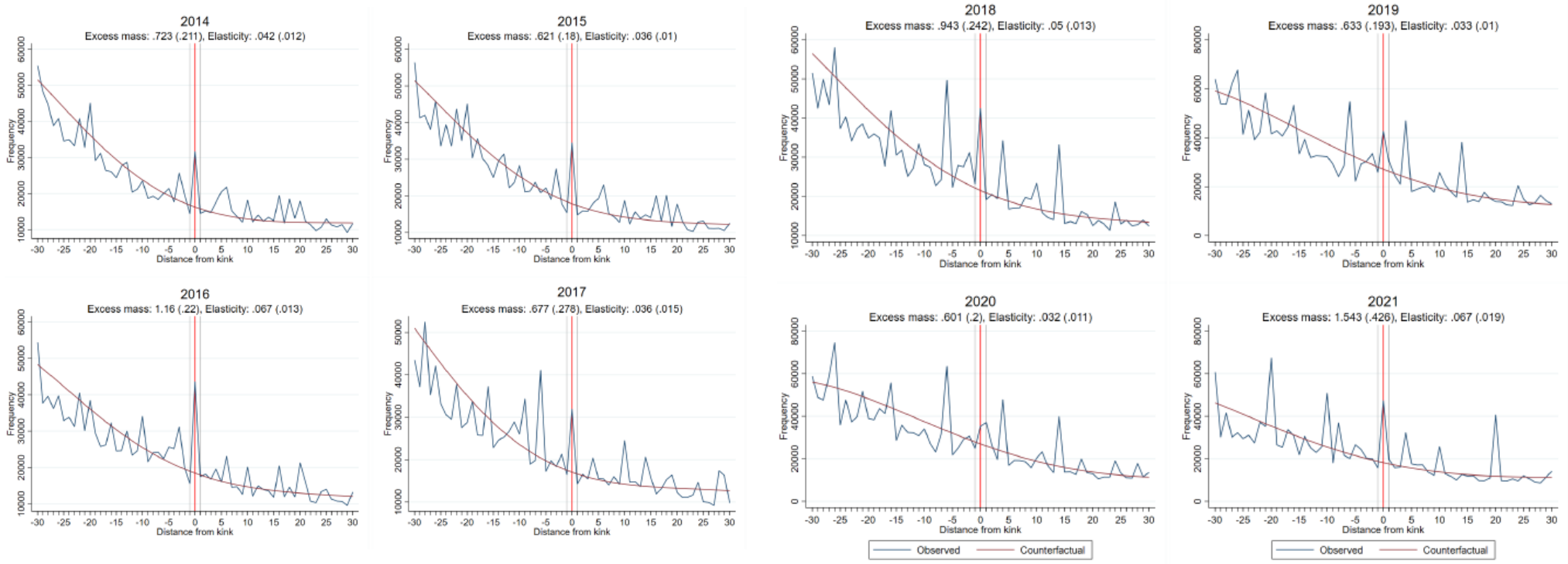
- Applies bunching approaches to tax administrative data in a developing country context and is the first of its kind in Zambia - Using individual PAYE data for Zambia over the period 2014-2021.
- Results - significant evidence of excess bunching at the first kink in the PAYE schedule for all years with an excess mass between 0.6 and 1.5. Since we detect bunching in all years, this indicates behavioral responses in adherence with the changes in the location of the kink.
- Indication for excess bunching at the second kink, and no evidence for bunching at the third (and highest) kink in the PAYE tax schedule.
- Throughout we observe "round-number bunching" at natural focal points such as 3,000 Kwacha, 3,500 Kwacha, 4,000 Kwacha etc. Our excess bunching estimates remain significant after controlling for bunching at such reference points.

Personal Income Tax Schedules in Zambia

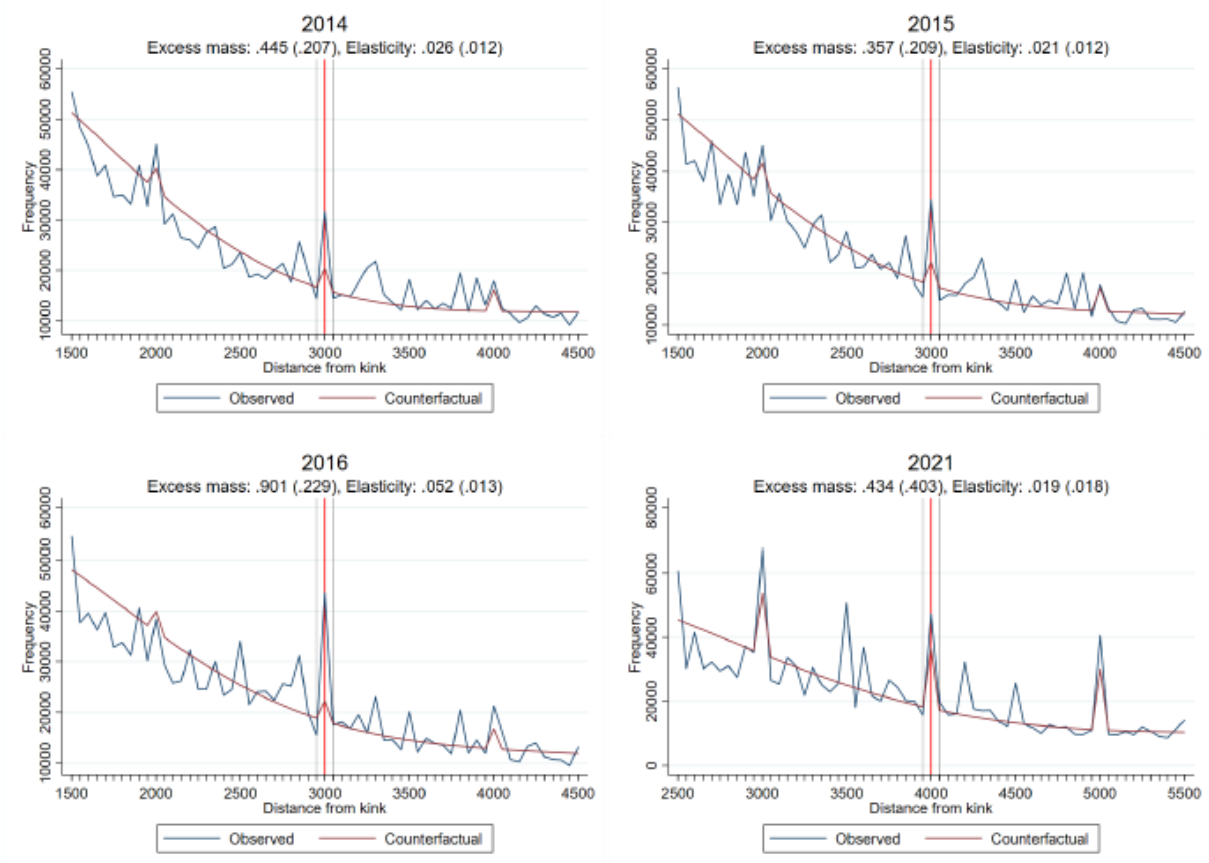




Bunching at the first kink in the income tax schedule



Accounting for round-number bunching at the first kink



Largest round-number bunching appears in 2021 - where the spike in the counterfactual distribution is largest - suggesting that bunching behavior at the first kink is almost entirely driven by round-number bunching.

We do still find the strongest evidence of bunching for tax reasons in other years.

Reason for the 2021 result???

Findings in perspective (1)

- Results in line with Boonzaaier et al. (2019) - observed bunching reacts sharply and immediately to changes in the location of the kink points over time.
  - Suggests that the behavioral response is driven by reporting responses rather than real economic responses.
  - Real responses would result in a more scattered response around the kink point (and not such sharp bunching) due to inherent uncertainties in relation to real economic outcomes, e.g. adjustments in the labour supply.
  - Moreover, real responses require adjustments along different dimensions, which may require more time or at least cannot take place in a very short time.
  - Adjusting the working hours of employees in response to changes in the PAYE tax rates is more time-consuming than adjusting the reported income.
- Reporting responses may be are less detrimental to welfare, compared to real economic responses, since the evasion/avoidance behavior often entails transfers to other economic actors.

Findings in perspective (2)

- Results differ from those by Bell (2020) – They find the largest bunching responses at the highest kink, followed by the medium kinks and the smallest response at the lowest kink in the South African personal income tax schedule. We find the reverse in the case of Zambia.
- They also find evidence for bunching only among self-employed workers and not for wage earners (in line with Chetty et al., 2011, Kleven and Waseem, 2013, Bastani and Selin, 2014) – we find it for wage workers in the Zambian case.
- Our results in line with more recent papers that bunching responses are also observed for wage workers (Mortenson and Whitten, 2020; Mavrokonstantis and Seibold, 2022).
- Consistent with Bachas and Soto (2021) we find that the behavioral response to the kinks is driven by a reporting response. Bergolo et al. (2021) also find evidence for bunching at the bottom kink in Uruguay, though.
- Bergolo et al. (2021) observe an increase in the amount of bunching over time = learning process by individuals. Our results confirm that individuals dynamically respond to changes in the location of the tax kinks in Zambia.

Back of the envelope calculation (work in progress)

- How big is the ”missed tax revenue” arising from the excess bunching at the three kinks in the Zambian PAYE schedule due to tax avoidance reasons?
- Simple calculation of the number of excess individuals at these kinks and using the average amount of tax paid by individuals just above the tax kink.
- We find that the annual missed tax revenue of up to ZMW 7.15 million due to excess bunching at the third kink, while it is only up to ZMW 430,000 for the first tax kink.
- In total the missed tax revenue is estimated at ZMW 25.96 million - This only constitutes a small fraction of around 0.25 per cent of the overall PAYE tax collected by ZRA over the same time-period.