

Affordability of cigarettes from the WHO Report on the Global Tobacco Epidemic, 2017

Rajeev Cherukupalli and Anne-Marie Perucic

March 9, 2018, Cape Town

17th World Conference on Tobacco or Health

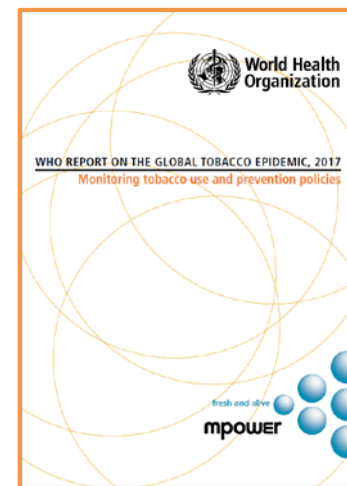


JOHNS HOPKINS

BLOOMBERG SCHOOL
of PUBLIC HEALTH

GTCR 2017 introduced a measure of affordability alongside taxation

M MONITORING	P SMOKE-FREE POLICIES	O CESSATION	W WARNINGS		E ADVERTISING BANS	R	
	LINES REPRESENT LEVEL OF COMPLIANCE		HEALTH WARNINGS	MASS MEDIA	LINES REPRESENT LEVEL OF COMPLIANCE	TAXATION	CIGARETTES LESS AFFORDABLE SINCE 2008
					—	15%	YES
						80%	↔
	—					40%	YES
					—	40%	YES
	—				—	37%	NO
						39%	YES
						68%	YES
						66%	↔
						89%	YES
						50%	NO
						69%	YES
					—	70%	...
	—				—	24%	↔



YES	Cigarettes less affordable – per capita GDP needed to buy 2000 cigarettes of the most sold brand increased on average between 2008 and 2016
NO	Cigarettes more affordable – per capita GDP needed to buy 2000 cigarettes of the most sold brand declined on average between 2008 and 2016
↔	No trend change in affordability of cigarettes since 2008

“GTCR”: WHO Report on the Global Tobacco Epidemic



Research questions

- Have cigarettes become more or less expensive on average?
- Do cigarette prices rise consistently or sporadically?
- Are

- Some countries or regions
- Higher-tax countries
- Some types of tax regime

} better at reducing
cigarette affordability

- Working hypotheses
 - countries with slower income growth, higher taxes and stronger tax regimes should be better at stopping cigarettes from becoming more affordable
- Using the WHO Report on the Global Tobacco Epidemic (“GTCR”), 2017



Outline

- Defining affordability
- Point in time (cross-section) vs over time
- Decision rule to determine if affordability changed
- Results: affordability changes over time
 - By income groups, regions, tax levels and tax structures
- Year-on-year changes, usefulness for tracking



Affordability tracks how prices move relative to income changes

- Budget outlay needed to buy a certain number of cigarettes
 - If this *increases* – cigarettes have become less affordable (costlier vs income)
 - Reduced income
 - Higher prices,
 - Or both
- Alternatively, number of cigarettes that can be bought using a certain budget outlay
 - If this *decreases* – cigarettes have become less affordable
 - Reduced income, higher prices, or both
- Affordability is not an indicator of how smokers act on their preferences.



Data inputs

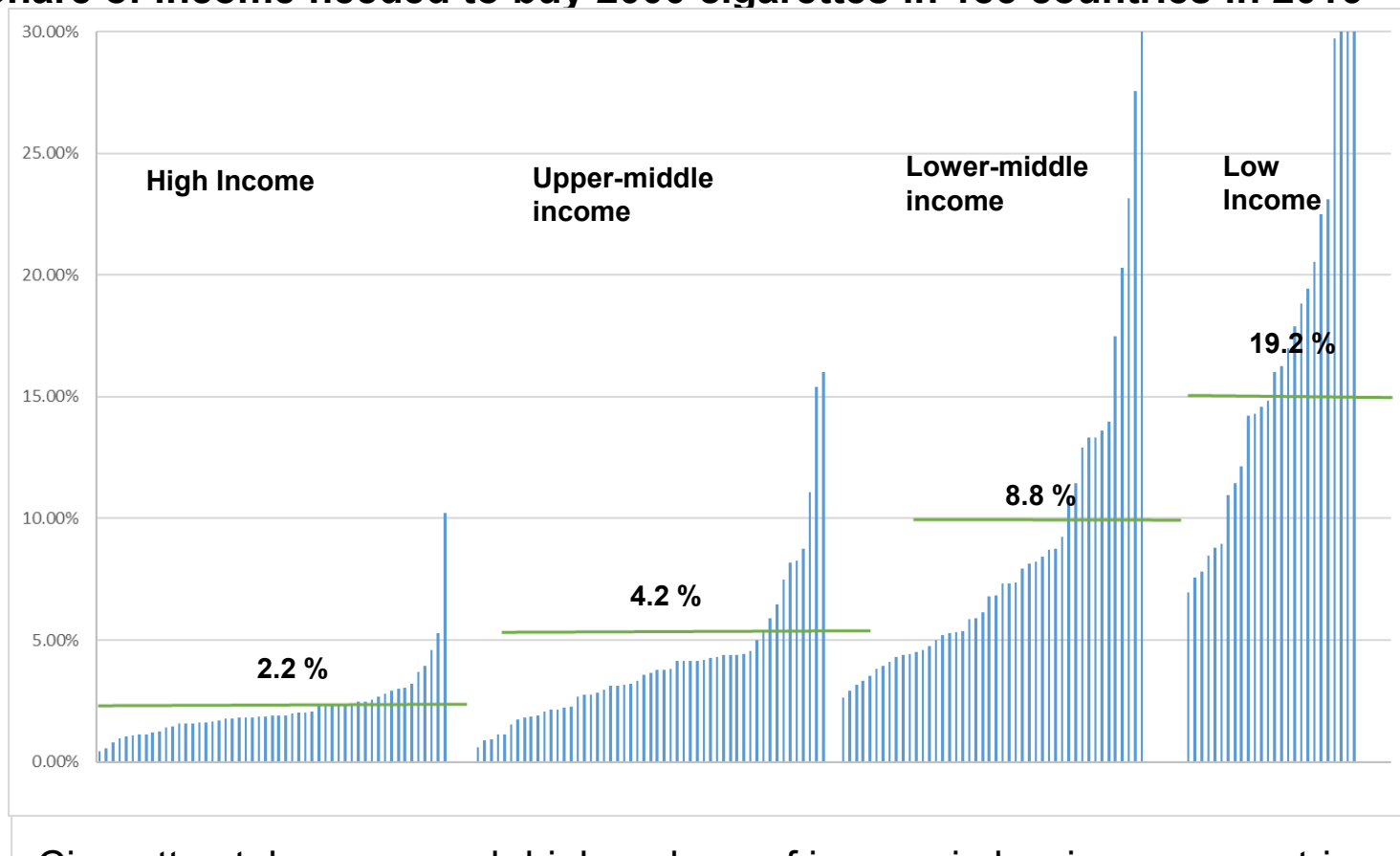
- Affordability: Per capita GDP required to purchase 2000 cigarettes of the most sold brand reported in that year
- = $100 \times \text{price of packs-of-20} / \text{GDP per capita}$
- Prices: Price of the most sold brand measured in Local Currency Units in each year
- GDP per capita: sourced from the IMF's World Economic Outlook (WEO) database – local currency units
- 5 points in time: 2008, 10, 12, 14, 16

	Share of GDP per capita to purchase 2000 cigarettes				
	2008	2010	2012	2014	2016
Uganda	10.7%	11.6%	11.7%	10.4%	11.5%
United Republic of Tanzania	17.4%	24.4%	18.3%	20.5%	14.2%



Affordability at a point in time reflects income differences

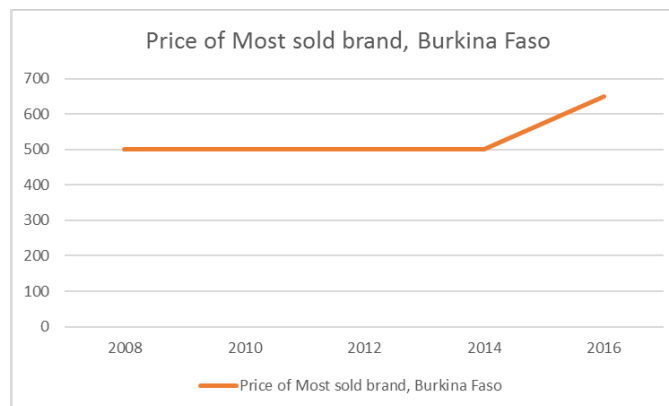
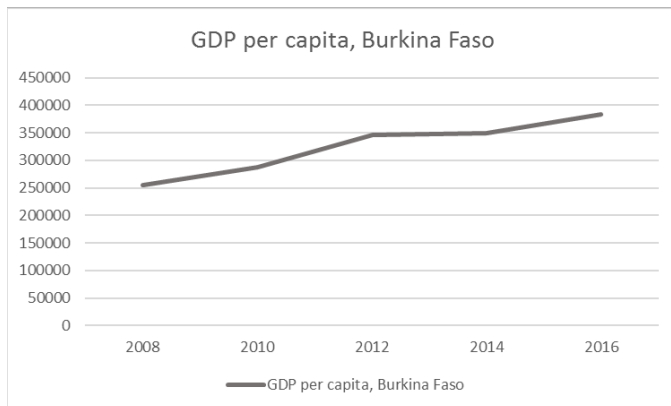
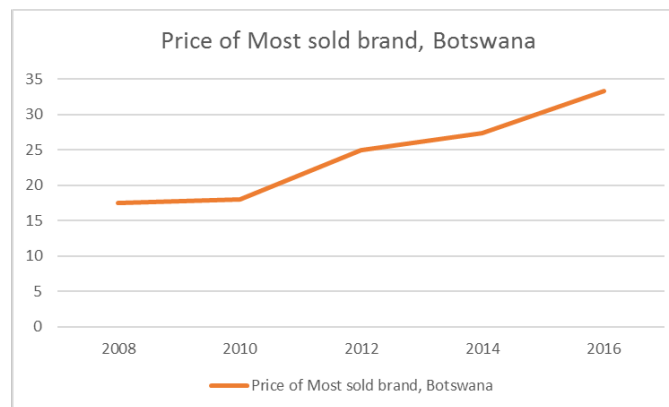
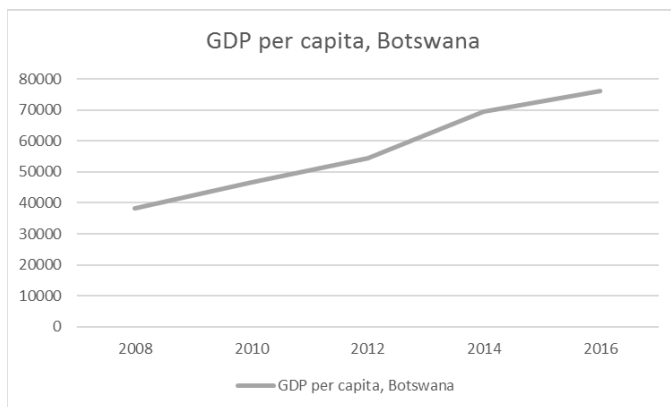
Share of income needed to buy 2000 cigarettes in 185 countries in 2016



- Cigarettes take up a much higher share of income in low income countries
- Cross-section comparisons of affordability can be misleading

Affordability over time, within countries is more informative

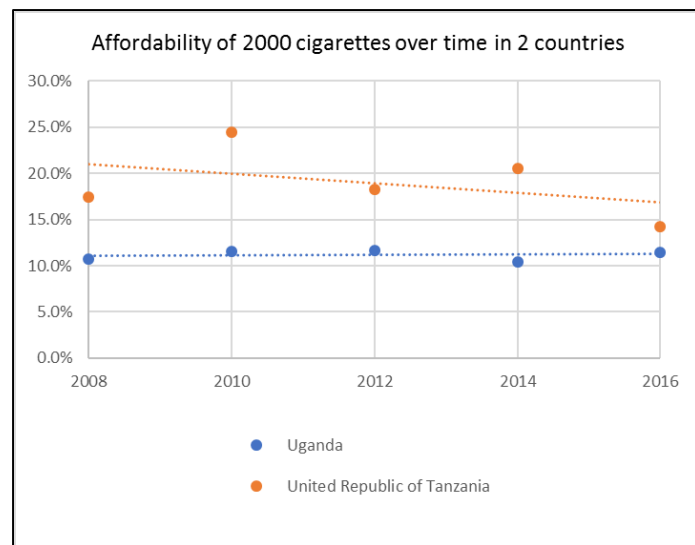
- Income per capita tends to drift up over time.
- Price does not always change in the same way
- Year-to-year changes are a natural consequence within countries



After computing % of GDP to purchase 2000 cigarettes – we computed the trend rate of change

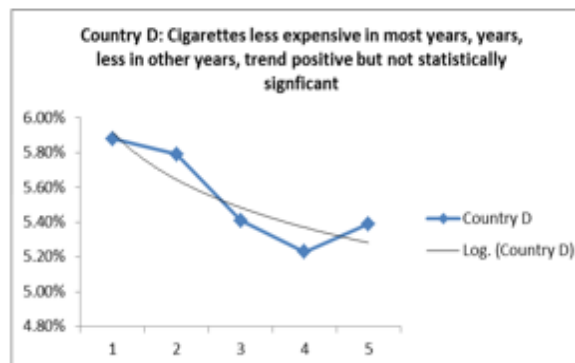
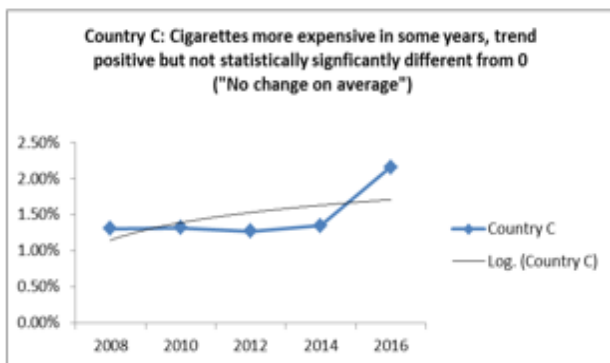
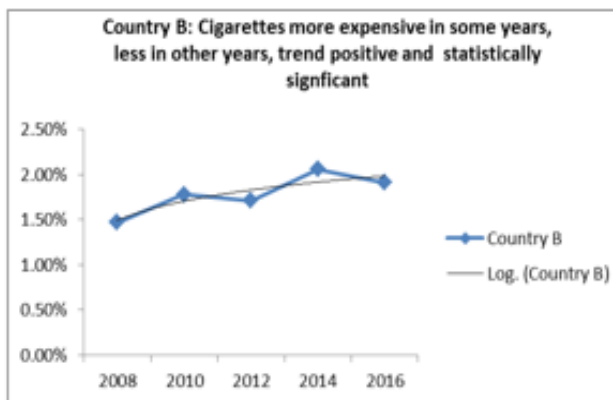
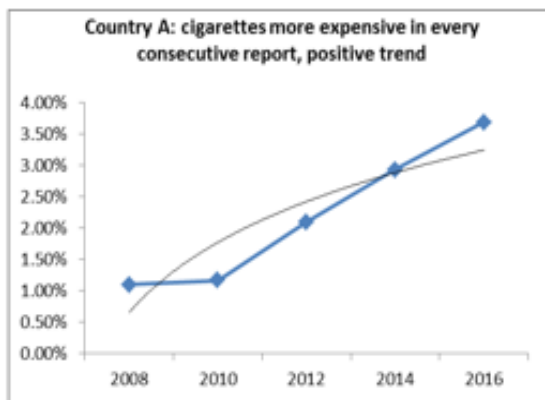
Do tobacco product prices within a country rise/fall/stay unchanged **on average** when income rises?

	Share of GDP per capita to purchase 2000 cigarettes					Rate of change
	2008	2010	2012	2014	2016	
Uganda	10.7%	11.6%	11.7%	10.4%	11.5%	0.2%
United Republic of Tanzania	17.4%	24.4%	18.3%	20.5%	14.2%	-2.9%



Is the trend statistically significant?

Do tobacco product prices within a country rise/fall on average when income changes, and is this statistically **different from 0**?



Decision rules determine how many countries fall in each category (more/less affordable/no change)

1. Per capita GDP to buy 2000 cigarettes increases/decreases over time
2. Per capita GDP to buy 2000 cigarettes increases/decreases by a certain rate (e.g. +/- 1.45% per annum)
3. Per capita GDP to buy 2000 cigarettes decreases in a statistically significant manner over time

This has implications for simplicity and the # of countries

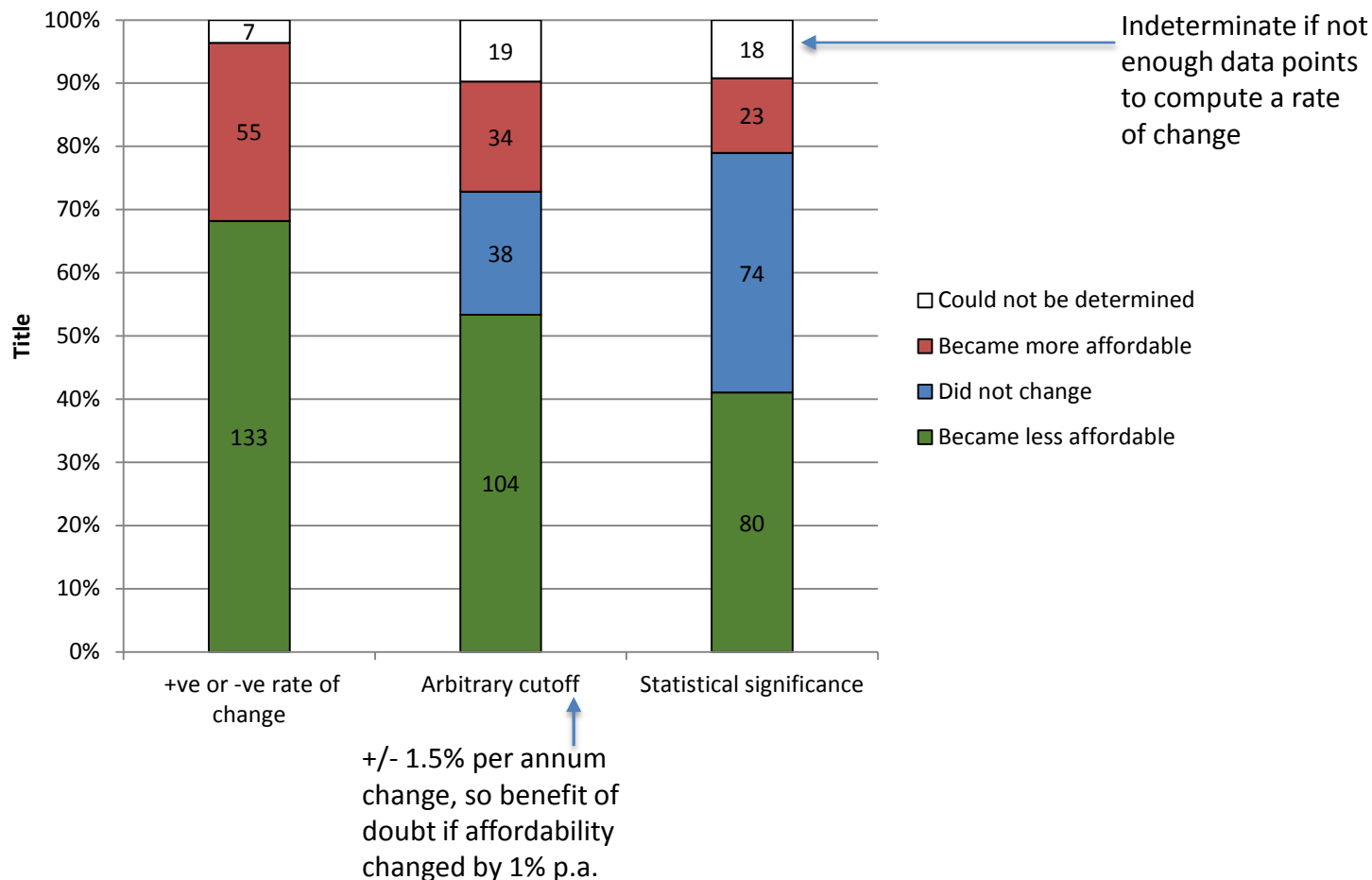
1 vs 2 vs 3: Most intuitive vs based on a simple numeric cutoff vs statistical criterion

1 vs 2 vs 3: The number of countries classified as “no change” will differ

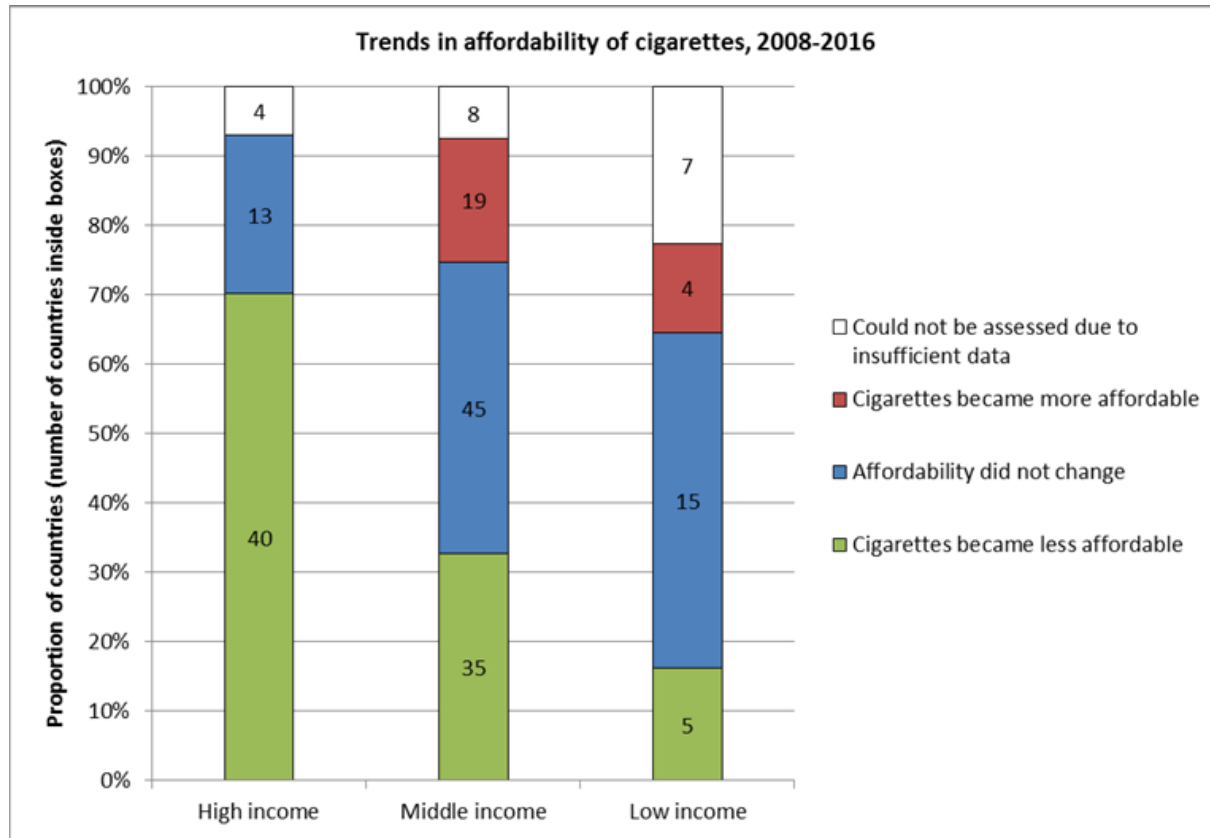


The statistical significance criterion gave more increased the set of “no change” countries

Effect of alternative cutoff criteria on classifying affordability in 195 countries



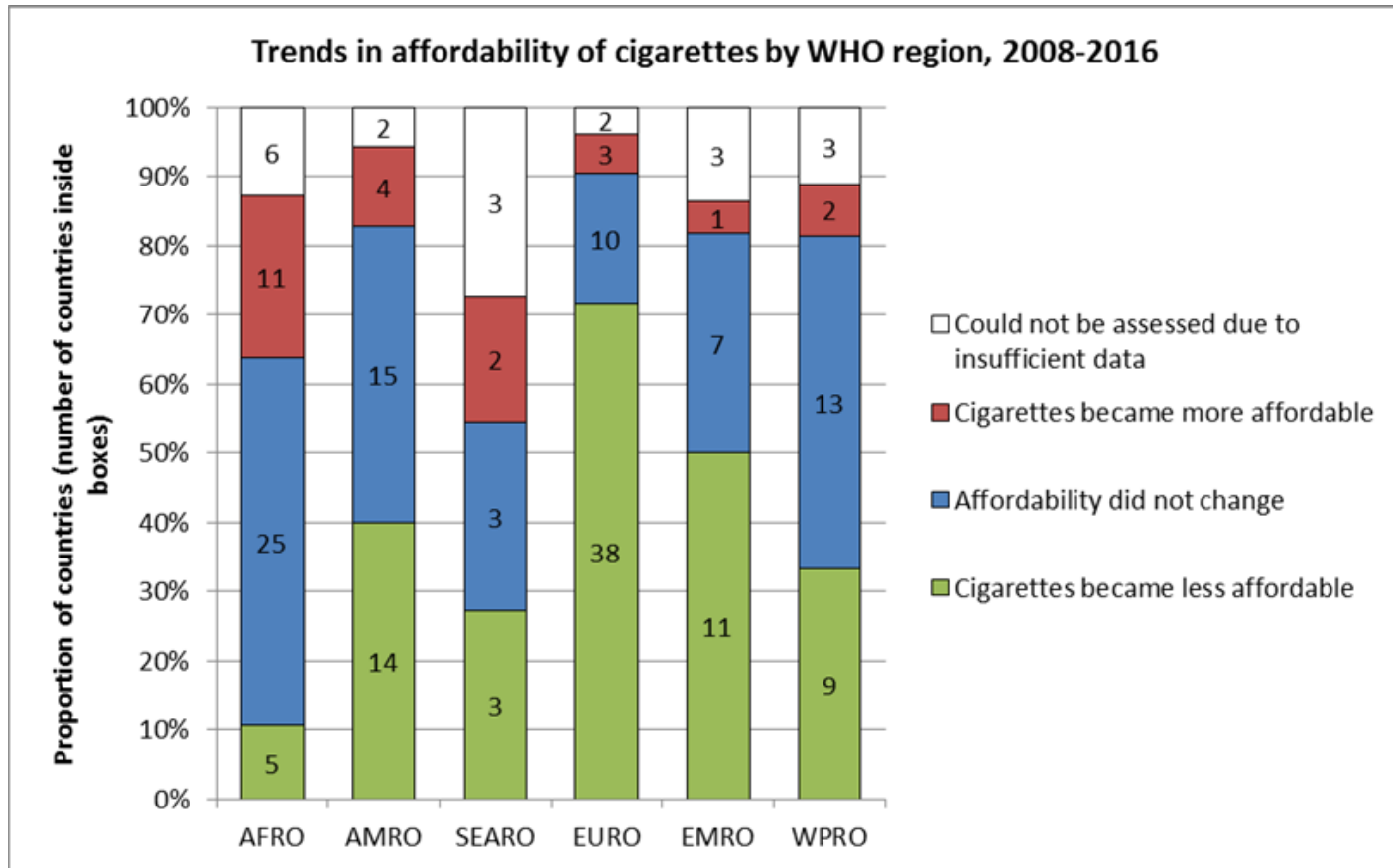
Income groups: Prices **outpaced** GDP growth in 80 countries, **fell short** in 23 countries



- Affordability reductions are more common in high income countries (**40** of 57) than in middle (**35** of 107) and low (**5** of 31)

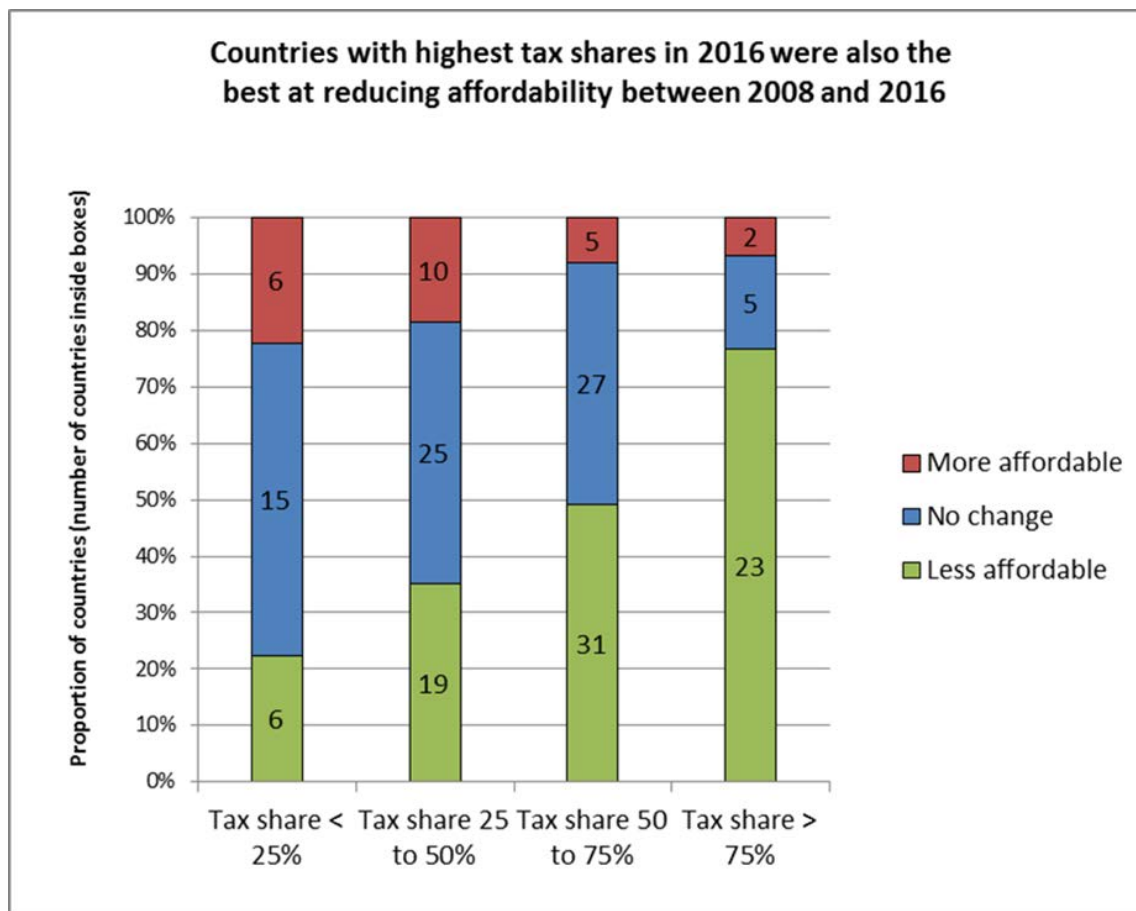


Regions: Prices **outpaced** GDP growth in 70% of EURO region member states, buy only 10% of AFRO



- Affordability reductions are most common in EURO (**38** of 53), followed by EMRO (**11** of 53), AMRO (**14** of 35), WPRO (**27** of 35), SEARO (**3** of 11), , AFRO (**5** of 47)

High total tax countries were the best at reducing cigarette affordability



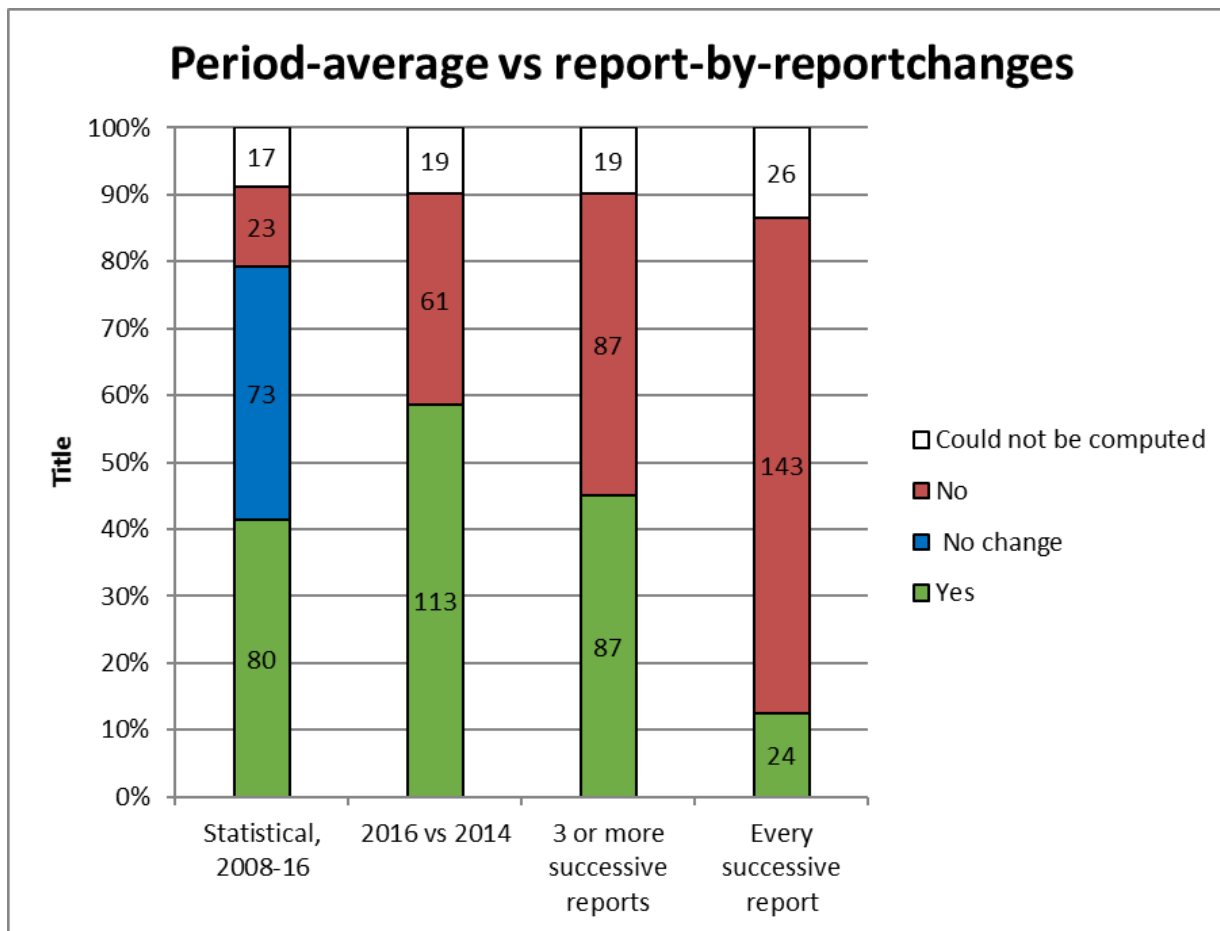
Consistency: year-on-year changes

- Retrogression happens often in the tax measure – tax as a share of price may go up or down, especially when countries have specific taxes
- Similarly, affordability does not typically reduce every year

		CIGARETTE AFFORDABILITY		YEAR-WISE COMPARISONS OF AFFORDABILITY		
		LEAST SQUARES GROWTH RATE AND STATISTICAL SIGNIFICANCE				
		TREND GROWTH RATE IN AFFORDABILITY ⁺	CIGARETTES LESS AFFORDABLE SINCE 2008 ⁺⁺⁺	CIGARETTES LESS AFFORDABLE IN 2016 THAN IN 2014	CIGARETTES LESS AFFORDABLE IN 3 OR MORE SUCCESSIVE REPORTS	CIGARETTES LESS AFFORDABLE IN EACH SUCCESSIVE REPORT
Botswana	AFRO	-0.33%	No change	Yes	No	No
Burkina Faso	AFRO	-2.42%	No change	Yes	No	No
Burundi	AFRO	2.67%	No change	No*	No	No
Cabo Verde	AFRO	-1.22%	No	No	No	No
Cameroon	AFRO	-4.12%	No	No	No	No
Central African Republic	AFRO
Chad	AFRO	4.35%	No change	Yes	No	No
Comoros	AFRO	1.56%	No change	Yes	No	No



Consistent reductions in affordability of cigarettes are rare



Acknowledgments

This work was supported with funding from Bloomberg Philanthropies' Bloomberg Initiative to Reduce Tobacco Use (bloomberg.org)

We thank Alison Commar, Kerstin Schotte, Avdyl Ramaj, Evan Blecher and Asim Khan

