LIGHTING UP THE ILLICIT MARKET:

SMOKER'S RESPONSES TO THE CIGARETTE SALES BAN IN SOUTH AFRICA

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EXECUTIVE SUMMARY

Cigarette sales have been banned since the start of South Africa's lockdown on 27 March 2020, as cigarettes are not regarded as "essential products or services". The ban has been controversial, attracting praise from public health groups and criticism from the tobacco industry and some members of the public.

Between 29 April and 11 May 2020 members of the Research Unit on the Economics of Excisable Products, based at the University of Cape Town, conducted an online survey among smokers to determine how they responded to the ban on cigarette sales during the lockdown, and to evaluate how the lockdown has impacted the market for cigarettes in South Africa. The survey was filled out by more than 16 000 respondents. From these responses, 12 204 analysable observations were derived.

About 41% of smokers had attempted to quit smoking cigarettes during the lockdown. Of those who tried to quit, 39% had successfully quit at the time they completed the survey, while 61% of those who tried to quit, were unsuccessful. Of smokers who successfully quit at the time of answering the survey, 12% intend to start smoking again after the cigarette sales ban is lifted.

Cigarette consumption among smokers who did not quit increased marginally from an average of 10 cigarettes per day in the pre-lockdown period to 11 cigarettes per day in the first two weeks of the lockdown, but decreased to 9 cigarettes per day after the lockdown extension was announced.

Around 90% of survey respondents had purchased cigarettes during the lockdown. Many smokers had been unable to purchase their pre-lockdown brand. 46% of smokers switched from a multinational company (MNC) brand to a brand produced by a local producer. The MNCs are British American Tobacco, Philip Morris, Japan Tobacco International and Imperial Tobacco. The local producers are mostly members of the Free-trade Independent Tobacco Association (FITA) and include companies like Gold Leaf Tobacco Company, Amalgamated Tobacco Company, Carnilinx and Best Tobacco Company.

The purchasing environment changed dramatically after the lockdown. Whereas 56% of smokers purchased their cigarettes from formal retailers before the lockdown, this decreased to 3% after the lockdown. The percentage of smokers who purchased from spaza shops increased from 34% to 44%, and from house shops from 4% to 18%. Sales outlets that either did not exist, or that were inconsequential before the lockdown, but that became important sources of cigarettes during the lockdown include street vendors (26% of smokers), friends and family (30%), WhatsApp groups (11%), and "essential worker" acquaintances (10%).

Further, we analysed reported cigarette prices, which were standardized to a per stick price based on the reported packaging type. We find that smokers have had to pay a substantially higher price for cigarettes during the lockdown than before. The average per stick price increased by 90% from the pre-lockdown period. We regressed the percentage change in the price of cigarettes (reported lockdown price vs. pre-lockdown price) against a variety of explanatory variables and found the following:

- The price per stick increased by an average of 4.4% each day during the 13 days that the survey was conducted. This meant that the average price of cigarettes was 53%

percentage points higher than they were in the pre-lockdown period on the last day of the survey, compared to the first day of the survey.

- The price increases differ substantially across the provinces, with the Eastern Cape, Limpopo, Mpumalanga and North-West Province experiencing lower increases in the price and the Free State and the Northern Cape experiencing higher increases in the price.
- Smokers who live in rural areas have experienced substantially higher increases in the price during lockdown than smokers that live in more populated areas (e.g. suburbs, townships and informal settlements).
- Smokers with higher household incomes have experienced substantially higher increases in the price of cigarettes during the lockdown than low-income smokers.
- Smokers who purchase their cigarettes through WhatsApp groups, other online platforms, family and friends, and essential worker acquaintances have experienced a larger increase in the cigarette price post-lockdown than smokers who purchase their cigarettes at spaza shops and the (few) formal retailers.
- Smokers who purchased cigarettes as single sticks during the lockdown experienced the largest increase in price. On the other hand, smokers who purchased cigarettes by the carton, followed by smokers who purchased cigarettes in 20-packs, experienced the smallest increase in the price per cigarette.
- Smokers who smoked local brands before the lockdown and continued smoking local brands during the lockdown, experienced a 61% greater increase in the price of cigarettes than smokers that smoked MNC brands both before and during the lockdown.

Respondents were offered an opportunity to provide "further comments" at the end of the survey. An analysis of these comments indicates that the overwhelming sentiment was one of anger. Respondents do not understand the economic or health rationale for the sales ban. While most of the respondents acknowledged that smoking is bad for their health, they felt that the sudden imposition of the sales ban, without any cessation support, caused them mental health problems because they were unable to smoke. Many respondents indicated increased anxiety, feelings of depression, being less focused, and experiences of physical withdrawal symptoms.

Our findings suggest that the ban on cigarette sales is failing in what it was supposed to do. While the original intention of the ban was to support public health, the current disadvantages of the ban may well outweigh the advantages. Smokers are buying cigarettes in large quantities, despite the lockdown, and unusual brands are becoming prevalent.

While one should not exaggerate the revenue potential of excise taxes on tobacco products, since it contributes only 1% of total government revenue, it does not make economic sense to not collect this revenue. The current sales ban is feeding an illicit market that will be increasingly difficult to eradicate when the lockdown and the COVID-19 crisis is over. It was an error to continue with the cigarette sales ban into Level 4 lockdown. The government should lift the ban on cigarette sales as soon as possible.

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1. Introduction

Following the actions of other countries and in an attempt to "flatten the curve" of COVID-19 infections, the President of South Africa declared a National State of Disaster on 15 March 2020. Under the emergency measures, the government prohibited people from gathering in groups of more than 100, encouraged people to work from home, and encouraged social distancing. The President created the National Coronavirus Command Council (NCCC), in terms of the of the Disaster Management Act. The NCCC is chaired by the President and by the Minister of Cooperative Governance and Traditional Affairs, Nkosazana Dlamini-Zuma, and consists of 20 Ministers and their Directors-General, and representatives from the security agencies in South Africa. The first meeting of the NCCC took place on 17 March 2020.

On Monday 23 March 2020 President Cyril Ramaphosa announced that the government would institute a nationwide, three-week-long lockdown starting at 00h00 on 27 March 2020. In the subsequent days various Ministers fleshed out the details of the emergency regulations. All 'non-essential' sectors of the economy were prohibited from producing and trading during this period.[i] On Wednesday 25 March 2020 the government declared that tobacco products were a non-essential product and that the sales of tobacco products were therefore prohibited during the lockdown period.[i] Government's reason for the ban stemmed from concerns around the risk of COVID-19 transmission from people sharing cigarettes/pipes, and the health repercussions of smoking in the face of the respiratory disease.[ii]

On 9 April 2020 the President announced a two-week extension to the lockdown, extending the end date from 16 April to 30 April 2020.[iii] The ban on cigarette sales remained in force during this two-week extension period.

On Thursday, 23 April 2020, President Ramaphosa announced a phased approach to ending the lockdown.[iv] The initial five-week lockdown became known as 'Level 5' – the most severe stage in which only essential services were permitted to operate. The President indicated that Level 5 lockdown would move down to Level 4 on 1 May 2020. In his televised speech to the nation, the President announced that the sale of tobacco products would be permitted under Level 4 lockdown. The President announced that the details of the new regulations would be announced by various Ministers in subsequent days.

On Friday 24 April 2020, Minister Nkosazana Dlamini-Zuma, announced that members of the public could make submissions to government regarding the transition from Level 5 to Level 4.

On Wednesday, 29 April, two days before Level 4 lockdown was set to begin, Minister Dlamini-Zuma announced that some 70 000 submissions were received across a variety of topics, 2 000 of which were against lifting the ban on tobacco products sales.[v] Citing wider consultation on the health repercussions of smoking in the face of the COVID-19 pandemic,

Minister Dlamini-Zuma announced that the sale of tobacco products would not be allowed under Level 4 lockdown.[v]

Numerous media reports claimed that Dlamini-Zuma had undermined the President on the matter of cigarette sales.[vi] However, on Monday, 4 May 2020, in his weekly online newsletter, the President defended Dlamini-Zuma's announcement of the continued prohibition on tobacco sales, noting that it was a "collective" decision taken during a meeting of the NCCC on 28 April.[vii] The Minister of Finance, Tito Mboweni, publicly announced that he opposed the further extension of the cigarette and alcohol sales ban, "but I lost the debate and, therefore, I have to toe the line".[viii]

In response to government's decision to continue the prohibition on tobacco sales, the representative body of small domestic tobacco producers, the Fair Trade Independent Tobacco Association (FITA), filed a lawsuit against the South African government in the Pretoria High Court.[ix] The case is set to appear before the Court in early June 2020. British American Tobacco South Africa (BATSA) also threatened legal action against the government[x], but on 6 May issued a statement that "we have taken the decision not to pursue legal action at this stage but, instead, to pursue further discussions with government on the formulation and application of the regulations under the Covid-19 lockdown."[xi]

On 5 May 2020, the Commissioner of the South African Revenue Services (SARS), Edward Kieswetter, announced that SARS's illicit economy unit had visited a cigarette manufacturing plant and found that three of their machine lines were actively producing cigarettes. He did not mention the name of the company. The manufacturer's explanation that they were producing for the export market does not hold water as, at that time, exports were not allowed during the lockdown.[xii]

The smoking ban has received a great deal of media attention since the start of the lockdown, and is a source of continued debate in South Africa.[xiii] There have been several media reports suggesting that the ban has given rise to illicit trade in cigarettes.[xiv] The logic is that, with their regular suppliers prohibited from selling cigarettes, smokers have been more likely to buy from underground traders. BATSA's media release of 6 May 2020 also mentions the threat of illicit trading in substantial detail.

To determine how smokers responded to the ban on cigarette sales during the lockdown, and to understand how the lockdown has impacted the market for cigarettes in South Africa, we designed and disseminated a self-administered online survey aimed at all cigarette smokers living in South Africa. The survey ran from 29 April to 11 May 2020. This report presents the results of the survey. Our objective is to explore how cigarette smokers responded to the ban and to assess the implications of their response on the market for cigarettes in South Africa.

2. Methodology

The survey questionnaire was designed by a team of researchers at the Research Unit on the Economics of Excisable Products (REEP) at the University of Cape Town. The survey was aimed at people who were regular cigarette smokers in the period immediately before the ban on cigarette sales was announced on 25 March 2020. Users of other tobacco products, like pipe tobacco, cigars, snuff and waterpipe, and users of electronic cigarettes, were not eligible to answer the questionnaire, and if any did answer, this data was excluded. Respondents had to be at least 18 years old to answer the questionnaire.

The full questionnaire is presented in Appendix A. The design of the questionnaire is as follows: Eligible respondents (i.e. people who were at least 18 years old and who had been regular smokers (at least one cigarette per day) in the week before the lockdown started) were asked whether they had considered quitting smoking after the ban on cigarette sales was announced on 25 March. Those who answered yes to this question were asked a number of questions about their quitting attempts, both before and after the lockdown.

Both smokers who did not attempt to quit, and those who had tried but failed to quit, were asked about their smoking behaviour before the lockdown (e.g. number of cigarettes smoked per day, brand choice, price paid, and place where they bought cigarettes). The subsequent module asked respondents whether they stocked up on cigarettes before the lockdown, and if they did, how many, and what brands.

This was followed by a module on smoker behaviour during the lockdown. Respondents were asked how many cigarettes they smoked on average per day during the first two weeks of the lockdown (27 March to 9 April 2020) and in the subsequent period (after the announcement of the lockdown extension on the 9 April 2020). Respondents were asked whether they were able to obtain additional cigarettes during the lockdown (for free or purchased). Respondents who indicated that they had purchased cigarettes during the lockdown were asked questions about the type of sales outlet, the packaging type, the average price paid, and the brand.

The next section asked respondents about their perceptions of the cigarette and alcohol sales ban during the lockdown, and whether they thought that COVID-19 symptoms are worse or lighter in smokers than in non-smokers.

The last section of the questionnaire asked respondents about their race, gender, year of birth, education level, income bracket, and province where they reside. Respondents were also given an opportunity to respond to the question "Any further comments?"

Ethics approval was granted by the University of Cape Town's Commerce Faculty's Ethics in Research Committee (ref. REC 2020/04/024). The survey was administered through SurveyMonkey. Because of the time constraints (working on the understanding that the cigarette sales ban would end on 30 April 2020) we did not have sufficient time to run a pilot survey. The survey was published in English and Afrikaans. In order to incentivise people to respond, ten respondents were randomly selected to receive a R500 Takealot voucher in a lucky draw.

We opened the survey to the public on 29 April 2020, the same day that Minister Dlamini-Zuma announced the extension of the cigarette sales ban. We issued a media release to 78 newspapers and 21 radio stations, and used social media, a petition site (www.change.org) and a data-free messaging server (Moya Messenger, see https://www.datafree.co/moya-messenger-app) to publicise the survey. The survey ran for 13 days, and was closed on Monday 11 May 2020, by which time we had received 16 510 completed responses.

We found that, relative to the demographics and geographical distribution of South Africa's smoking population, Whites, Indians, females, the Western Cape and Gauteng were over-sampled, and that Africans, males and the seven other provinces were under-sampled. As is standard in any survey, we weighted the sample observations to be as reflective of the smoking population as possible. The weighting was based on the interaction of three criteria: race,

gender and province. We used the National Income Dynamics Study (a nationally representative household survey of South African's population) to estimate the smoking population proportions. The details of the weighting process are provided in Appendix B. All data analysis, descriptive statistics and the regression equations are based on the weighted data.

We followed a systematic and rigorous approach to clean the data, particularly the reported prices. Due to survey software limitations, some respondents provided data in non-standard ways, e.g. writing out "forty rand" rather than indicating 40.00. In other cases, they provided a range for the prices that they paid during the lockdown, or indicated that the prices "were double". The first step of the data cleaning process considered these types of issues. The second step of the data cleaning process was to correct obviously incorrect entries (price outliers). For example, we had more than 30 respondents that reported a price of more than R300 for a pack of 10 cigarettes before the lockdown. In these cases, it was clear that respondents had intended to quote the price for a cartons of 10 packs of 20 cigarettes each, rather than for a pack of 10 cigarettes. Using our experience from previous data cleaning exercises, we created a number of rules to clean price outliers. The rules are described in detail in Appendix C.

The last question of the survey was open-ended, and asked respondents if they wished to provide any further comments. Data obtained through these comments underwent thematic analysis in *Nvivo* (version 11.2).[1] Thematic analysis is a method of identifying, analysing, organizing and describing themes found in a dataset. The rationale and methodology of the thematic analysis is explained in Appendix D.

We first present descriptive statistics of the most important findings. We then also present the regression results where we regress the percentage change in reported cigarette prices (between the pre-lockdown period and the lockdown period) on a large number of independent variables.

3. Results

3.1 Sample description

The cleaned dataset contained a total of 12 204 observations. The average age of respondents was 34 years old. The youngest respondent was 18 and the oldest, 81. The average duration of smoking for those in our sample was just over 15 years, suggesting that most smokers started in their teenage years. Table 1 shows descriptive statistics for the main demographic variables used in our analysis.

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[1] Nvivo a qualitative data analysis software programme.

Table 1: **Descriptive statistics for demographic and geographic variables**

	Weighted Proportion of sample	Frequency
Gender		
Female	20.3	2 423
Male	77.9	9 314
Prefer not to answer	1.9	226
Race group		
African	64.0	7 655
Asian/Indian	2.8	334
Coloured	17.6	2 111
White	9.4	1 125
Prefer not to answer & Other	6.2	738
Province		
Eastern Cape	9.3	1 110
Free State	5.0	599
Gauteng	31.3	3 740
KwaZulu-Natal	12.3	1 470
Limpopo	5.5	653
Mpumalanga	7.5	896
North West	5.2	616
Northern Cape	4.4	522
Western Cape	19.7	2 354
Area of residence		
City	8.8	1 052
Farm	3.3	394
Informal settlement	5.4	640
Rural	12.5	1 491
Suburb	30.2	3 607
Town	8.6	1 022
Township	31.2	3 728

Notes: The data are weighted. The weighting was performed with Wave 5 of NIDS as the reference point. For technical details on the weighting process, see Appendix B.

The sample (once weighted) consists of 78% males and 20% females (2% of respondents chose not to declare their gender). Africans represent around 64% of the weighted sample, followed by Coloureds (18%) and then Whites (9%). Most smokers live in Gauteng (31%), while the least live in the Northern Cape (4.3%). African males living in Gauteng constitute the largest share of smokers in SA (19.8% in the sample), while Coloured females residing in the North West make up the smallest proportion of the sample (less than 0.01%). In terms of location, around 60% of the sample are split evenly between townships and suburbs, which comprise 31.2% and 30.2% of all survey responses, respectively.

3.2 The impact of the lockdown on smokers' behaviour and the market for cigarettes in South Africa

3.2.1 Descriptive statistics

Roughly 41% of smokers in the total sample indicated that they had attempted to quit smoking cigarettes during the lockdown. While nearly 70% of those attempting to quit had tried quitting

before, predominantly for health reasons, around 30% of smokers were attempting to quit smoking for the first time.

Of the smokers who tried to quit, 39% had successfully quit at the time they completed the survey, while 61% were unsuccessful (see Figure 1). Thus, approximately 16% of smokers at the start of the lockdown were able to quit successfully (at least at the time of the survey). Of smokers who successfully quit at the time of answering the survey, 12% intend to start smoking again after the cigarette sales ban is lifted.

Figure 1: Percentage of smokers who successfully quit during the lockdown and intention to stay quit after the lockdown
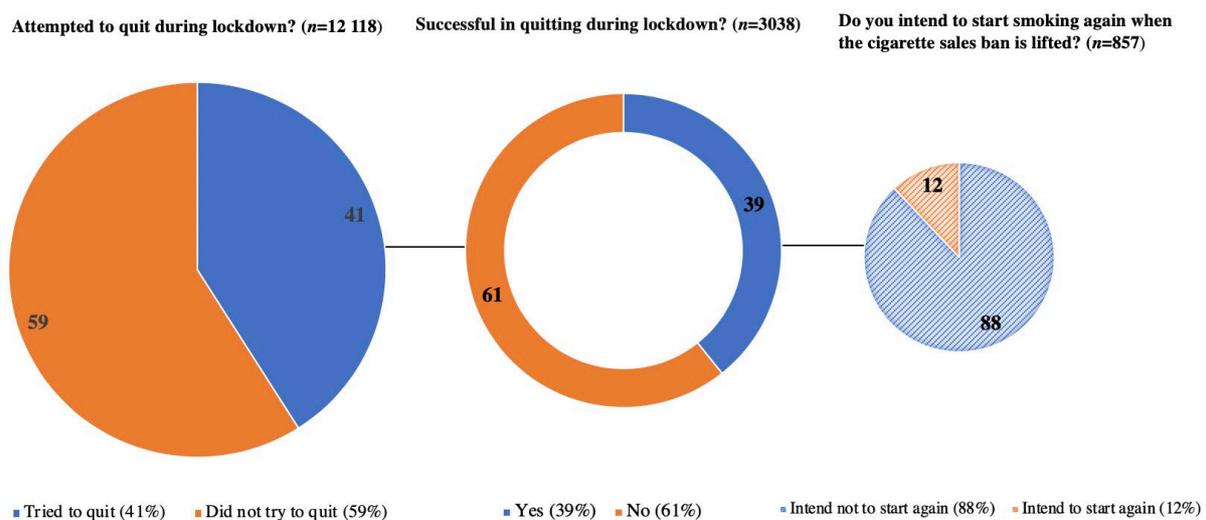
Attempted to quit during lockdown? (*n*=12 118)   Successful in quitting during lockdown? (*n*=3038)   Do you intend to start smoking again when the cigarette sales ban is lifted? (*n*=857)

■ Tried to quit (41%) ■ Did not try to quit (59%)   ■ Yes (39%) ■ No (61%)   ■ Intend not to start again (88%) ■ Intend to start again (12%)

Notes: The data are weighted. The weighting was performed with Wave 5 of NIDS as the reference point. For technical details on the weighting process, see Appendix B.

The respondents who had neither attempted to quit and nor successfully quit (about 84% of the full weighted sample) were asked whether they think that they have smoked more/less/the same number of cigarettes per day during the lockdown compared to before the lockdown. Roughly 36% of females believed that they smoked less than before, 33% believed that they smoked more and 32% believed that they smoked the same number of cigarettes as before (Table 2). For males, 54% believed that they smoked less than before, while 24% of males believed that they smoked more than they did before the lockdown. There were significant racial effects, with Africans generally indicating that they smoked fewer cigarettes than before the lockdown, while this was not the case for Coloureds, Indians and Whites.

Table 2 Perception of cigarette consumption change after the lockdown, by gender and race

Female	Less than before	More than before	The same as before
African	55	28	17
Indian	31	34	34
Coloured	34	37	29
White	24	30	46
Total (%)	36	33	32
Male			
African	59	24	17
Indian	32	30	38
Coloured	43	27	29
White	26	25	49
Total (%)	54	24	22

Notes: All percentages are rounded to the nearest integer. The data are weighted. The weighting was performed with Wave 5 of NIDS as the reference point. For technical details on the weighting process, see Appendix B.

As a follow-up question, we asked respondents how many cigarettes, on average, they had in fact smoked per day during the first two weeks of the cigarette sales ban, and how many cigarettes, on average, they had smoked per day in the subsequent period. The rationale for these two questions was to determine whether smoking behaviour changed when they realised that the sales ban period was to be extended from three weeks to five weeks, and whether they began rationing the remained of their stock-piles, if they had one.

Table 3 indicates the average number of cigarettes smoked by respondents before the lockdown, in the first two weeks of the lockdown (pre-extension) and in the subsequent weeks of the lockdown (post-extension). Prior to the lockdown, White males were the heaviest smokers (on average 20 cigarettes per day), while African females were the lightest smokers, consuming around 7 cigarettes per day. The relative position of each race-gender category remains largely unchanged across the three time periods. The results show a trend across most of the population groups; there is a slight increase in daily consumption in the first two weeks of the lockdown compared to before, however consumption then drops to below pre-lockdown levels in the post-extension lockdown period. This suggests that that most people did not stock up sufficiently for the extension and were forced to ration the remainder of their cigarettes.

Table 3. Average daily cigarette consumption in different time periods, by race and gender (standard deviations in parentheses)

	Before lockdown (*n= 9040*)	**Lockdown, pre extension** (*n= 10 088*)	**Lockdown, post extension** (*n= 10 006*)
Africans			
Males	8 (7,4)	9 (11,3)	7 (12,3)
Females	7 (5,5)	8 (8,2)	6 (7,5)
Asian/Indian			
Males	12 (8,6)	13 (11,0)	11 (8,8)
Females	10 (5,4)	12 (11,2)	10 (8,5)
Coloured			
Males	12 (8,1)	12 (10,0)	10 (10,2)
Females	11 (7,1)	13 (14,4)	10 (8,8)
White			
Males	20 (9,5)	20 (11,4)	18 (11,7)
Females	18 (8,7)	19 (10,2)	17 (10,2)
Overall	10 (8,5)	11 (11,9)	9 (11,8)

Notes: All numbers are rounded to the nearest integer, except for the standard deviations, which are rounded to one decimal place. The data are weighted. The weighting was performed with Wave 5 of NIDS as the reference point. For technical details on the weighting process, see Appendix B.

The survey also contained a number of questions on people's purchasing behaviour during the lockdown. Around 90% of survey respondents, who did not quit smoking, indicated that they have purchased cigarettes during the lockdown. Results show that regardless of race or gender, the proportion of people who purchased cigarettes during the lockdown far exceeds those that did not. However, a slightly higher proportion of males (91%) purchased cigarettes compared to females (88%).

Table 4: Percentage of people that purchased cigarettes during the lockdown, by race and gender (*n=7 545*)

Female	**Did not buy cigarettes (%)**	**Bought cigarettes (%)**
African	19	81
Indian	14	86
Coloured	12	88
White	9	91
Total	**12**	**88**
Male		
African	10	90
Indian	10	90
Coloured	8	92
White	6	94
Total	**9**	**91**

Notes: The data are weighted. The weighting was performed with Wave 5 of NIDS as the reference point. For technical details on the weighting process, see Appendix B.

To understand how the retail market for cigarettes has changed as result of the lockdown, we asked respondents to record the most common place where they purchased cigarettes prior to the start of lockdown (single response only) and during the lockdown (multiple responses were allowed). Figure 2 shows this distribution. Note that only the respondents who indicated that they were able to get cigarettes during the lockdown are included in the retail outlet distribution before the lockdown, to enable like-for-like comparison.

Figure 2: Distribution of outlets where smokers purchased cigarettes before and during the lockdown (%), (n= 7 359)
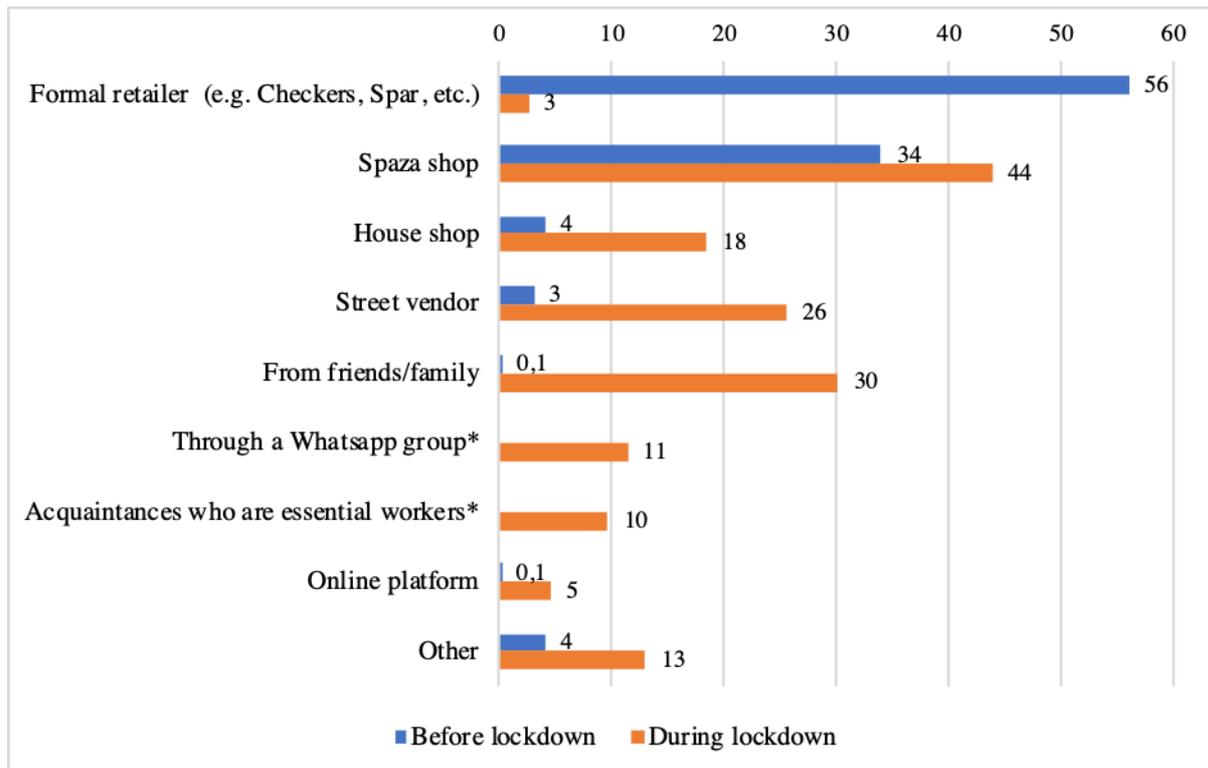
Notes: For the 'during lockdown' period, respondents could indicate more than one source of purchased cigarettes during the lockdown. Thus the shares sum to more than 100%. Labels marked with an asterisk(*) show that the option was only included in the 'during lockdown' period. The data are weighted. The weighting was performed with Wave 5 of NIDS as the reference point. For technical details on the weighting process, see Appendix B.

It is clear that the distribution network has fundamentally changed during the lockdown period. Whereas formal retail outlets were the dominant outlet for cigarettes before the lockdown (56%), they have all but disappeared during the lockdown (3%). Street vendors and house shops have become more important during the lockdown. The number of people using street vendors has risen from 3% before the lockdown to 26% during the lockdown, while the proportion of people relying on house shops has risen from 4% to 18%. While people typically did not rely on their friends and family as distributors of cigarettes before the lockdown, 30% of smokers have been buying cigarettes from friends and family during the lockdown. Even though all cigarettes purchased during the lockdown are being traded 'illegally' (by virtue of the fact that all cigarette sales were banned during the lockdown period), 26% of the 13% (i.e. 4% of the total) of people who selected the 'other' option specified that they had purchased their cigarettes through 'drug dealers', 'cigarette smugglers', or 'black market traders'.

We asked respondents in what type of packaging they typically bought their cigarettes before the lockdown and during the lockdown. For the pre-lockdown period, respondents could choose only one packaging type from a list of five: single stick, pack of 10, pack of 20, pack of 30 and carton of 200. For the lockdown period, respondents could indicate as many packaging types as they purchased, given that the normal market was so disrupted, and many smokers had to simply "make do".

In line with the proliferation of street vendors, sales of single cigarettes have more than tripled during the lockdown (Figure 3). Results also show that while 20-packs of cigarettes have maintained their popularity across both periods. The percentage of people buying cartons almost doubled between the two periods (from 13% before lockdown to 25% during lockdown).

Figure 3. Distribution of the type of packaging purchased in the pre-lockdown period and during the lockdown (*n*=11 273)
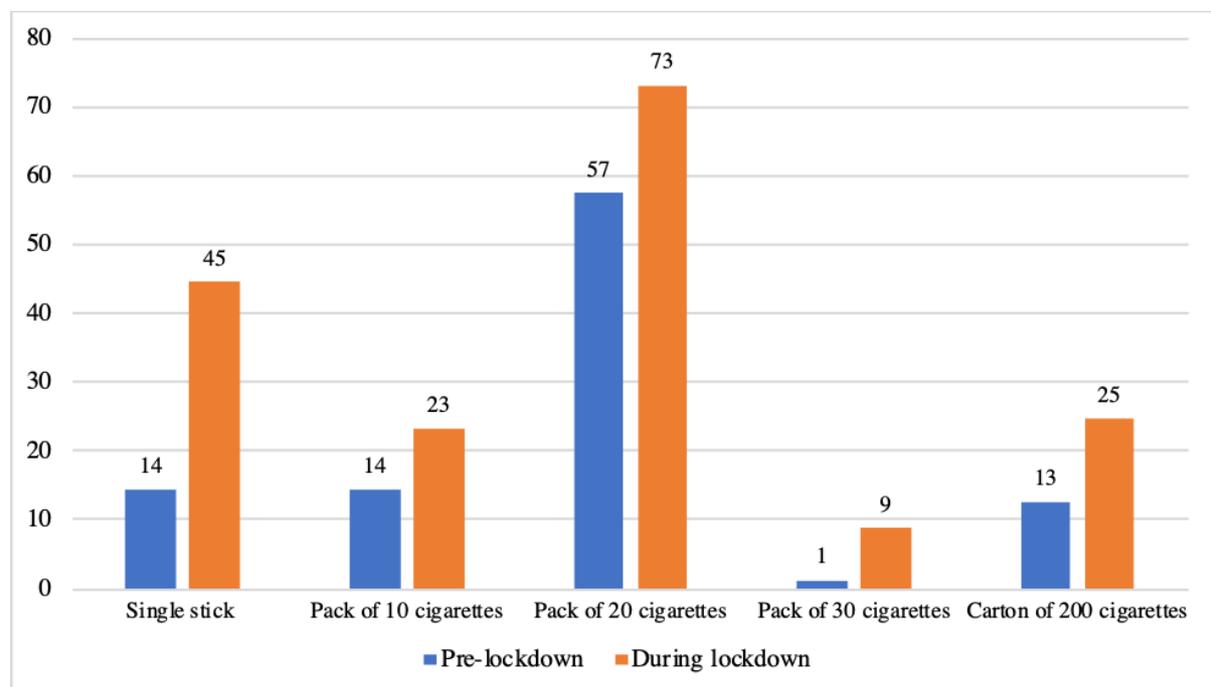
Notes: respondents could indicate more than one packaging type during the lockdown. Therefore the shares add to more than 100%. The data are weighted. The weighting was performed with Wave 5 of NIDS as the reference point. For technical details on the weighting process, see Appendix B.

The distribution of cigarette brands has also changed during the lockdown. In Figure 4 we show the change in cigarette brand for the periods before the lockdown and during the lockdown. Brands are aggregated by producer, of which we classify two types: brands produced by the multinational companies (MNCs), namely British American Tobacco, Philip Morris, Japan Tobacco International and Imperial Tobacco; and those produced by local or regional manufacturers (local).

Figure 4. Brand switching behaviour of smokers between the pre-lockdown period and during lockdown (%), (n= 6 953)
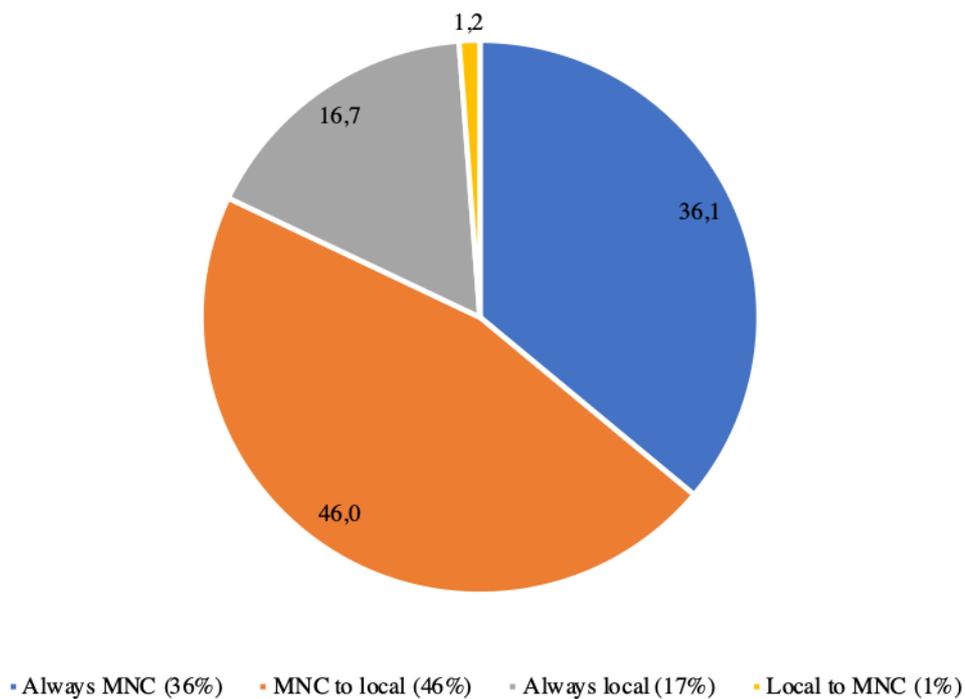
Note: The data are weighted. The weighting was performed with Wave 5 of NIDS as the reference point. For technical details on the weighting process, see Appendix B.

Results show that while 53% of smokers have stayed loyal to their pre-lockdown brand owner (36% of consumers of MNC brands and 17% of consumers of local brands), 46% have switched from a MNC brand to a local brand, while only 1.2% of smokers have switched from a local brand to a MNC brand during the lockdown. While this probably reflects the fact that many smokers have been unable to find their normal (MNC) brands, the implications for the market shares in the SA cigarette market are dramatic.

Figure 5 shows the impact of brand-switching on the distribution of MNC and local brands before and during lockdown. Results show that, before the lockdown (Panel A), 81% of smokers smoked brands produced by the MNCs, while 19% of smokers smoked brands produced by local or regional manufacturers. Following the brand switching during lockdown, however, 63% of smokers now smoke local companies' brands, while 37% of smokers smoked MNCs' brands (Panel B).

Figure 5: Distribution of MNC and local brands before and during lockdown
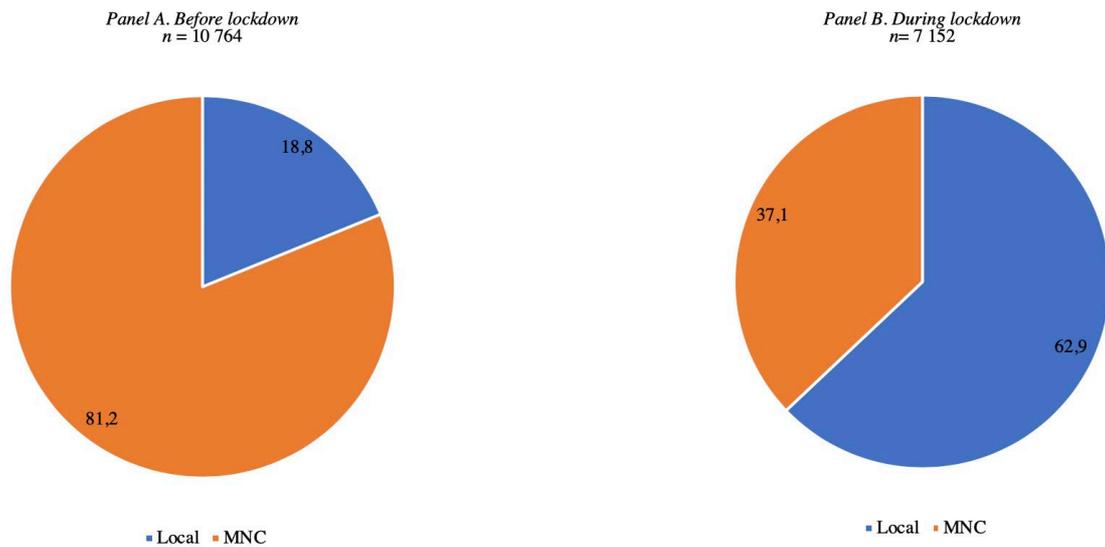
Panel A. Before lockdown
n = 10 764

18,8

81,2

■ Local ■ MNC

Panel B. During lockdown
n= 7 152

37,1

62,9

■ Local ■ MNC

Note: The data are weighted. The weighting was performed with Wave 5 of NIDS as the reference point. For technical details on the weighting process, see Appendix B.

Figure 6 and Table 5 disaggregate the same information about market shares at the producer-level and at the brand-level, respectively. Figure 6 indicates that the distribution of the top ten producers and brands has changed dramatically between the pre-lockdown period and during the lockdown.

While 60% of smokers were buying BAT brands before the lockdown began, only 24% bought BAT brands during the lockdown. Sales of BAT products have decreased markedly, to the extent that fewer smokers smoke BAT brands than Gold Leaf Tobacco products during the lockdown. Gold Leaf Tobacco has greatly increased its share of the market. Before the lockdown, approximately 12.5% of smokers smoked brands produced by Gold Leaf Tobacco. After the lockdown, 30% of smokers smoke their products. All four MNC producers (BAT, Philip Morris, Japan Tobacco International and Imperial Tobacco) have lost market share during the lockdown, while the market shares of the local producers have increased.

Table 5 shows the changes in the percentage of smokers smoking popular brands before and during the lockdown. While 21.4% of smokers purchased BAT-owned Peter Stuyvesant prior to the lockdown, only 9.7% of smokers reported buying Peter Stuyvesant during the lockdown. Half of the brands that are in the top-10 in during the lockdown did not feature at all in the top-10 brands list for the pre-lockdown period. These brands are all produced by local companies: Sharp (11.9%, produced by Gold Leaf Tobacco), Caesar (8.1%, produced by Best Tobacco Company), JFK (3.4%, produced by Carnilinx), Remington Gold (2.6%, produced by Pacific Cigarette Company) and Savanah (2.8%, produced by Gold Leaf Tobacco Company).

Figure 6 Distribution of top 10 producers before and during lockdown
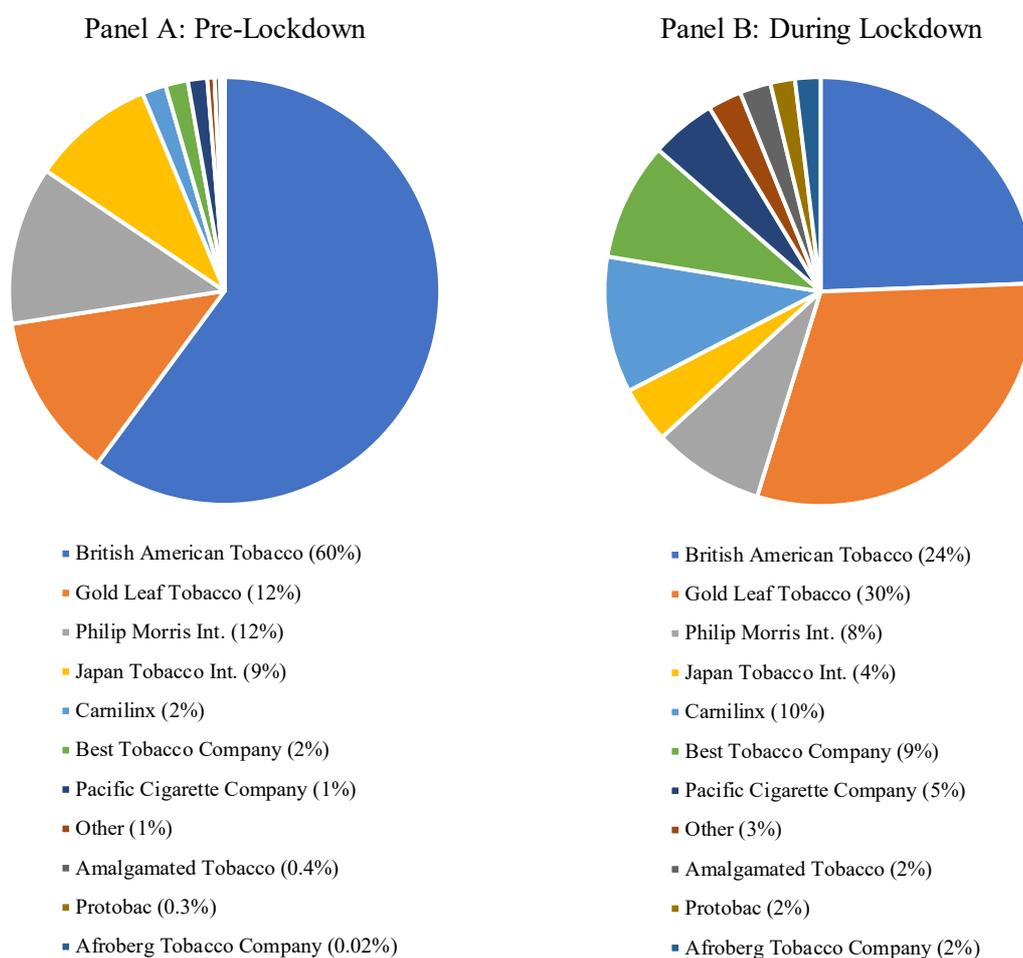
Panel A: Pre-Lockdown   Panel B: During Lockdown

■ British American Tobacco (60%)	■ British American Tobacco (24%)
■ Gold Leaf Tobacco (12%)	■ Gold Leaf Tobacco (30%)
■ Philip Morris Int. (12%)	■ Philip Morris Int. (8%)
■ Japan Tobacco Int. (9%)	■ Japan Tobacco Int. (4%)
■ Carnilinx (2%)	■ Carnilinx (10%)
■ Best Tobacco Company (2%)	■ Best Tobacco Company (9%)
■ Pacific Cigarette Company (1%)	■ Pacific Cigarette Company (5%)
■ Other (1%)	■ Other (3%)
■ Amalgamated Tobacco (0.4%)	■ Amalgamated Tobacco (2%)
■ Protobac (0.3%)	■ Protobac (2%)
■ Afroberg Tobacco Company (0.02%)	■ Afroberg Tobacco Company (2%)

Note: The data are weighted. The weighting was performed with Wave 5 of NIDS as the reference point. For technical details on the weighting process, see Appendix B.

Table 5 Top 10 brands before and during lockdown

Pre-lockdown		During lockdown	
Brand	**%**	**Brand**	**%**
Peter Stuyvesant	21.35	Sharp	11.91
Courtleigh	12.79	RG	10.16
Marlboro	9.22	Peter Stuyvesant	9.72
Pall Mall	8.51	Caesar	8.14
Camel	6.73	Marlboro	6.87
Dunhill	5.66	Courtleigh	6.38
Rothmans	4.08	JFK	3.36
RG	3.90	Camel	3.12
Chesterfield	2.72	Savannah	2.79
Benson & Hedges	2.28	Remington Gold	2.55
Other	22.73	Other	34.98

Note: The data are weighted. The weighting was performed with Wave 5 of NIDS as the reference point. For technical details on the weighting process, see Appendix B.

Figure 7[2] shows the distribution of cigarette prices before lockdown and during the lockdown. The prices for the various packaging types are standardised to a per-stick price. The average price for a single cigarette (across all packaging types) before the lockdown was R1.88 (blue line), which increased to R 3.55 per cigarette (average across all packaging types) during lockdown (red line). This is an increase in the average price of nearly 90%. The range of prices during the lockdown period is significantly wider than in the pre-lockdown period. Before the prohibition on tobacco sales, the price of a single cigarette ranged between R0.50 per stick and R 4 per stick. During lockdown, however, the price ranges from R0.50 to about R15 for a single cigarette, though obvious peaks occur at the R4 and R5 mark.

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[2] The pre-lockdown prices show the distribution of per-stick prices before lockdown. We restrict the sample in this figure to people who purchased cigarette both before and during the lockdown period. It does not include the prices that were paid by respondents that purchased cigarettes before the lockdown, but that did not purchase cigarettes during the lockdown. By excluding some of the respondents that did not purchase cigarettes during the lockdown, we can compare the two price distributions in a like-for-like way.

Figure 7: Price distribution before and during lockdown
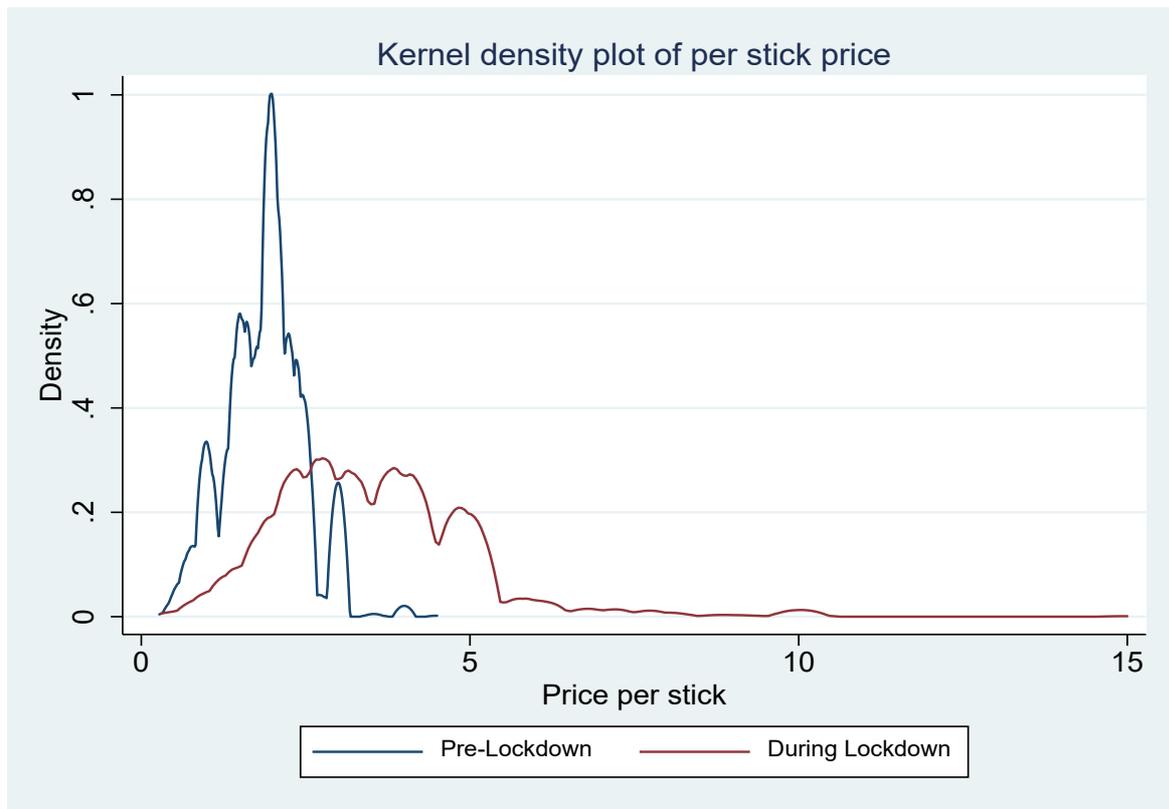
Note: The data are weighted. The weighting was performed with Wave 5 of NIDS as the reference point. For technical details on the weighting process, see Appendix B.

3.2.2 Regression analysis

The descriptive analysis clearly indicates that the ban on cigarette sales have had a significant impact on prices that smokers pay for cigarettes. In this section we investigate the covariates of the price increases using regression analysis. The dependent variable, i.e. the variable of interest, is the percentage change in the price per cigarette before lockdown, and the average price per stick (averaged across all reported packaging types) during lockdown.

Using OLS, we regress the percentage change in the price of cigarettes on the following: (1) geographic variables (province and type of area when the respondent lives), (2) household income bracket, (3) two demographic variables (race and gender), (4) age and duration of smoking, (5) type of retail outlet where smokers purchased cigarettes during the lockdown, (6) the packaging types bought during the lockdown, and (6) whether the respondent switched from MNC brands to local brands (or vice versa). We also included the day that the respondent completed the survey (29 April 2020 = day 1, 30 April 2020 = day 2, … 11 May 2020 = day 13) in the regression equation to determine whether cigarette prices were changing over the course of the survey period. The regression results are shown in Table 6.

Table 6. Regression Analysis

Dependent variable: Percentage change in per stick price, before and during lockdown	Coefficient	T-stat N
Province: Base - Western Cape (n=1597)		
Eastern Cape	-45.21***	-7.477
		211
Free State	35.99***	4.222
		126
Gauteng	5.855	1.201
		2034
KwaZulu-Natal	-1.642	-0.261
		499
Limpopo	-15.80*	-1.919
		52
Mpumalanga	-33.18***	-4.78
		106
North West	-38.66***	-4.516
		95
Northern Cape	54.48***	6.837
		61
Area Type: Base - City (n=475)		
Farm	53.30***	4.936
		162
Informal settlement	-51.85***	-5.381
		56
Rural	10.45	1.371
		179
Suburb	-11.92**	-2.037
		3050
Town	1.324	0.181
		491
Township	-32.99***	-5.154
		368
Household income: Base - R0-R400 (n=131)		
R401-R800	-20.73*	-1.767
		35
R801–R1 600	22.15***	2.652
		98
R1 601–R3 200	24.97***	3.445
		188
R3 201–R6 400	35.12***	5.447
		376
R6 401–R12 800	28.98***	4.269
		589
R12 801 – R25 600	33.27***	4.794
		1171
R25 601-R51 200	31.34***	4.288

			1282
R51 201–R10 2400	40.22***	4.641	665
R102 401–R204 800	49.17***	3.114	145
R204 801 or more	74.01***	5.363	101
Population group: Base - African (n=606)			
Asian/Indian	-7.371	-0.791	260
Coloured	0.985	0.188	858
White	-23.04***	-3.916	3057
Gender: Base - Female (n=2322)			
Male	-11.65***	-2.882	2459
Age	-1.276***	-3.323	4781
Smoking duration (in years)	1.093***	2.918	4781
Outlet post-lockdown			
Street vendor	-3.828	-1.159	4781
Spaza shop	-11.67***	-3.668	4781
House shop	0.166	0.0455	4781
Formal retail outlet	-22.69**	-2.203	4781
Whatsapp	14.90***	2.739	4781
Online	60.83***	5.794	4781
Acquaintance (essential service worker)	15.46***	3.036	4781
Family or friends	6.056*	1.686	4781
Other	10.17*	1.941	4781
Packaging type post-lockdown			
Single stick	43.67***	10.8	4781
10 pack	13.56***	3.254	4781
20 pack	-7.526**	-2.04	4781
30 pack	17.69***	2.765	

		4781
Carton of 200 cigarettes	-16.30***	-3.803
		4781
Brand switching between pre- and post-lockdown: Base - Always MNC (n=1768)		
MNC to local	-4.965	-1.449
		2328
Always local	60.38***	12.35
		638
Local to MNC	24.84*	1.806
		47
Day of survey	4.444***	5.641
		4781
Constant	83.71***	6.106
Observations	4,781	
R-squared	0.199	

Notes: Significance stars indicate *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are applied. The data are weighted. The weighting was performed with Wave 5 of NIDS as the reference point. For technical details on the weighting process, see Appendix B.

We discuss the coefficients as they appear chronologically in Table 6.

There are substantial differences in the price increase between provinces. Using the Western Cape as the base category, we find that some provinces (notably the Free State and the Northern Cape) have experienced significantly higher increases in cigarette prices than other provinces. On the other hand, the Eastern Cape, Mpumalanga, North-West Province and, to a lesser extent, Limpopo, have experienced a substantially lower increase in the price of cigarettes, compared to the Western Cape. The price increases in Gauteng and KwaZulu-Natal were similar to that of the Western Cape.

The area where people live also has a significant impact on the cigarette price increase that they experienced during the lockdown. Respondents living on farms and rural areas (although not significant for the latter) experienced substantially higher price increases than people living in more densely populated areas. Cigarette prices increased by 33% less in townships than in the cities, the base category. In informal settlements, the price increase was about 53% less than in the base category. These quite substantial differences in the price increase between rural and more urban areas suggest that competitive pressure in urban areas is tempering the price increases in such areas. The more remote, rural areas do not have these market disciplines and the evidence indicates that cigarette traders in these areas are able to extract higher prices.

There is very strong evidence that higher-income respondents have experienced a much greater increase in the price of cigarettes than low-income respondents. The base category in the regression are smokers with a monthly income of R400 or less. With the exception of people earning between R400 and R800, the evidence shows that, as the level of income is increasing, the cigarette price increases nearly monotonically. For example, respondents who declare incomes of between R6 401 and R12 800 per month, experienced a 29% greater increase in the cigarette prices than the poorest group, while people at the very top of the income distribution experienced an increase of 74% more than the very poorest group. This is in line with basic

economic intuition, as people with greater incomes have a greater ability to absorb greater price increases.

Regarding the population groups, the cigarette price increase for Whites is 23% lower than for Africans (the base category), holding other factors constant. There are no differential racial effects on Coloureds and Asians/Indians. Also, males experienced slightly lower (about 12%) increases in the price of cigarettes.

The coefficient on age is -1.3, which suggest that older smokers have experienced a somewhat smaller increase in the price than younger smokers. The number of years that a respondent has smoked is used as a measure of addictiveness. One would expect more addictive people to be more desperate to purchase cigarettes and thus more willing to pay a higher price than a less addicted person. The coefficient on "years of smoking" is 1.1 and statistically significant, indicating that for every additional year of smoking, smokers pay 1.1% more than their fellow smokers who have smoked for a shorter period. However, this coefficient is substantially affected by the person's age (where the coefficient is -1.3). Age and smoking duration are strongly collinear, as most people start smoking at similar ages (15-21). Given that the two variables are in opposite directions and of a similar magnitude, the net effect of age and smoking duration is very small.

The outlet where smokers bought cigarettes during the lockdown period has a substantial impact on the magnitude of the increase in the prices paid. Since respondents could fill out multiple options, the dummy variable trap is not applicable, and we therefore do not have a base category. Each category can be interpreted by itself, without a reference to a base category. Smokers that bought their cigarettes at spaza shops, have experienced a 12% lower price increase. Similarly, smokers who purchased their cigarettes through the (small number of) formal retailers experienced a 23% lower price increase. On the other hand, smokers who purchased their cigarettes through a Whatsapp group or other online platform have experienced a substantially (and significantly) higher increase in the prices of cigarettes (by 15% and 61% respectively). Smokers who bought their cigarettes through essential worker acquaintances or family and friends also experienced a higher increase of 16% and 6% respectively.

The packaging type in which cigarettes were purchased also makes a difference to the price increase reported by smokers during the lockdown. Like for the retail outlet, respondents could indicate multiple packaging types, and as such there is no concern for the dummy variable trap and there is no base category. Unsurprisingly, single stick sales experienced the highest increase in price, with a 44% greater increase in the price that the average of the other categories. Cartons experienced the smallest increase in prices, with a 16% lower increase. Again, this is hardly surprising, as people who can afford to purchase cigarettes in bulk, are able to negotiate a relatively better price. Packs of 20 also experienced a somewhat (7%) lower increase in the price, whereas the less common 10-packs and 30-packs experienced a substantially higher (by 14% and 18% respectively) price increase.

Many smokers changed cigarette brands during the lockdown period, with most shifting from MNC brands to local brands. The base category in this case are smokers who smoked a MNC brand before the lockdown and who continued smoking a MNC brand during the lockdown. Smokers who switched from MNC brands to local brands experienced a slightly lower increase in the prices that they paid (of 5%) but the coefficient was not statistically significant. The sign of the coefficient is correct, as one would expect that smokers who "downgrade" to local brands would pay a relatively lower price, than had they continued smoking MNC cigarettes. Smokers

who smoked local brands pre-lockdown and continued smoking local cigarettes post-lockdown, experienced a 61% higher price than smokers who smoked MNC brands before and during the lockdown. This does not imply that the absolute prices of local brands are higher during the lockdown period, but rather that the percentage increase in the price of local cigarettes is much higher than that of the MNC brands.

A very small number of smokers (47 in the regression sample) indicated that they switched from local cigarettes pre-lockdown to MNC cigarettes during the lockdown. The coefficient of 22.3 looks rather low. One would have expected it to have been higher than 61 (the coefficient for local – local brands), but this anomaly could be attributed to the very small number of observations that drive this result.

The survey was launched on Thursday 29 April 2020, and ran for 13 days. Based on comments from respondents that the price of cigarettes "was increasing daily" we tested for this by including a linear time variable in the equation, which took on the value 1 if the respondent filled out the questionnaire on the first day, 2 if he/she filled out the questionnaire on the second day, and so forth.

The coefficient on the "day" variable is 4.4 and is highly significant. This means that, during the 13 days that the survey was in-field, the reported price paid by responses increased by an average of 4.4% per day. Stated differently, the average price increases that were reported on the last day of the survey were 53 percentage points higher than the pre-lockdown prices, in comparison to the prices reported on the first day of the survey. This suggests that cigarettes experienced hyper-inflation in the first weeks of May 2020.

3.3 Qualitative analysis of survey comments

We received 5 831 individual comments on our questionnaire. African males had the most responses (64 % of all responses), followed by Coloured males (8%) and Coloured females (7%) (Figure 7).

Figure 8 Survey respondents who responded to "*any further comments?*", by race and gender
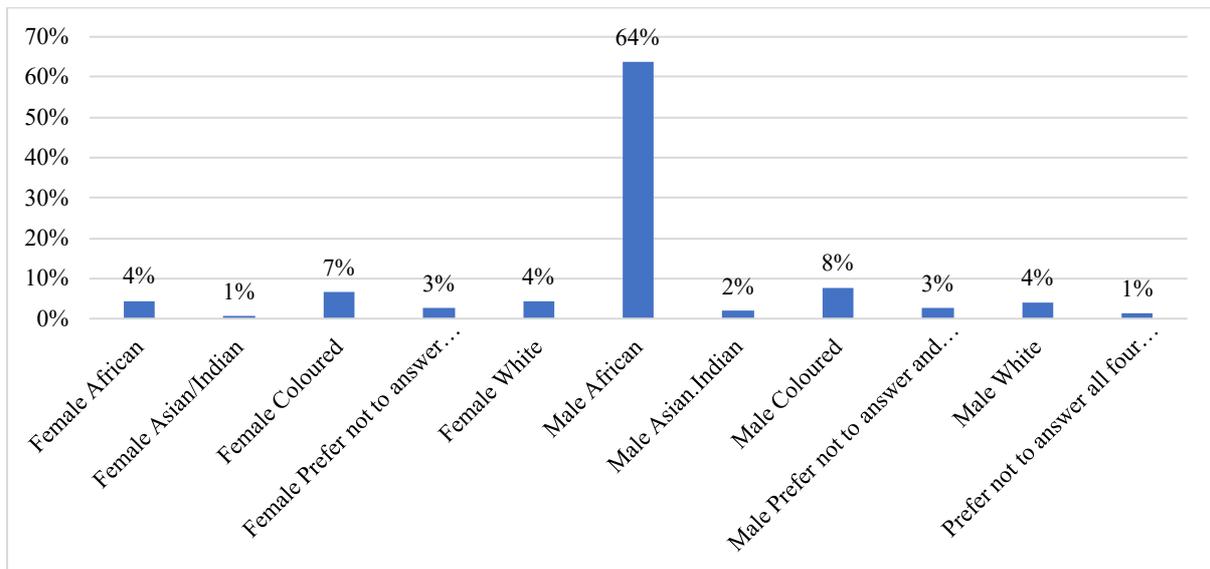
Notes: The data are weighted. The weighting was performed with Wave 5 of NIDS as the reference point. For technical details on the weighting process, see Appendix B.

From the thematic analysis, we found two main themes and seven sub-themes, which are summarised in Figure 8. Because some respondents expressed more than one theme in their comment, the number of observations across all themes (6 833) exceeds the total number of comments received (5 902).

Figure 9 Themes created from respondents' further comments (*n*= 6 833)
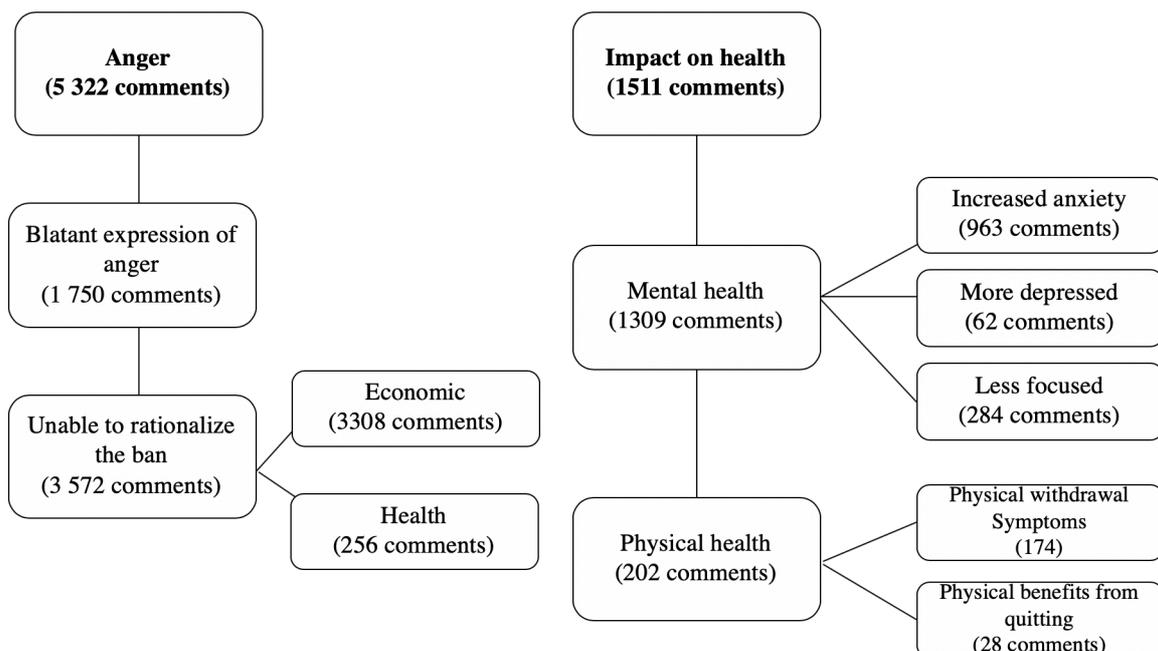
The vast majority of comments (77%) fell under the theme of 'anger'. Thirty-three per cent of respondents in this theme expressed their anger outright. The sentiment expressed in the this sub-theme can be summarised by the following responses:

"I am frustrated, angry, short tempered and have to smoke whatever I can get, the latest Ossum, what the hell…"

"I feel angry, frustrated and irritated most of the time. I did not get the opportunity to stock up as the decision to ban cigarettes were 3 days before my pay day. I didn't get a choice of my own to stop or continue smoking. My rights were taken away. A decision was made for me…"

Others (67%) expressed their anger by calling the rationale of the ban into question, most commonly on economic or health grounds. Seven per cent of respondent's in this category reject government's assertion of the link between the coronavirus and smoking. Some respondents even claimed that government is putting people at a greater risk by forcing them into a situation where they need to share cigarettes. The vast majority of respondents in this category (93%), however, were those who expressed frustration about the perceived economic illogicality of the ban. As one respondent remarked:

"The continuation of the ban is illogical - everyone is still smoking- just doing it illegally and at great cost while the government loses tax income and criminals make a fortune."

A further 22% of all comments to this section pertained to the health impact of the cigarette sales ban. For most, this pertained to a deterioration in their mental state. Of those who complained of the cigarette sales ban's impact on mental health, 74% commented that they have experienced increased anxiety, 4% report increases in the severity and/or duration of depressive episodes, 22% experienced a decrease in their ability to concentrate. Black males were most the significantly affected by perceptions of deteriorating mental health (31%), followed by Coloured and White females, both at 14% (Figure 5). Comments about changes in physical health were less common (13%), and largely pertained to expressions of discontent around their physical withdrawal symptoms and discomfort.

Figure 10 Further comments that mention negative mental health implications of the cigarette sales ban, by race and gender
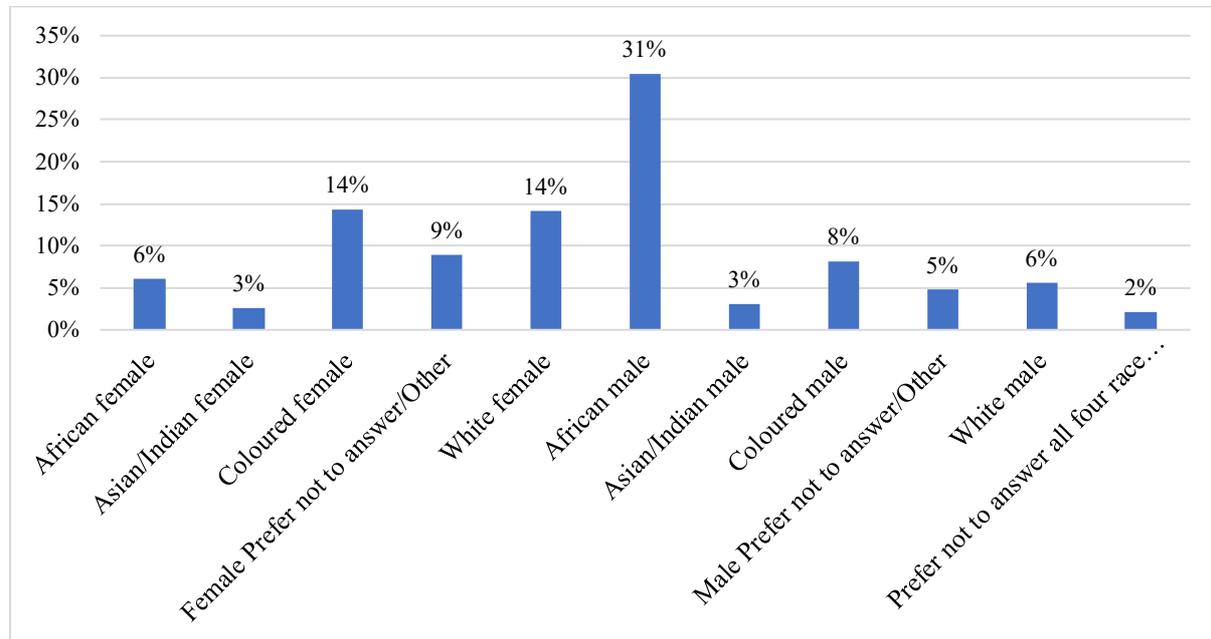
Notes: The data are weighted. The weighting was performed with Wave 5 of NIDS as the reference point. For technical details on the weighting process, see Appendix B.

A minority of respondents (13% of the 13% who commented about physical health) indicated that they had experienced positive physical benefits since the start of the tobacco ban. For example, one respondent remarked that she was *"less asthmatic than before the lockdown"*, and another commented that "*the ban on smoking was not nice. But it helped me quit and I feel better and healthier. Smoker's cough is gone.."* These respondents, as well as 80% of the other respondents who claimed that they experienced an improvement in their physical health, all had successful quit attempts during the lockdown.

4. Discussion

The Research Unit on the Economics of Excisable Products (REEP) has published a number of papers in recent years in which we analyse the illicit market for cigarettes in South Africa.[xv,xvi,xvii] Before 2010 the illicit market in South Africa was modest, despite the tobacco industry's claims that the illicit market was out of control.[xv, xviii, xix] Since 2010 the illicit market has grown rapidly, and between 2014 and 2017 it reached epidemic proportions. Estimates from a variety of sources suggest that at least 30% of cigarettes sold in 2017 were illicit (in that they have not paid the full amount of taxes). The leadership crisis at the South African Revenue Services (SARS) and the corresponding shutdown of specialized investigative units within the agency certainly contributed to the dramatic increase in illicit trade after 2014.[xx, xxi]

Revenue data published in the Budget Review in February 2020 indicate that the tide may have turned. According to the so-called "revised estimate" of revenues for the 2019/2020 fiscal year, the number of legal cigarettes increased by 11% in 2019/2020.[xxii] This is not attributable to an increase in smoking prevalence, but rather a probable decrease in the illicit trade.

The prohibition on cigarette sales instituted as part of South Africa's coronavirus response is likely to undo this progress. The ban on cigarette sales was argued on health, rather than economic, grounds. Preliminary results from the medical literature is indicating that smokers do indeed have a higher probability of being hospitalised and suffering worse symptoms of the COVID-19 virus than non-smokers.[xxiii] As economists, we are not able to express an opinion on the medical literature.

We have approached this study from an economic perspective. Our results show that the ban on tobacco sales has fuelled the illicit market for cigarettes. By exploiting the ban and the desperation of smokers, illicit traders have gained a foothold in a market where they previously could not compete on a quality basis. Accompanying this is the entrenchment of their distribution networks and payment channels. It is unlikely that these networks will dissipate after the lockdown is over. In fact, because prices have increased so much over the lockdown, we anticipate that when the ban is lifted, a price war will ensue between the between various cigarette producers. This will place downward pressure on all cigarette prices in the local market and ultimately lead to increased cigarette consumption in South Africa.

Our analysis of the change in the price of cigarettes suggests that cigarette prices have sky-rocketed during the 13 days in which the survey was conducted. Our analysis shows that cigarette prices were increasing by 4.4% *per day*. That suggests hyper-inflation in the cigarette market. The cigarette market is in turmoil. Smokers are desperate and are willing to pay exorbitant prices for cigarettes.

The HSRC recently released a media statement in which they report on a survey that they conducted between 9 and 16 April 2020. In their report they indicate only 12% of smokers report that they have purchased cigarettes. One could easily ask: why are our results so different from those of the HSRC? We believe that the differences in the results can be explained in terms of differences in the time when the surveys were being conducted. The HSRC report was conducted between 14 and 21 days after the lockdown was instituted. Our results indicate that 90% of smokers had stocked up on cigarettes before the start of the lockdown. The initial expectation was that the ban on the sales of cigarettes would last for three weeks, so presumably most smokers would have enough stock to last them through that period.

When the President announced an extension to the lockdown on 9 April 2020, many smokers probably started getting worried that their stocks may not last. We see that they reduced their average consumption from eleven to nine cigarettes per day. While our survey did not specifically ask smokers at what stage they started looking for cigarettes to buy, it stands to reason that increasingly anxious smokers were wanting to replenish their stocks in weeks three to five of the lockdown. When the sales ban was not relaxed at the end of the fifth week, most smokers had presumably depleted their stocks, and many were becoming desperate.

Our survey started on the second-last day of Level 5 lockdown and continued for another eleven days into the Level 4 lockdown period. By this stage, most smokers would have depleted their stocks. Also, the announcement by the President on 23 April 2020 that the ban on cigarette sales would be lifted when Level 4 lockdown would be introduced on 1 May 2020, followed by the subsequent reversal, would have been very disappointing for many smokers. The anger displayed in the "comments" section of the questionnaire is testament to this disappointment and frustration.

We note several weaknesses and caveats to our analysis. First, our results may not fully capture the percentage of smokers who have quit. We advertised the survey to people who were regular smokers in the week before the lockdown. People who may have quit in the first four weeks of the lockdown may not have filled out the questionnaire, because they felt that they were no longer smokers and that the questionnaire was not relevant to them. At the same time, some people who were successful quitters at the time of the study may relapse in coming weeks and months, which would make them smokers again. These two forces work against each other, and there is no way of knowing which effect dominates.

In addition, our sample size has been reduced as a result of data cleaning and the removal of price reporting errors. To the extent that we may have dropped more observations of a certain type of smoker (for example smokers who purchase single cigarettes) than any other type (for example those who purchase cartons), our sample will be biased. There may also be measurement error in so far as individuals did answer truthfully about whether they were able to purchase cigarettes, for fear of being caught, or the number of cigarettes they smoke, because there may be stigmas associated with smoking, especially for specific demographic and cultural groups.[xxiv,xxv,xxvi]

Conclusion

Our findings suggest that the ban on cigarette sales is failing in what it was intended to do. While the original intention of the ban was to support public health, the reality now is that the disadvantages of the ban outweigh the advantages. People are buying cigarettes in large quantities, despite the lockdown.

While one should not exaggerate the revenue potential of excise taxes on tobacco products, since it contributes only 1% of total government revenue, it does not make economic sense to *not* collect this revenue. The current sales ban is feeding an illicit market that will be increasingly difficult to eradicate, even when the lockdown and the COVID-19 crisis is over. It was an error to continue with the cigarette sales ban into Level 4 lockdown. The government should lift the ban on cigarette sales as soon as possible.

APPENDIX A

Dear respondent,

Thank you for taking the time to answer this survey. As a result of the national lockdown, cigarette sales are prohibited.

This survey is targeted at regular and recent smokers. We would like to hear from you. We want to understand how you have responded to the unavailability of cigarettes in standard retail outlets.

This academic survey is being conducted by researchers at the University of Cape Town. We are independent of any government institution, such as the SA Revenue Services or the SA Police Service. The information we collect from you will be anonymous, and will not be used to trace you in any way. The survey is voluntary and you can stop at any point during the survey. It will take between 5 and 10 minutes to complete. This survey has been approved by the Ethics in Research Committee of the Commerce Faculty at the University of Cape Town.

By completing this survey, you have the opportunity to be entered into a draw to win one of ten R500 Takealot vouchers. The draw will take place on Friday the 15th of May. If you have any questions about the survey, please let us know. The Principal Investigator is Professor Corné van Walbeek. He can be contacted at cornelis.vanwalbeek@uct.ac.za.

UCT Survey of Smokers in Lockdown

1. Are you 18 or older?
- ○ Yes
- ○ No

UCT Survey of Smokers in Lockdown

2. Were you a regular cigarette smoker (at least 1 cigarette per day) in the week before the lockdown started (19-26 March)?
- ○ Yes
- ○ No

UCT Survey of Smokers in Lockdown

3. Did you attempt to quit smoking after the sale on cigarettes was banned due to lockdown (26 March)?
- ○ Yes
- ○ No

UCT Survey of Smokers in Lockdown

4. Had you ever tried quitting smoking before the ban on cigarette sales (lockdown)?
- ○ Yes
- ○ No

UCT Survey of Smokers in Lockdown

5. For your previous quit attempts (before lockdown), what was your main reason for trying to quit?

○ Health concerns

○ Requests/pressure from family and friends

○ I did not want to be addicted to cigarettes

○ I cannot afford cigarettes/cigarettes have become too expensive

○ Other (please specify)

UCT Survey of Smokers in Lockdown

6. Have you successfully quit smoking over lockdown?

○ Yes

○ No

UCT Survey of Smokers in Lockdown

7. Do you intend to start smoking again after the lockdown is over?

○ Yes

○ No

UCT Survey of Smokers in Lockdown

For this section, answer all questions in relation to your usual smoking behaviour before the lockdown/ban on the sale of cigarettes.

8. How many cigarettes did you typically smoke per day?

9. In what quantities/packaging did you usually buy cigarettes?

○ Single stick

○ Pack of 10 cigarettes

○ Pack of 20 cigarettes

○ Pack of 30 cigarettes

○ Carton of 200 cigarettes

(Continued) For this section, answer all questions in relation to your usual smoking behaviour before the lockdown/ban on the sale of cigarettes.

10. How much did you typically pay for one {{ Q9 }} (in Rands and cents)?

11. Which brand of cigarettes did you usually buy?

12. Where did you usually buy cigarettes?
- ○ Formal retailer (e.g Checkers, Spar, etc.)
- ○ Spaza shop
- ○ House shop
- ○ Street vendor
- ○ Online platform
- ○ From friends/family
- ○ Other (please specify)

---

13. How many singles, packs and cartons of cigarettes did you buy in preparation for the lockdown?

Single sticks

Packs of 10 cigarettes

Packs of 20 cigarettes

Packs of 30 cigarettes

Cartons of 200 cigarettes

14. Which brand of cigarettes did you stock up on?

15. If you did not buy your usual/preferred cigarette brand, what was the reason for this?
- ☐ I bought a cheaper brand so I could buy more cigarettes
- ☐ I could not find my usual brand
- ☐ I bought my usual/preferred brand
- ☐ I did not stock up
- ☐ Other (please specify)

---

16. Do you think you have smoked more/less/the same number of cigarettes per day during the lockdown compared to before the lockdown?
- ○ More than before lockdown
- ○ Less than before lockdown
- ○ The same as before lockdown
- ○ Don't know

17. How many cigarettes did you smoke on average per day during the first two weeks of the lockdown (before the extension was announced on 9 April)?

18. Since the lockdown **extension** was announced (9 April), how many cigarettes have you smoked per day on average?

19. Have you obtained any additional cigarettes during lockdown?
- ○ Yes
- ○ No

---

20. During lockdown, have you been given cigarettes as a gift from family or friends?
- ○ Yes
- ○ No

21. During lockdown, have you purchased cigarettes?
- ○ Yes
- ○ No

22. During lockdown, where have you purchased your cigarettes? [select as many as apply]

☐ Street vendor

☐ Spaza shop

☐ House shop

☐ Formal retailer (e.g. Checkers, Spar, etc.)

☐ Through a WhatsApp group

☐ Other online platform

☐ Acquaintances who are essential workers

☐ From friends/family

☐ Other (please specify)

[   ]

23. During lockdown, what price did you pay on average per item, for the following packaging types? [answer for as many as apply]

Single stick   [   ]

Pack of 10 cigarettes   [   ]

Pack of 20 cigarettes   [   ]

Pack of 30 cigarettes   [   ]

Carton of 200 cigarettes [   ]

24. Which brand of cigarettes have you bought most often during lockdown?

[▲▼]

[   ]

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25. Do you agree with the policy to ban the sale of tobacco products during lockdown?

○ Yes

○ No

○ Don't know

26. Do you agree with the policy to ban the sale of alcohol during lockdown?

○ Yes

○ No

○ Don't know

27. Do you believe that COVID-19 symptoms are more/less/equally as severe for smokers compared to a non-smokers?

○ More severe for smokers

○ Less severe for smokers

○ As severe for smokers as non-smokers

○ Don't know

---

28. What is your gender?

○ Male

○ Female

○ Prefer not to answer

29. What year were you born?

[   ]

30. How old were you when you started smoking cigarettes regularly?

[   ]

---

31. What population group do you belong to?

○ African

○ Coloured

○ Asian/Indian

○ White

○ Prefer not to answer

○ Other (please specify)

[   ]

32. What is the highest level of education that you have completed?

○ No formal schooling

○ Some primary school completed (Grade 7 not completed)

○ Completed primary school (Grade 7 completed)

○ Some secondary school completed (Grade 12 not completed)

○ Completed secondary school (Grade 12)

○ Completed a tertiary qualification

○ Post-graduate degree completed

○ Don't know

○ Prefer not to answer

33. How many people, including children, live in your household?

34. What was your household's monthly after-tax total income (before the lockdown)? This includes all sources of income, like social grants, UIF, etc.

○ No income
○ R1 – R400
○ R401 – R800
○ R801 – R1 600
○ R1 601 – R3 200
○ R3 201 – R6 400
○ R6 401 – R12 800
○ R12 801 – R25 600
○ R25 601 - R51 200
○ R51 201 – R102 400
○ R102 401 – R204 800
○ R204 801 or more
○ Prefer not to answer
○ Don't know

35. In which province do you live?
○ Eastern Cape
○ Free State
○ Gauteng
○ KwaZulu-Natal
○ Limpopo
○ Mpumalanga
○ Northern Cape
○ North-West Province
○ Western Cape

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36. Which of the following best describes the area where you live?
○ Farm
○ Informal settlement
○ City
○ Rural
○ Suburb
○ Town
○ Township

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37. Any further comments?

20

Thank you for participating in this survey. If you would like to be included in the draw to win one of ten R500 Takealot vouchers, please fill in your cell phone number or email. We will not use your contact information for any other purpose. The draw will take place on Friday the 15th of May.

38. Phone number

39. Email address

21

34

APPENDIX B

Weighting of the sample data

In a perfect world, respondents to the survey are a perfectly representative sample of the population that one wishes to survey. That means that each respondent carries an equal weight in the analysis. However, in practice, some demographic groups are over-represented, while others are under-represented in the sample. This is particularly likely in an online survey, where the organisers of the survey do not have control over who will complete the questionnaire, and the questionnaire is likely to be completed by more affluent and connected people.

In order to address this, we retrospectively weight the data. We give a higher weight to demographic groups that are under-represented in the sample and a lower weight to groups that are over-represented in the sample.

Since this is survey of cigarette smokers, the "population" is not the whole population of South Africa (which is best measured by the most recent census numbers), but the population of smokers. Since the purchase of cigarettes is restricted to people aged 18 and older, we restrict the population to smokers aged 18 and older.

We cannot determine the population of smokers from the census (because the census does not ask if the respondent smokes or not), so we used wave 5 of the National Income Dynamic Study (NIDS) to approximate the number of cigarette smokers in South Africa. Based on the weights of NIDS wave 5, there were 6.5 million people in South Africa, aged 18 and older who regularly smoked cigarettes. This implies a smoking prevalence of 20.4% (of the population aged 18 and older), which is in line with other studies that have investigated smoking behaviour in South Africa (e.g. SANHANES, 2014).

Figures B1, B2 and B3 compare the unweighted distribution of this survey's respondents by gender, race and province, respectively, with the nationally representative distribution of cigarette smokers in South Africa obtained from Wave 5 of NIDS. From Figure B1, females are over-represented and males are under-represented in our survey sample: 18.82% of South Africa's smokers older than 18 are female, yet around 48% of responses in our survey were from females. In terms of race (Figure B2), Africans are substantially under-represented in the sample, while Whites, and to a lesser extent Indians/Asians, are substantially over-represented in the sample. Coloureds are marginally over-represented. In terms of province (Figure B3), respondents from Gauteng and the Western Cape are over-represented in the survey, while respondents from the other seven provinces are under-represented.

Figure B1. Percentage of smokers by gender: comparison between the population (*n*=6.5 million) and the survey sample (*n*=12 147)
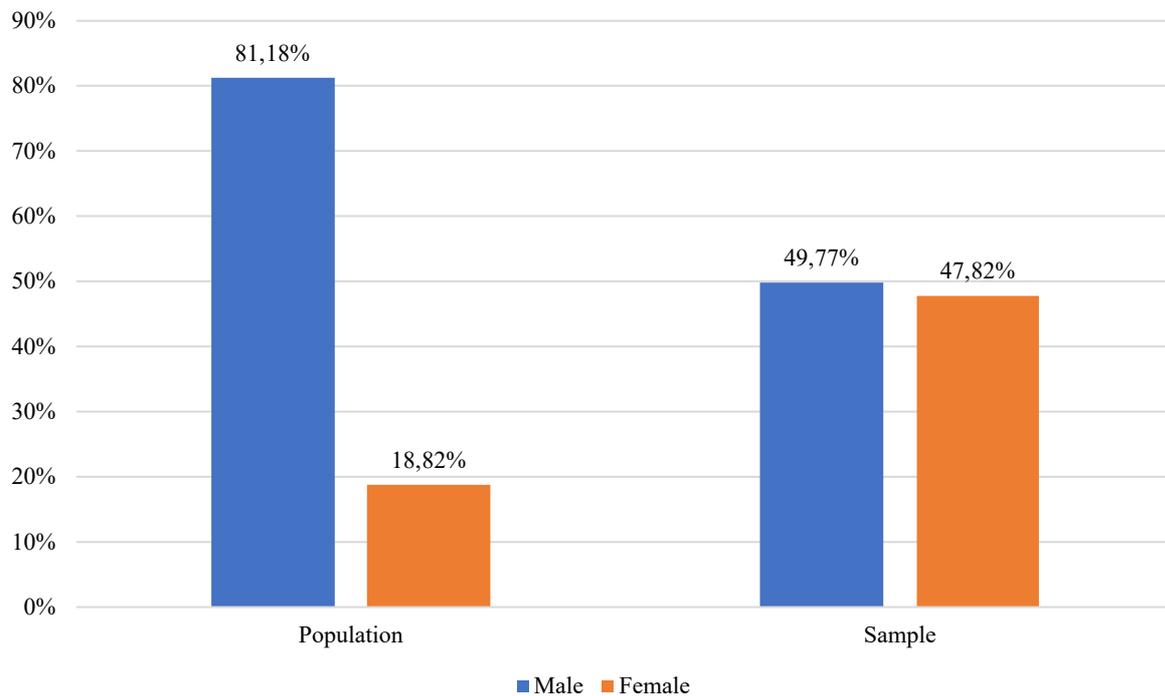
Notes to Figure B1: 292 individuals (2.40% of the sample) chose "Prefer not to answer" in response to being asked to identify their gender

Figure B2. Percentage of Smokers by race: comparison between the population (*n*=6.5 million) and the survey sample (*n*=12 125)
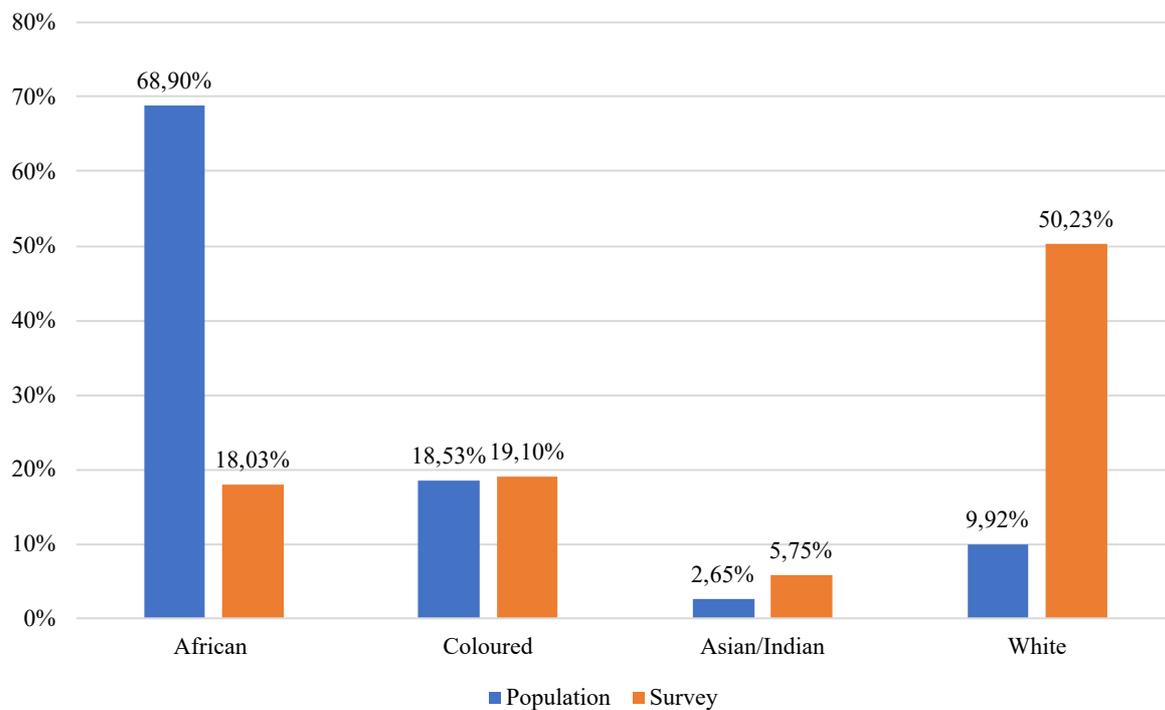
Notes to Figure B2: 832 individuals (6.86% of the sample) chose "Prefer not to answer" in response to being asked to identify their race. A further four individuals (0.03% of the sample) identify as "Other"

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Figure B3. Percentage of Smokers by province: comparison between the population (*n*= 6.5 million) and the survey sample (*n*=12 060)
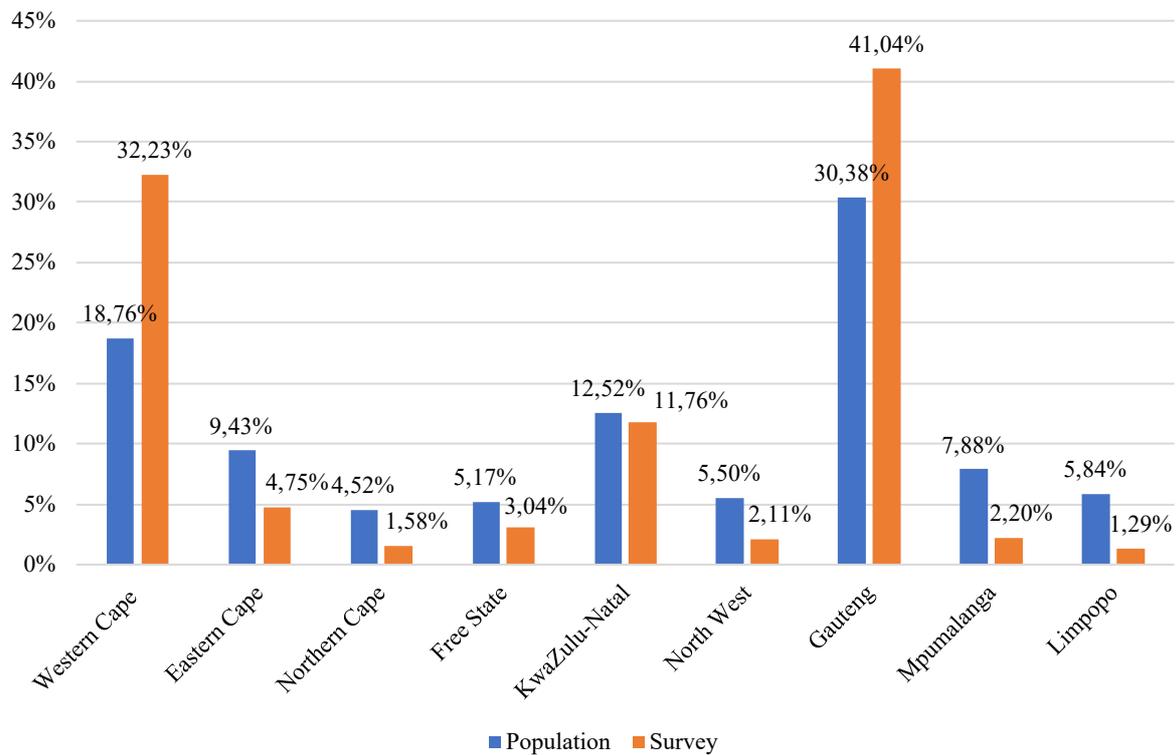
To account for the under- and over-representation based on gender, race and province, we stratified smokers over the age of 18 in the NIDS Wave 5 dataset (hereafter, "the population") based on these three characteristics. In theory we could have created 72 unique strata into which to classify smokers (9 provinces x 2 genders x 4 race groups = 72 unique groups). For each of these groups, we calculated the weight as follows:

$$WEIGHT_i = POP\_PROP_i / SAMPLE\_PROP_i \hspace{3cm} [B1]$$

where POP_PROP_i is the proportion of the total population of total smokers that are in group *i*, and $SAMPLE\_PROP_i$ is the proportion of the total sample, for which we have completed responses on race, gender and province, that are based in group *i*. For example, 5.09% of the smoking population (based on NIDS wave 5) are African males residing in the Western Cape. In our sample, 1.37% of respondents for which we have information on race, gender and province, are African males residing in the Western Cape. This group is under-sampled and thus those respondents that did answer the questionnaire are given a higher weight, i.e. 5.09%/1.37% = 3.71.

In the population, there were nine strata that were empty. For example, in NIDS wave 5 there were no Indian female smokers residing in Mpumalanga. That does not necessarily mean that such people do not exist at all; they were simply not sampled by NIDS. In order to accommodate the few (23) respondents for which there were no strata in the population, we simplified the stratification to include only province and gender (irrespective of race). We then took the mean over each respective stratum as the new representative weight for each of these nine groups. For example, the average weight of all females living in Mpumalanga is 1.36, so we assigned a weight of 1.36 to female Indian smokers residing in Mpumalanga.

An issue of more concern is where respondents to the current survey either did not fill out the section that enquired about their race, gender and/or province or chose the option of "prefer not to answer" (this applied to race and gender only). Of the 12 204 responses that we used in the survey, 636 (0.05%) of respondents were in this position. Rather than to discard the data, these respondents were allocated a weighting of one. To the extent that there is a particular pattern in the non-responses to the race, gender and province questions, this could bias the results somewhat. However, without more information, we are not in a position to determine the direction or the magnitude of this bias.

The weights vary between 0.05 and 13.03. The mean of the weights is 1.08, the standard deviation is 1.83 and the coefficient of variation is 1.69. As a comparison, the weights used in wave 5 of NIDS have a coefficient of variation of 1.35. A smaller coefficient of variation is better than a larger coefficient of variation, because it suggests that the weights are closer together. Within this context, our sampling is just off that of NIDS.

APPENDIX C

Data cleaning

The data were cleaned using Stata and Excel. The biggest problems arose with the brand names and the prices that respondents declared for the cigarettes that they bought. Our intention was to exclude as few observations as possible, but also to ensure that data provided by respondents that are obviously wrong or entered erroneously do not contaminate the results of the study. Based on previous experience of cleaning prices, the REEP team applied rules to the current data set.

The first step was to ensure that the data entered by respondents could be analysed in Stata. For example, where respondents entered "R" before or "rand" after the price, these were removed. Where they wrote the price out in words, we converted them to a numeric. Where they provided a range of prices, we used the midpoint of the price.

In the second step, we considered outlier prices (i.e. prices that seem either too low or too high). Where obvious errors were detected, these were corrected using the below set of general rules (for example, a carton price quoted as a 20 pack price). For extreme prices without obvious errors (for example, R7 for a single stick before lockdown), these were removed from the data. Respondents were asked about cigarette prices in two places in the questionnaire: before the lockdown started and during the lockdown. The following rules were applied:

Cigarette prices before the lockdown:

Respondents were asked what packaging they usually buy their cigarettes in, and were given the following options: (1) single cigarettes, (2) packs of 10 cigarettes, (3) packs of 20 cigarettes, (4) packs of 30 cigarettes, and (5) cartons of 200 cigarettes. In the next question, respondents were asked how much they usually pay for a single unit of the packaging that they chose in the previous question.

Below we present the general rules that we applied for cleaning the prices. However, based on knowledge and experience that members of the REEP team have collected over the years, especially with the African Cigarette Price (ACP) project, some further refinements with respect to individual brands were done. These are not presented here, but the Stata do-file, where these further refinements are shown, is available on request (speak to Kirsten van der Zee at kirsten.vanderzee@uct.ac.za). The general rules for pre-lockdown prices are as follows:

1. For all packaging types, if price < R0.50, remove from sample
2. For packaging types other than singles, replace packaging with single if price ≥ R0.5 and price ≤ R4.5
3. For all packaging types, if price > R5 and price < R10, remove from sample
4. For all packaging types other than cartons, replace packaging with carton if price ≥ R50 and price < R500 and brand = local
5. If price > R60 and price < R150 and brand=MNC, remove from sample
6. For all packaging types other than cartons, replace packaging with carton if price ≥ R150 and price < R500 and brand = MNC
7. For all packaging types, if price > R500, remove from sample

Cigarette prices after the lockdown

Because the situation during the cigarette price ban is unprecedented, one cannot look to previous methodologies to define price rules. It is clear that the prices of cigarettes have increased substantially. Anecdotal evidence from desperate smokers indicates that they are willing to pay exorbitant prices for cigarettes. Based on a thorough analysis of the raw data, we apply the assumption that reported prices as high as R15 per single cigarette stick, R100 for a pack of 10 cigarettes, R200 for a pack of 20 cigarettes, R300 for a pack of 30 cigarettes, and R1800 for a carton of 200 cigarettes are plausible, but that prices in excess of this are implausible. If the price is higher than R15 per cigarette-equivalent, we assume that the respondent has either entered the price at the wrong packaging type, or that it is an error.

A small number of respondents (104) seem to have misinterpreted the question and instead of recording the price they paid for the various packaging types, have recorded the quantities of these packaging types that they have purchased. These respondents were removed from the sample.

Similar to the pre-lockdown prices, a set of general rules was applied to the post-lockdown prices to remove errors. Further refinements with respect to individual brands and prices were made. These are not presented here, but the Stata do-file is available on request from the authors. The general rules applied to post-lockdown prices are:

1. For all packaging types, if price < R0.50, remove from sample
2. For packaging types other than singles, if price ≥ R0.50 and price ≤ R15 allocate to single sticks
3. If price > R15 and price ≤ R20 and brand = MNC, remove from sample
4. For packs of 10, if price > R100 and price ≤ R200, allocate packaging to 20 pack
5. For packs of 20, if price > R200 and price ≤ R1800, allocate packaging to carton
6. For packs of 30, if price > R15 and price ≤ R40, allocate packaging to 20 pack
7. For packs of 30, if price > R300 and price ≤ R1800, allocate packaging to carton
8. For all packaging types, if price ≥ R1800, remove from sample

APPENDIX D

Rationale for and methodology of the thematic analysis used in this study

While it is readily acknowledged that thematic analysis can produce trustworthy and insightful findings,[xxvii,xxviii, xxix] Moules *et al.* (2017: 2) observe that there is no overarching consensus on how researchers should apply the method to achieve the most robust results.**Error! Bookmark not defined.** Moreover, they note that existing guides on how to undertake thematic analysis primarily focus on conducting research with an applied focus[xxx,xxxi,xxxii], or describe the distinction between inductive and deductive coding[xxxiii, xxxiv].

Moules *et al.* (2017) therefore propose a step-by-step approach for conducting a "trustworthy" thematic analysis in any context. This process involves acquainting oneself with the data, searching for initial themes, reviewing the initial themes, naming and defining themes and, lastly, producing the report.

Using this approach, further comments were then imported as "internal sources" into *Nvivo*. A word frequency query was run on each of the responses. This enabled identification of the most common words or phrases used by survey respondents, a process which informed the coding of initial "theme nodes".

Subsequently, each comment was read line-by-line and responses coded so that the views expressed either refined the initial nodes, led to the development of sub-categories within these nodes, or led to the creation of new theme nodes. This process ensured that the themes identified in relation to each of comments were not substitutable or redundant.

Each respondent was then assigned a "case node", which allowed the attribution of a particular comment to an individual according to their sample grouping. Differences in the nature of the response could thus be gauged based on respondents' demographic features. Through this process of identifying, analysing, and organizing the themes emerging from the comments survey respondents, we were able to derive a robust description of what smokers in South Africa think about the ban on cigarette sales.

In order to limit the potential for researcher bias in interpreting responses, the technique of respondent validation should be employed.[xxxv] In our case, respondent validation would mean inviting those who provided further comment to review the themes derived on the basis of their individual responses. Because of the sample size of this research project, this is not a feasible option, though we have alerted survey respondents that they may contact us if they are interested in undertaking this task.

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[i] Government of South Africa. 2020. Disaster Management Act: Regulations to address, prevent and combat the spread of Coronavirus COVID-19: Amendment. Gazette 43148, Gazette 43168, Gazette 43199, Gazette 43232 and Gazette 43240. Available: https://www.gov.za/documents/disaster-management-act-regulations-address-prevent-and-combat-spread-coronavirus-covid-19 [2020, May 10].

[ii] Gerber, J. 2020. Tobacco ban: We understood the reasons and we agree,' says parliamentary health committee chair. *News24*. 30 April. Available: https://www.news24.com/SouthAfrica/News/tobacco-ban-we-understood-the-reasons-and-we-agree-says-parliamentary-health-committee-chair-20200430 [2020, May 10].

iii Ramaphosa, C. 2020. President Cyril Ramaphosa: Extension of Coronavirus COVID-19 lockdown to the end of April. 9 April. Available: https://www.gov.za/speeches/president-cyril-ramaphosa-extension-coronavirus-covid-19-lockdown-end-april-9-apr-2020-0000 [2020, May 10].

iv Ramaphosa, C. 2020. President Cyril Ramaphosa: South Africa's response to Coronavirus COVID-19 pandemic. 23 April. Available: https://www.gov.za/speeches/president-cyril-ramaphosa-south-africas-response-coronavirus-covid-19-pandemic-23-apr-2020 [2020, May 10].

v Dlamini-Zuma, N. 2020. *Briefing on Level 4 regulations*. Available at: Rupiah, K. 2020. Watch it again: National command council briefing on Level 4 lockdown restrictions. Mail & Guardian. 29 April. Available at: https://mg.co.za/coronavirus-essentials/2020-04-29-coming-up-national-command-council-briefing-on-level-4-lockdown-restrictions/ [2020, May 13].

vi News24. 2020. Tobacco sale U-turn was collective decision – Ramaphosa defends Dlamini Zuma. Daily Maverick. 04 May. Available: https://www.dailymaverick.co.za/article/2020-05-04-tobacco-sale-u-turn-was-collective-decision-ramaphosa-defends-dlamini-zuma/ [2020, May 12]

vii Ramaphosa, C. 2020. Weekly newsletter: from the President's desk. Available: https://mailchi.mp/presidency.gov.za/presi-desk-mon4-may-20 [2020, May 12]

viii Mokone, T. 2020. I don't approve of the booze and cigarette bans, says Tito Mboweni. *Times Select*. 01 May. Available: https://select.timeslive.co.za/news/2020-05-01-i-dont-approve-of-the-booze-and-cigarette-bans-says-tito-mboweni/ [2020, May 12]

ix Ndaba, B. 2020. 12 May. Legal showdown between government and Fita put on hold for now. Available: https://www.iol.co.za/news/politics/legal-showdown-between-government-and-fita-put-on-hold-for-now-47839831 [2020, May 15].

x British American Tobacco South Africa. 2020. BATSA welcomes the response by the South African government. Available: http://www.batsa.co.za/group/sites/bat_a2elad.nsf/vwPagesWebLive/DOA2LJ7R/$FILE/medMDBPDNHA.pdf?openelement [2020, May 12].

xi Cronje, J. 2020. SA's largest cigarette company drops proposed legal action against tobacco ban Available: https://www.fin24.com/Economy/sas-largest-cigarette-company-drops-proposed-legal-action-against-tobacco-ban-20200506 [2020, May 15].

xii Mokone, T. 2020. Tax shock: Covid-19 and cigarette and booze bans cost SA almost R300bn. *Times LIVE*. 05 May. Available: https://www.timeslive.co.za/politics/2020-05-05-failing-companies-booze-cig-bans-lead-to-r285bn-drop-in-tax-revenue/ [2020, May 12]

xiii Evan ,S., Cowan, K., Toit, P. 2020. Lockdown: Fresh court challenge likely after govt backtracks on lifting cigarette sales ban. News24. 30 April. Available: https://www.news24.com/SouthAfrica/News/lockdown-fresh-court-challenge-likely-after-govt-backtracks-on-lifting-cigarette-sales-ban-20200430 [2020, May 12].

xiv Smith, C. 2020. Cigarette ban could force 11 million smokers to seek illicit traders, industry warns *Fin24*. 04 April. Available: https://www.fin24.com/Companies/Agribusiness/cigarette-ban-could-force-11-million-smokers-to-seek-illicit-traders-industry-warns-20200404 [2020, May 12].

xv Vellios, N., van Walbeek, C. & Ross, H. 2019. Illicit cigarette trade in South Africa: 2002–2017. *Tobacco Control*. Published Online First: 05 August 2019. doi: 10.1136/tobaccocontrol-2018-054798

xvi Van der Zee, K., van Walbeek, C. & Magdala, S. 2019a. Illicit/cheap cigarettes in South Africa. 2019. *Trends in Organized Crime*. https://doi.org/10.1007/s12117-019-09372-9

xvii van der Zee, K., Vellios, N., van Walbeek, C. *et al. 2020*. The illicit cigarette market in six South African townships. *Tobacco Control*. Published Online First: 11 March 2020. doi: 10.1136/tobaccocontrol-2019-055136

xviii van Walbeek, C. & Shai, L. 2015. Are the tobacco industry's claims about the size of the illicit cigarette market credible? The case of South Africa. *Tobacco Control*. 24:e142–e146

xix Van Walbeek, C.P. 2014. Measuring changes in the illicit cigarette market using government revenue data: the example of South Africa. *Tobacco Control*. 0:1-6. DOI:10.1136/tobaccocontrol- 2013-051178

xx Pauw, J. 2017. *President's keepers*. NB Publishers: Cape Town

xxi Van Loggerenberg, J. & Lackay, A. 2016. Rogue: *The Inside Story of SARS's Elite Crime-busting Unit*. Jonathan Ball Publishers: Johannesburg, South Africa.

xxii Natioanl Treasury. 2020. *Budget Review*. Available: [2002, May 15].

xxiii World Health Organization. 2020. Q&A: Smoking and COVID-19. [Online]. Available: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub/q-a-detail/q-a-on-smoking-and-covid-19 [2020, May 15].

xxiv Pérez-Stable, E.J., Marin, B.V., Marin, G. *et al*. 1990. Apparent underreporting of cigarette consumption among Mexican American smokers. *Am J Public Health* 80:1057–1061.

xxv Roth, M.A., Aitsi-Selmi, A., Wardle, H. & Mindell, J. 2009. Under-reporting of tobacco use among Bangladeshi women in England. *J Public Health.* 31:326–334.

xxvi Dietz, P.M., Homa, D., England, L.J., Burley, K. et al. 2011. Estimates of nondisclosure of cigarette smoking among pregnant and nonpregnant women of reproductive age in the United States. *Am J Epidemiol*. 173:355–359.

xxvii Attride-Stirling, J. 2001. Thematic networks: An analytic tool for qualitative research. *Qualitative Research*. 1: 385–405. DOI:10.1177/ 146879410100100307

xxviii Crabtree, B. & Miller, W. 1999. Using codes and code manuals: A template for organizing style of interpretation. In B. Crabtree & W. Miller, Eds. *Doing qualitative research*. 2nd ed. California, United States of America: Sage. 163–178.

xxix King, N. 2004. Using templates in the thematic analysis of text. In *Essential guide to qualitative methods in organizational research*. C. Cassell & G. Symon, Eds. London, United Kingdom: Sage. 257–270.

xxx Rice, P. & Ezzy, D. 1999. *Qualitative research methods: A health focus*. Melbourne, Australia: Oxford University Press.

xxxi Begley, C. & Tobin, G. 2004. Methodological rigour within a qualitative framework. *Journal of Advanced Nursing*. 48(4): 388-396. DOI: 10.1111/j.1365-2648.2004.03207.x

xxxii Guest, G., Macqueen, K. M., & Namey, E. E. 2011. *Applied thematic analysis*. California, United States of America: Sage.

xxxiii Fereday, J. & Muir-Cochrane, E. 2006. Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Research*. 5 (1): 80–92.

xxxiv Cameron, E. Gale, N.K. Heath, G., Rashid, S. & Redwood, S. 2013. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Medical Research Methodology*. 13(117): 1 – 8. DOI: 10.1186/1471-2288-13-117

xxxv Anderson, C. 2010. Presenting and Evaluating Qualitative Research. *American Journal of Pharmaceutical Education*. 74(8): 1 - 6.