SMOKING AND QUITTING BEHAVIOUR IN LOCKDOWN SOUTH AFRICA:

RESULTS FROM A SECOND SURVEY

Professor Corné van Walbeek

Samantha Filby

Kirsten van der Zee

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EXECUTIVE SUMMARY

This report is based on the results of an online survey, conducted between 4 June and 19 June 2020. The study was conducted by the Research Unit on the Economics of Excisable Products (REEP), an independent research unit based at the University of Cape Town. It was funded by the African Capacity Building Foundation, which in turn is funded by the Bill & Melinda Gates Foundation.

This report follows on from our first report entitled "Lighting up the illicit cigarette market: Smokers' responses to the cigarette sales ban in South Africa", which was published on 15 May 2020. That report was based on an online survey conducted between 29 April and 11 May 2020.

When the second survey was conducted, the ban on the sales of cigarettes had been extended, even as the country had moved from lockdown Level 4 to Level 3. The questionnaire was distributed on Twitter, Change.org (a petition site) and Moya (a data-free platform). The survey yielded 23 631 usable responses. In contrast to the first study, we did not weigh the data, because the sampling methodology (i.e. online survey) made it impossible to reach the poorer segments of society. We thus do not claim that the data is nationally representative; we report on the characteristics of the sample, not the South African smoking population. In the report we often report the findings by race and gender, because smoking behaviour in South Africa has very pronounced race-gender differences.

Our most important results regarding quitting during lockdown are as follows:
- Roughly 27% of smokers in the sample indicated that they had attempted to quit smoking cigarettes during the lockdown. There were large racial differences, with African males (62%) and females (68%) substantially more likely to attempt to quit than other groups, especially White males (18%) and females (17%).
- Of the smokers who tried to quit, 33% indicated that they had been successful, implying that 9% (27% x 33%) of smokers in our sample had successfully quit smoking. Again, there were large racial and gender differences, with Africans having the highest quit success (36% for males and 48% for females) and Whites having the lowest quit success (3.7% for males and 1.8% for females).
- Based on the unweighted data, the percentage of successful quitters of all respondents increased from 7.4% in the first survey to 9.0% in the second survey. (The often-quoted quit percentage of 16% in the first survey was based on weighted data).
- Successful quitters smoked substantially less (average of 7.8 cigarettes per day) pre-lockdown than all other respondents (average of 16.4 cigarettes per day), suggesting that successful quitters were the least addicted subset of the sample.
- Seven out of ten (71%) smokers who quit during lockdown intend to stay non-smokers after the sales ban is lifted.
- Amongst those who made a quit attempt, the single most important reason for wanting to quit smoking during lockdown is the high price of cigarettes (56%). The unavailability of cigarettes (14%) and the ban on the sale of cigarettes (11%), although ranking behind high prices, did not feature as strongly. Health concerns (9%), not wanting to be addicted to cigarettes (5%), and pressure from family and friends (1.3%) are relatively unimportant in the decision to quit smoking.
- More than 70% of respondents who quit successfully smoked their last cigarette on 2 May 2020 or before, i.e. during Level 5 of the lockdown. About 16% of successful quitters quit between 3 and 31 May 2020 (i.e. during lockdown level 4) and 4% of quitters quit since 1

June 2020 (i.e. during lockdown level 3). 8% of successful quitters don't know when they quit smoking.

For respondents who continue to smoke, our survey revealed the following:
- Average daily consumption decreased from an average of 16.4 cigarettes per day pre-lockdown to 13.1 cigarettes per day during the lockdown (average of the last four weeks before taking the survey).
- About half of respondents had smoked less during lockdown than before, while 15% smoked more, and 35% smoked the same.
- Around 93% of continuing smokers in the survey purchased cigarettes during the lockdown. This is slightly higher than the 91% reported in the first survey.
- The main sources of cigarettes for smokers in our survey are friends and family (27%), spaza shops (25%), street vendors (11%) and WhatsApp groups (8%). Formal retail outlets, which were the predominant outlet before lockdown (53%), have all but disappeared (0.3%).
- 82% of respondents indicated that, pre-lockdown, they never shared individual cigarette sticks with other people. This percentage has decreased to 74% during lockdown. The percentage of respondents indicating that they regularly shared individual cigarettes (more than 50% of cigarettes smoked) has increased from 1.7% pre-lockdown to 8.9% during lockdown. This is an increase of 430%.

Our survey revealed the following about cigarette prices, brands and competitive aspects:
- The average price of cigarettes, as reported by respondents to our second survey, is nearly 250% higher than pre-lockdown prices, averaging R5.69 per stick (i.e. R114 per pack of 20 cigarettes). This is substantially higher than the 90% average price increase reported in our first report.
- There are substantial inter-provincial differences in the price increase. The Western Cape (379%), Northern Cape (367%) and Eastern Cape (281%) have experienced the largest increases, while Limpopo (123%), Mpumalanga (141%) and Gauteng (152%) have experienced the smallest price increases.
- Pre-lockdown, 77% of cigarettes purchased by survey respondents were manufactured by multinational tobacco companies (MNCs, i.e. British American Tobacco, Philip Morris International, Japan Tobacco International and Imperial Tobacco). By early May this percentage had decreased to 38% and by early June 2020 to 18%.
- Based on our survey, the companies with the largest market share in June 2020 were Gold Leaf Tobacco Corporation (26%), followed by Carnilinx (14%), Best Tobacco Company (11%), Amalgamated Tobacco Company (10%) and British American Tobacco (9%).
- None of the top ten cigarette brands that were most purchased by our survey respondents, pre-lockdown, are in the top ten list of cigarette brands purchased during the lockdown.
- Cigarettes produced by MNCs sell at a premium (R6.30 per stick, R126 per pack of 20 cigarettes) to non-MNC cigarettes (R5.57 per stick, R111 per pack), in our June 2020 sample. Because the prices of non-MNC brands were substantially lower than the MNC brands pre-lockdown, the percentage change in the non-MNC brands is substantially higher (231% for MNCs vs 457% for non-MNCs).

The fact that the Fair-Trade Independent Tobacco Association (FITA) initiated a court case to have the sales ban lifted is ironic, because their members have benefitted disproportionately from the sales ban. They have greatly increased their share of the market within our sample, and sold their cigarettes at hugely inflated prices. The extraordinary profits likely earned during the lockdown

period will allow them oppose tobacco control reforms more effectively in future. For example, they could engage in legal battles with the government over the Control of Tobacco Products and Electronic Delivery Systems Bill or Track and Trace systems.

Being able to produce cigarettes legally for the export market (as has been the case since the country moved to lockdown level 4), but not able to sell cigarettes in South Africa, has created a loophole and an incentive to sell illegally in the very lucrative local market. Manufacturers will find it difficult to resist this temptation, especially because so many companies are selling cigarettes, despite the sales ban. Given the tobacco industry's long record of involvement in illicit trade, it is likely that they will divert cigarettes, ostensibly destined for the export market, to the local market.

The multinationals have been the biggest losers during the lockdown period. Their markets have been captured by local companies and, to a lesser extent, by imported cigarettes, significantly reducing their market share. We predict that, once the sales ban is lifted, there will be a price war, in which the multinationals will aim to get some of their market share back and the non-multinational companies will aim to hold on to their markets. The resulting price decrease will be detrimental to public health.

We argue that, instead of imposing a sales ban to prevent people from smoking cigarettes, the government would have been able to achieve a similar outcome by substantially increasing the excise tax (from the current level of R17.40 per pack of 20 cigarettes to R50 per pack or more). Most smokers that have quit smoking during lockdown did not quit because of health concerns or because they wanted to follow the government's regulations, but because the illegal market that was created by the lockdown made cigarettes unaffordable. Critics of a strategy to increase the excise tax substantially would argue that to do so would increase illicit trade. That may be possible, but at least it will not increase to 100%, as is currently the case. Our survey indicates that, more than anything else, the price of cigarettes made people quit during lockdown.

A substantial (for instance, 100%) immediate increase in the excise tax, followed by above-inflationary increases in subsequent years, would counteract the impact of a likely price war, once the sales ban is lifted. It would allow the National Treasury and the South African Revenue Services to claw back some of the revenue that they have lost during lockdown. Furthermore, it would encourage smokers to quit, and incentivise many quitters (who may otherwise resume smoking when the price falls to its "normal" level) to stay non-smokers. However, an important proviso for such a tax strategy is that the illicit trade in cigarettes is under control. This will be difficult, given that the illicit operators have been able to entrench themselves during the lockdown period. However, with political will and with the appropriate use of technology (such as digital tax stamps and an independent Track and Trace solution), this can be done.

In our first report we argued that, although well-intentioned at the outset, the extension of the cigarette sales ban into lockdown Level 4 was an error. Based on the results of the second survey, we believe that the further extension of the sales ban, into lockdown Level 3, amplified the error. We recommend that the government expeditiously lifts the ban on the sale of cigarettes; substantially increases the excise tax on tobacco products; and implements better tax enforcement measures.

SMOKING AND QUITTING BEHAVIOUR IN LOCKDOWN SOUTH AFRICA:

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1. INTRODUCTION

On 15 May 2020 the Research Unit on the Economics of Excisable Products (REEP) published a report titled "Lighting up the illicit cigarette market: Smokers' responses to the cigarette sales ban in South Africa". The report was based on 12 204 valid responses to an online survey of smokers, conducted between 29 April 2020 and 11 May 2020. The report is available on our website.

The background to the survey was that cigarette sales in South Africa had been banned since 27 March 2020 as part of the lockdown. We reported that, based on a weighted sample, 16% of respondents successfully quit during the lockdown. Although we did not indicate absolute numbers in the report, pro-health groups calculated that about one million smokers quit smoking during the lockdown. Of the smokers who did not quit during lockdown, 90% had been able to purchase cigarettes during lockdown. Cigarette prices were substantially higher than pre-lockdown. On average, the price was 90% higher. We found that during the two-week period of the survey, cigarette prices were increasing at a rate of 4.4% per day. We also reported that the structure of the market had changed dramatically during the lockdown, with the multinationals losing market share and the local cigarette manufacturers gaining market share.

We concluded as follows:

> *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 not to 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 are 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.*

We sent copies of the report to all members in the National Coronavirus Command Council, and to officials in National Treasury and the South African Revenue Services with whom we have engaged in the past.

REEP is a pro-health research unit, with no links to the tobacco industry, focused on the economics of excisable products. Our past research typically focused on understanding the public health and fiscal impact of tobacco control policies, and, in particular, excise taxation. More recently, members of REEP have published a number of papers on the size of the illicit market in South Africa and in other countries (see www.reep.uct.ac.za for details). Despite our research credentials, our results were regarded as controversial by the tobacco control community in South Africa. A number of members of the tobacco control community disagreed with our methodology and

conclusion that the cigarette sales ban, and especially the extension of the ban after 1 May 2020, had been unsuccessful in preventing most smokers from accessing cigarettes. Many health federations and anti-smoking groups supported the extension of the ban on public health grounds. As economists we do not challenge the public health rationale for the sales ban. Our argument was practical, namely that it was not stopping (most) people from purchasing cigarettes.

Our report featured prominently in the court case between the Fair-Trade Independent Tobacco Association (FITA) and the Minister of Cooperative Governance and Traditional Affairs (COGTA), and in the court case between British American Tobacco (and others) and the Minister of COGTA (and others). British American Tobacco extensively quoted from our report in their founding affidavit. In the responding affidavit by the Minister, a number of academics and research groups evaluated and criticised our report. The single most contested issue about our report is whether the survey was representative of all smokers in the country. We return to this matter in the methodology section of this report.

Considering that the cigarette sales ban was extended well beyond the originally announced three-week period, and beyond the period of the first survey, we ran a second, similar survey of lockdown smokers and quitters in June 2020. This survey aimed both to update the findings of the first survey, and to improve on the questionnaire design and reach of the first round (for example, more thorough advertising amongst lockdown quitters). The current report presents the findings of the second round of the REEP lockdown survey.

2. METHODOLOGY

We conducted a second online survey of smokers between 4 and 19 June 2020. Many questions in the second questionnaire were the same as or similar to those of the first round. We excluded some questions (particularly some detailed questions regarding stock-up), and added some additional questions regarding when during the lockdown respondents quit, and whether respondents shared cigarettes with others before and during the lockdown. The round 2 questionnaire is presented in Appendix A.

As with round 1, the questionnaire asked people about their smoking behaviour and purchasing patterns before the sales ban, whether they had stocked up before the lockdown (and for how long they expected their stock to last), whether (and, if so, when) they quit during the lockdown (and the reasons for quitting), and their smoking behaviour and purchasing patterns during the lockdown. We also asked respondents about their perceptions of the cigarette and alcohol sales ban, as well as of the lifting of the ban on alcohol sales in level 3. The last section asked respondents about their demographic and socio-economic characteristics.

Since the sales ban had been in place for more than nine weeks by the time we launched the second survey, we did not ask respondents to describe their overall experience during these nine weeks, since this could have changed considerably, but rather asked about their smoking behaviour (specifically the number of cigarettes smoked) during the previous *month*. Also, for the prices paid, the brand purchased, the packaging type and the retail outlet accessed during the lockdown, we asked respondents to describe their *most recent* purchase. In the first round of the survey, respondents were not asked about their most recent purchase, but about all their purchases in the lockdown period.

As this was an online survey, we relied on social media to advertise the survey. In order to participate in the survey, respondents had to be at least 18 years old and must have been regular

smokers (at least one cigarette per day) the week before the lockdown started. In total, 34 321 eligible participants opened the survey link, and of these, 23 631 individuals completed the survey. A large number of completed responses (10 803) were received in the first two days of the survey (4 June and 5 June). On the evening of 5 June, the survey was advertised to the signatories of the Change.org petition. The Change.org petition was signed by about 600 000 people (presumably mostly smokers), calling on the government to allow the legal sale of cigarettes. In the following two days we received another 6776 responses, of which a large portion can presumably be attributed to Change.org. We also advertised the survey on the Moya data-free platform, using a separate link. This yielded 5434 complete responses. We asked a pro-health group to advertise the survey among people who had approached their quit line and who were on their social media network. Although we only analyse complete responses in this report, 204 respondents who did not complete the full survey provided sufficient information to be included in the quitting analysis.

We noted some outliers in the lockdown consumption variable; for example, individuals reporting smoking 10 cigarettes per day before lockdown, and 20 or 50 cigarettes per day during lockdown. This is likely the result of the wording of the lockdown consumption question: "How many cigarettes have you smoked on average per day **in the last month**?" (bold emphasis is in the questionnaire). It is possible that some individuals interpreted this question as "How many cigarettes have you smoked **in the last month**?" (i.e. they missed the words "on average per day") and responded with an aggregate for the month. To resolve this issue, we removed all lockdown consumption responses that were more than 1.5 times the individual's pre-lockdown consumption. As a result, 1 371 outlier lockdown consumption numbers were removed, which equates to 6.6% of all lockdown consumption responses. Although we believe this is an appropriate rule to remove outliers, based on the data, this approach may result in unintentionally removing accurate data.

We also noted a number of data outliers which suggested data errors in the responses to the questions on prices, for example, a price of R300 for a pack of 20 cigarettes in the pre-lockdown period. In cases where obvious errors were observed, a specific set of rules was followed to correct these errors. A detailed description of these rules is outlined in appendix B.

As was the case in round 1, we oversampled females (even more so than in round 1), Whites, and the Western Cape and Gauteng provinces, and undersampled males, Africans and the other seven provinces. In round 1 we weighted the data by race, gender and province with the intention of making the sample more representative of South Africa's smoking population. However, because the survey was done online, poorer, less literate, and less computer-literate South Africans will be under-represented because they have less access to the internet than more affluent groups. Cigarette consumption in our sample is also substantially higher than average national cigarette consumption, suggesting that we do not sufficiently capture light smokers. Based on discussions with experts in sampling design, and on comments by reviewers of our study in Minister Dlamini-Zuma's responding affidavit in the BATSA case, we have been persuaded that weighting the data by gender, race and province, as we did in round 1, will not solve the representativity problem. For example, even though we can upweight our sample of Africans to match national proportions, this will not give a representative picture of the full spectrum of African smokers, because very poor Africans were not sufficiently captured in our sample. Therefore, for this report we decided not to weight the data, but to report the results from the *sample* we surveyed. We thus do not attempt to claim national representativity.

Because smoking patterns in South Africa have distinct racial and gender dimensions, we disaggregate our results by race and gender, where appropriate. For example, females smoke substantially less than males, on average, but this distinction is even greater within race groups.

African females smoke on average 5.6 cigarettes per day, while White females smoke on average 15.4 cigarettes per day (reference to NIDS wave 5). Table 1 below indicates the number and proportions of respondents in the various race-gender categories in the two rounds of the survey, compared to the weighted proportions of smokers aged 18 and older in wave 5 of the National Income Dynamics Study (NIDS), conducted in 2017. NIDS is a nationally representative, South African household panel survey, of which there are 5 waves, conducted between 2008 and 2017. NIDS asks adult respondents various smoking-related questions, and thus provides an appropriate national comparator for our data (reference to NIDS wave 5). Where appropriate, we show the findings of rounds 1 and 2 (unweighted), however appendix C describes in detail why readers should use caution when directly comparing the two rounds.

Table 1. Number of respondents, by race and gender: weighted NIDS wave 5 (2017) data of smokers, compared with REEP survey data in rounds 1 and 2

	NIDS Wave 5		REEP Survey Round 1		REEP Survey Round 2	
	N	Proportion	N	Proportion	N	Proportion
Overall	4122	100	12094	100.0	23631	100.0
Males	3081	81.1	5667	46.9	8271	35.0
African	2213	63.8	1589	13.1	2132	9.0
Coloured	654	10.4	910	7.5	1285	5.4
Indian	58	2.0	444	3.7	585	2.5
White	156	5.0	2724	22.5	4269	18.1
Females	1038	18.8	5434	44.9	13272	56.2
African	243	5.1	533	4.4	931	3.9
Coloured	628	8.1	1341	11.1	2851	12.1
Indian	25	0.7	239	2.0	488	2.1
White	142	4.9	3321	27.5	9002	38.1
Race and/or gender undisclosed	3	0.1	996	8.2	2088	8.8

Notes: NIDS Wave 5 is weighted using post-stratified, top-up weights.

The second survey yielded about twice the number of responses as the first round. However, despite its substantial size, the samples, both in round 1 and increasingly in round 2, are not representative of South Africa's smoking population by race and gender.

Table 1 clearly indicates the oversampling of females and Whites (compared to NIDS), and the corresponding undersampling of males and Africans. The survey substantially oversampled people at the higher end of the socio-economic spectrum (not shown in the table). For example, the median monthly household income of respondents was between R12 801 and R25 400. According to Saldru's income comparator tool (see https://www.saldru.uct.ac.za/income-comparison-tool/) the median household income for a family of 5 people in 2017 was about R6000 per month. Adjusted for inflation, that is about R7000 in 2020 prices. The median income for respondents in our sample is substantially higher than the median income in South Africa. Nearly 90% of respondents indicated that they had completed matric and approximately 50% of respondents indicated that they had some form of tertiary qualification. This is substantially higher than the education profile of the population as a whole. Also, as we report in the results section below, the survey has

substantially oversampled smokers who purchase cigarettes in cartons (i.e. 10 packs of 20 cigarettes each) and undersampled smokers who purchased cigarettes as single sticks.

Ethics approval for round 2 of the study was granted by UCT's Commerce Faculty Research in Ethics Committee (REC 2020/06/002). The survey was administered through SurveyMonkey. The survey was conducted in English only. In order to incentivise people to complete the survey, ten respondents were randomly selected to receive a R500 Takealot voucher in a lucky draw. The results presented here refer to the second survey, unless indicated otherwise.

3. RESULTS

3.1 Quitting during lockdown

The questionnaire had eight questions relating to quitting behaviour during the lockdown. In Table 2, we indicate the intention to quit, the success in quitting and the intention to stay 'quit' after the lockdown is over, by race and gender categories.

Table 2. Quitting behaviour during the lockdown

	N	Attempt to quit (%)	Successful quitter given quit attempt (%)	Successful quitters from all pre-LD smokers (%)	Intent to stay non-smokers, given successful quitting (%)
Males	8 342	32.9	40.8	13.5	73.8
African	2 165	62.4	56.7	35.5	79.8
Coloured	1 300	35.4	34.8	12.3	72.5
Indian	589	28.9	22.4	6.5	65.8
White	4 288	17.9	20.6	3.7	47.5
Females	13 373	23.7	27.6	6.6	69.4
African	945	68.1	69.3	47.5	79.4
Coloured	2 880	30.9	26.8	8.4	68.3
Indian	490	24.3	25.2	6.1	60.0
White	9 058	16.8	10.6	1.8	45.1
Race and/or gender undisclosed	2 126	25.3	27.7	7.0	59.1
Total	**23 835**	**27.1**	**33.2**	**9.0**	**70.9**

Notes: "Attempt to quit" is an indicator for whether the respondent had attempted to quit during the lockdown or not (asked of all respondents). The number of observations (N) refers to the respondents who have answered the first question ("Have you attempted to quit smoking since the sale on cigarettes was banned due to lockdown (since 27 March)? "Successful quitter given quit attempt" is an indicator for whether the respondent has been successful in their attempt to quit (asked only of those who had attempted to quit). "Successful quitters from all pre-LD smokers (%)" represents the number of individuals who had successfully quit, as a proportion of all respondents (including those who had and had not attempted to quit). "Intent to stay non-smokers, given successful

quitting (%)" is an indicator for whether successful quitters intended to start smoking again or not, once the cigarette sales ban has ended (asked only of successful quitters).

At the aggregate level, roughly 27% of smokers in the total sample indicated that they had attempted to quit smoking cigarettes during the lockdown. Of the smokers who tried to quit, 33% had successfully quit by the time they completed the survey, while 67% of those who attempted to quit were unsuccessful. Thus, approximately 9% (27% x 33%) of all respondents had quit successfully (at least at the time of the second survey). Males' success rate in quitting was almost double that of females, with 13.5% of males in the sample successfully quitting, compared to 6.6% of females. Except in the African race group, where females have been more successful at quitting smoking than males, males have been more successful at quitting smoking than females.

Table 2 shows that there are large differences in quitting behaviour by race. Around 64% of Africans (62% males and 68% females) attempted to quit, compared to 32% of Coloureds (35% male and 31% female), 27% of Indians (29% male and 24% female) and 17% of Whites (18% male and 17% female).[1] Africans were also had the highest overall quit rate compared to any other race group: around 39% of Africans (36% male and 48% female) who identified as smokers in the pre-lockdown period successfully quit smoking during the lockdown, compared to 2.2% of Whites (3.7% males and 1.8% females), who had the lowest overall quit rate of all race groups. Of the smokers who had successfully quit by the time of answering the survey, 71% intend to stay non-smokers after the cigarette sales ban is lifted.

Respondents who attempted to quit were asked to disclose the main reason for their attempt to quit during lockdown. The percentage distribution, broken down by race and gender, is shown in Table 3. The main reason for attempting to quit, espoused by the majority (56%) of attempting quitters, is the high price of cigarettes during lockdown. In fact (not shown in the table), 67% of *successful quitters* indicated that the high price of cigarettes during lockdown was the main reason for their attempt to quit. This conforms to standard economic theory, which predicts that an increase in the price of a product will lead to a decrease in consumption. A substantial proportion of the 29% of quitters in the sample that do not intend to stay non-smokers after the sales ban is lifted probably have an expectation that cigarette prices will return to pre-lockdown levels after the cigarette sales ban is lifted, and that therefore their main reason for quitting will no longer apply.

About 14% of respondents who attempted to quit indicated that they attempted to do so because they could not find cigarettes during the lockdown, and even fewer people (11%) were motivated to quit by the existence of the ban on cigarette sales. The results are broadly consistent across race and gender, though there are some interesting differences.

Females were more affected by the higher prices than their male counterparts: 61% of females, compared to 49% of males, cited that "cigarettes have become too expensive during the lockdown" as their reason for quitting. Men were more likely to be motivated to quit "because of the cigarette sales ban" (14.5%) than females (8.7%), while an almost equal proportion of men and women (around 14%) quit because they "could not find cigarettes".

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[1] Note that the quitting percentage for a race group is a weighted average of the quitting percentages of the two genders, based on the sample. The same applies to the next sentence.

Table 3. Main reason for attempting to quit during lockdown

	N	Cigarettes have become too expensive during lockdown	The ban motivated me to quit	I cannot find cigarettes	Health concerns	I don't want to be addicted to cigarettes	Requests/pressure from family and friends	Other
Males	2 740	49.4	14.5	14.2	10.9	6.4	1.5	3.1
African	1 347	38.6	21.0	11.6	16.2	9.0	1.6	2.0
Coloured	455	60.7	11.6	11.4	10.3	3.3	0.7	2.0
Indian	168	54.8	10.1	17.9	4.8	3.6	2.4	6.5
White	770	60.4	5.7	19.7	3.4	4.3	1.7	4.8
Females	3 172	61.6	8.7	13.7	6.7	4.7	1.0	3.5
African	639	30.5	23.8	14.6	16.1	11.9	1.4	1.7
Coloured	891	69.8	6.7	9.3	7.6	3.6	0.6	2.4
Indian	119	58.0	8.4	18.5	6.7	3.4	1.7	3.4
White	1 523	70.1	3.5	15.6	2.2	2.5	1.1	5.0
Race and/or gender undisclosed	533	56.5	8.3	17.3	7.3	4.1	1.5	5.1
Total	**6 441**	**56.0**	**11.1**	**14.2**	**8.5**	**5.4**	**1.3**	**3.5**

Note: This table includes all respondents who had attempted to quit during lockdown, both those who had succeeded and those who had failed in their attempt to quit.

In order to determine whether quitting took place sooner or later after the sales ban was imposed, we asked respondents who successfully quit smoking when they had smoked their last cigarette. The options were categorised into roughly two-week periods (Table 4).

Table 4. Approximate date when successful quitters smoked their last cigarette

	N	25 March - 4 April	5 April - 18 April	19 April - 2 May	3 May - 16 May	17 May - 31 May	Since 1 June	Don't know
Males	1 124	36.0	22.4	13.7	10.1	6.7	3.7	7.4
African	768	38.7	25.1	12.4	7.9	4.9	2.7	8.2
Coloured	160	38.1	15.6	14.4	10.0	11.3	2.5	8.1
Indian	38	39.5	21.1	10.5	7.9	5.3	7.9	7.9
White	158	20.3	16.5	20.3	20.9	10.8	8.9	2.5
Females	878	37.5	23.7	13.1	9.5	5.6	3.1	7.6
African	446	44.8	27.6	9.0	4.9	3.4	2.5	7.8
Coloured	240	34.2	18.8	16.3	13.3	5.0	2.9	9.6
Indian	30	56.7	16.7	6.7	3.3	3.3	3.3	10.0
White	162	18.5	21.6	21.0	17.3	13.0	4.9	3.7
Race and/or gender undisclosed	149	37.6	13.4	10.1	5.4	9.4	5.4	18.8
Total	**2 148**	**36.7**	**22.3**	**13.2**	**9.5**	**6.4**	**3.6**	**8.2**

Notes: This table includes all respondents who had successfully quit cigarette smoking during lockdown.

Table 4 shows that the majority of smokers who quit during lockdown quit smoking in the first month of lockdown (37% quit in the first two weeks, and 22% quit in weeks 3 and 4 of lockdown). About 8% of people did not know when they had quit, but it is likely that they would have quit earlier rather than later (they would probably have remembered had they quit more recently). Only about 16% of respondents who successfully quit smoking did so during Level 4 lockdown (3 May to 31 May 2020), and even fewer (about 4%) quit after June 1st (recall that the survey closed on 19 June 2020). That most people quit in the first four or five weeks of lockdown suggests that the public health benefit of people quitting was realised only marginally through the further extensions of the ban.

It seems plausible that, of all smokers, the least addicted would be the most likely to quit smoking successfully. In order to investigate this, we asked all respondents how many cigarettes they smoked on average per day before the lockdown started. We compared this pre-lockdown consumption between successful quitters and continuing smokers in Table 5 (broken down by race and gender group).

Except for White males, the results show that successful quitters smoked significantly fewer cigarettes per day (on average 8.6) than non-quitters (on average 16.4; significant at the 1% level). Thus, it is likely that our sample of successful quitters was the least addicted, pre-lockdown, of all the respondents.

Table 5. Average number of cigarettes smoked per day, successful quitters and continuing smokers

	Pre-lockdown cigarette consumption: Continuing smokers			Pre-lockdown cigarette consumption: Successful quitters			
	Mean	SD	N	Mean	SD	N	P-values
Males	16.2	9.7	7 103	8.0	7.9	1 102	0.00
African	8.3	6.2	1 382	5.7	4.1	748	0.00
Coloured	12.2	7.5	1 122	7.4	6.2	159	0.00
Indian	13.1	7.0	542	9.9	6.3	38	0.01
White	20.4	9.2	4 057	19.6	12.0	157	0.25
Females	16.5	8.7	12 280	7.0	7.5	866	0.00
African	7.8	6.4	489	4.1	4.2	439	0.00
Coloured	11.3	6.2	2 600	6.0	5.7	236	0.00
Indian	11.8	7.3	456	5.6	4.6	29	0.00
White	18.8	8.4	8 735	16.4	9.3	162	0.00
Race and/or gender undisclosed	15.9	8.7	1 922	10.2	12.7	142	0.00
Total	**16.4**	**9.0**	**21 305**	**7.8**	**8.2**	**2 110**	**0.00**

Notes: "Continuing smokers" includes both smokers who attempted but failed to quit, as well as smokers who did not attempt to quit. P-values are for the t-test for the difference in means.

We use logistic regression analysis to explore the correlates of attempting to quit (Table 6) and success of quitting (Table 7). We present both the marginal effects and odds ratios (ORs). On the matter of quit attempts, the results show that lighter smokers were more likely to make a quit attempt than heavier smokers. The marginal effect is -0.006, meaning that, for every additional cigarette smoked per day (pre-lockdown), a smoker is on average 0.6 percentage points less likely to attempt to quit smoking during the lockdown period. Relative to Africans, all other race groups are significantly less likely to make a quit attempt (ORs all less than 1, and marginal effects are negative). Males are more likely to attempt to quit than females (OR=1.13; 95% CI: 1.052 – 1.205). Relative to smokers in the city, smokers in rural areas, townships and informal settlements are more likely to make an attempt to quit (ORs greater than 1, and marginal effects are negative). The older the smoker, the more likely they are to make a quit attempt (OR=1.009 and marginal effect is 0.001). For every year in age, the probability of a quit attempt increases by 0.1 percentage points on average. The longer a person has been smoking, the less likely they are to make a quit attempt (OR = 0.970, and marginal effect = 0.005). Thus, for every additional year of smoking, the probability of attempting to quit smoking decreases by 0.5 percentage points on average.

Table 6. Logit regression: Correlates of attempting to quit

Logit regression				
Independent variables	**Marginal Effects**	**SE**	**Odds ratios**	**SE**
Number of cigarettes smoked per day before lockdown	-0.006***	0.000	0.968***	0.003
Base: African				
Asian/Indian	-0.217***	0.017	0.352***	0.030
Coloured	-0.173***	0.013	0.448***	0.026
White	-0.242***	0.014	0.303***	0.019
Prefer not to answer	-0.226***	0.016	0.334***	0.026
Base: Female				
Male	0.020***	0.006	1.126***	0.039
Prefer not to answer	0.039*	0.021	1.254**	0.144
Base: City				
Farm	0.007	0.015	1.042	0.092
Informal settlement	0.089***	0.026	1.619***	0.212
Rural	0.045***	0.015	1.288***	0.104
Suburb	-0.007	0.009	0.960	0.050
Town	-0.001	0.011	0.996	0.063
Township	0.060***	0.014	1.397***	0.105
Age	0.001**	0.001	1.009**	0.004
Smoking duration	-0.005***	0.001	0.970***	0.004
Constant			1.842***	0.195
Observations	23,121		23 121	

Notes: The binary dependent variable is 1 if the respondent attempted to quit, and 0 if they did not attempt to quit. Significance stars indicate: *** p<0.01, ** p<0.05, * p<0.1, robust standard errors are presented. Average marginal effects presented.

On the matter of quit success, the results in Table 7 are qualitatively similar to the results for quitting attempts, shown in Table 6. For Table 7 we consider only respondents who indicated that they tried to quit. Respondents who did not try to quit are excluded. Results show that lighter smokers are more likely to successfully quit than heavier smokers (OR=0.957; 95% CI: 0.943 – 0.972 and marginal effect = -0.008). The marginal effect indicates that for every additional cigarette smoked per day, the probability of quitting success decreases by 0.8 percentage points. Relative to Africans, all other race groups were less likely to successfully quit (ORs all less than 1, and marginal effects are negative). Males were more likely to successfully quit than females (OR=1.163; 95% CI: 1.024 – 1.321)). Older smokers, all else remaining the same, were more likely to be successful in their quit attempts than younger smokers (OR = 1.016; 95% CI: 1.003 – 1.030, marginal effect = 0.003). For every year, the probability of successfully quitting smoking increases by 0.3 percentage points on average. On the other hand, people who had been smoking longer are less likely to quit successfully (OR = 0.984; 95% CI: 0.970 – 0.997, marginal effect = -0.003), indicating that for each extra year of smoking, the probability of successful quitting decreases by 0.3% on average. There is a high correlation between age and smoking duration, so these odds ratios work against each other. The net effect of age and smoking duration is negligible. People in the suburbs and in towns were less likely to successfully quit than people who live in cities.

Table 7. Logit regression: correlates of quit success

Logit regression				
Independent variables	**Marginal Effects**	**SE**	**Odds ratios**	**SE**
Number of cigarettes smoked per day before lockdown	-0.008***	0.001	0.957***	0.007
Base: African				
Asian/Indian	-0.257***	0.030	0.303***	0.047
Coloured	-0.216***	0.020	0.377***	0.034
White	-0.305***	0.023	0.227***	0.025
Prefer not to answer	-0.255***	0.029	0.305***	0.044
Base: Female				
Male	0.027**	0.012	1.163**	0.076
Prefer not to answer	0.057*	0.035	1.367*	0.251
Base: City				
Farm	0.021	0.033	1.116	0.187
Informal settlement	0.045	0.037	1.258	0.232
Rural	0.032	0.027	1.177	0.159
Suburb	-0.077***	0.019	0.659***	0.067
Town	-0.076***	0.023	0.665***	0.083
Township	-0.029	0.022	0.859	0.100
Age	0.003**	0.001	1.016**	0.007
Smoking duration	-0.003**	0.001	0.984**	0.007
Constant			1.475**	0.279
Observations	6,257		6 257	

Notes: The binary dependent variable is 1 if the respondent was successful in his/her quit attempt, given quitting was attempted, and 0 if he/she was unsuccessful. Significance stars indicate: *** p<0.01, ** p<0.05, * p<0.1, robust standard errors are presented. Average marginal effects presented.

3.2   Smoking behaviour before and during lockdown

The second substantial section of the questionnaire asked about respondents' smoking behaviour before the lockdown. For the remainder of this report, we analyse continuing smokers only (including smokers who did not attempt to quit, and those who attempted to quit but failed), and refer to them as such.

(a) Daily consumption

Of the continuing smokers, we asked the following question in the section on smoking behaviour during lockdown: "How many cigarettes have you smoked on average per day **in the last month**?". Respondents were asked to enter a number between 1 and 99. Table 8 shows the average number of cigarettes consumed by smokers before and during the lockdown (in the month before the questionnaire was completed).

Table 8. Cigarette consumption per day, pre-lockdown and during lockdown

	Pre-Lockdown			During Lockdown			
	Mean	SD	N	Mean	SD	N	P-Values
Males	16.2	9.7	7 103	12.9	9.4	6 343	0.00
African	8.3	6.2	1 382	5.7	5.4	1 059	0.00
Coloured	12.2	7.5	1 122	8.5	6.7	953	0.00
Indian	13.1	7.0	542	10.7	7.0	476	0.00
White	20.4	9.2	4 057	16.2	9.5	3 855	0.00
Females	16.5	8.7	12 280	13.2	8.6	11 222	0.00
African	7.8	6.4	489	5.6	6.1	396	0.00
Coloured	11.3	6.2	2 600	8.2	6.0	2 231	0.00
Indian	11.8	7.3	456	9.7	7.6	389	0.00
White	18.8	8.4	8 735	15.2	8.6	8 206	0.00
Race and/or gender undisclosed	15.9	8.7	1922	12.8	8.8	1739	0.00
Total	**16.4**	**9.0**	**21 305**	**13.1**	**8.9**	**19 304**	**0.00**

Notes: Table includes continuing smokers only (those who did not attempt to quit, and those who attempted but failed to quit). P-values are for the t-test for the difference in means.

Prior to the lockdown, White males were the heaviest smokers (on average 20 cigarettes per day), while African females and males were the lightest smokers, both consuming around 8 cigarettes per day. The relative position of each race-gender category remains largely unchanged between the pre-lockdown and during-lockdown periods. For our sample, continuing smokers smoked an average of 13.1 cigarettes per day during the lockdown, down from 16.4 cigarettes per day in the pre-lockdown period.

We also calculated the percentages of continuing smokers who, on an individual level, decreased, increased, or kept steady their cigarette consumption per day during lockdown (compared to their pre-lockdown consumption). The results are shown in Table 9.

Table 9. Percentage of continuing smokers who changed their daily cigarette consumption during lockdown

	N	Consumption stayed the same	Consumption Increased	Consumption Decreased
Males	6 830	34.8	14.1	51.1
African	1 303	18.6	25.1	56.3
Coloured	1 079	24.2	17.2	58.6
Indian	514	36.0	16.0	48.1
White	3 934	43.0	9.4	47.7
Females	11 920	34.3	15.0	50.7
African	473	18.4	23.7	57.9
Coloured	2 510	22.2	19.0	58.9
Indian	438	29.5	22.4	48.2
White	8 499	39.0	12.9	48.1
Race and/or gender undisclosed	1 876	34.9	15.3	49.8
Total	**20 624**	**34.5**	**14.7**	**50.8**

Roughly 50% of males and females in the sample indicated that they smoked less than before, while 15% of females and 14% of males indicated that they smoked more. Across all races, the proportion of people who indicated that they smoked less during the lockdown was higher than the proportion of people who indicated that they smoked more.

(b) Purchasing cigarettes during lockdown

All continuing smokers were asked whether they had purchased cigarettes during the lockdown ("During lockdown, have you purchased cigarettes?") The percentage of respondents who indicated that they have purchased cigarettes during the lockdown is shown in Table 10. For comparative purposes, this is shown for both rounds of data collection.

Table 10. Percentage of continuing smokers that reported purchasing cigarettes during lockdown: Round 1 and Round 2 data

	Round 1		Round 2		
	N	% bought cigarettes during lockdown	N	% bought cigarettes during lockdown	P-values
Males	3 789	92.5	7 171	92.1	0.49
African	783	90.0	1384	86.8	0.03
Coloured	599	91.0	1 126	91.8	0.55
Indian	278	89.2	547	91.6	0.26
White	2 129	94.3	4 114	94.1	0.75
Females	3 756	89.7	12 409	93.9	0.00
African	237	78.5	494	78.9	0.89
Coloured	849	88.6	2 615	93.3	0.00
Indian	152	87.5	459	89.8	0.44
White	2 518	91.3	8 841	95.1	0.00
Race and/or gender undisclosed	678	89.7	1 946	90.2	0.70
Total	**8 221**	**91.0**	**21 526**	**93.0**	**0.00**

Note: P-values are for the proportions test for the difference in proportions within groups.

Reporting round 1 and round 2 together allows us to investigate whether smokers' ability/willingness to purchase cigarettes changed over time, as cigarettes became more expensive, or more difficult/easy to find during lockdown. For most subgroups, there was no statistical difference in the proportion of smokers who reported purchasing cigarettes; however, overall, significantly more smokers purchased cigarettes in round 2 than in round 1. For males, 92% of respondents in round 2 indicated that they purchased cigarettes during lockdown, a similar percentage as during round 1. For females, the percentage of respondents who have purchased cigarettes has increased from 91% in the first round to 94% (statistically significant at the 1% level). This is driven by significant increases in the percentage of coloured (from 89% to 93%) and white (from 91% to 95%) females indicating that they have purchased cigarettes during lockdown.

(c) Retail outlet

Respondents were asked where they purchased their cigarettes pre-lockdown ("Where did you usually buy your cigarettes?") and during lockdown ("Think about your **most recent** purchase of cigarettes (even if it was only a single stick). Where did you buy your cigarettes from?"). Figure 1 indicates the distribution of the retail outlets before and during the lockdown.

Note that we cannot do a direct comparison with the results from round 1, as respondents in that round could select more than one outlet type that they had purchased cigarettes from during the lockdown, whereas in round 2 they could only select one.

Figure 1. Distribution of outlets where respondents purchased cigarettes pre-lockdown and during lockdown
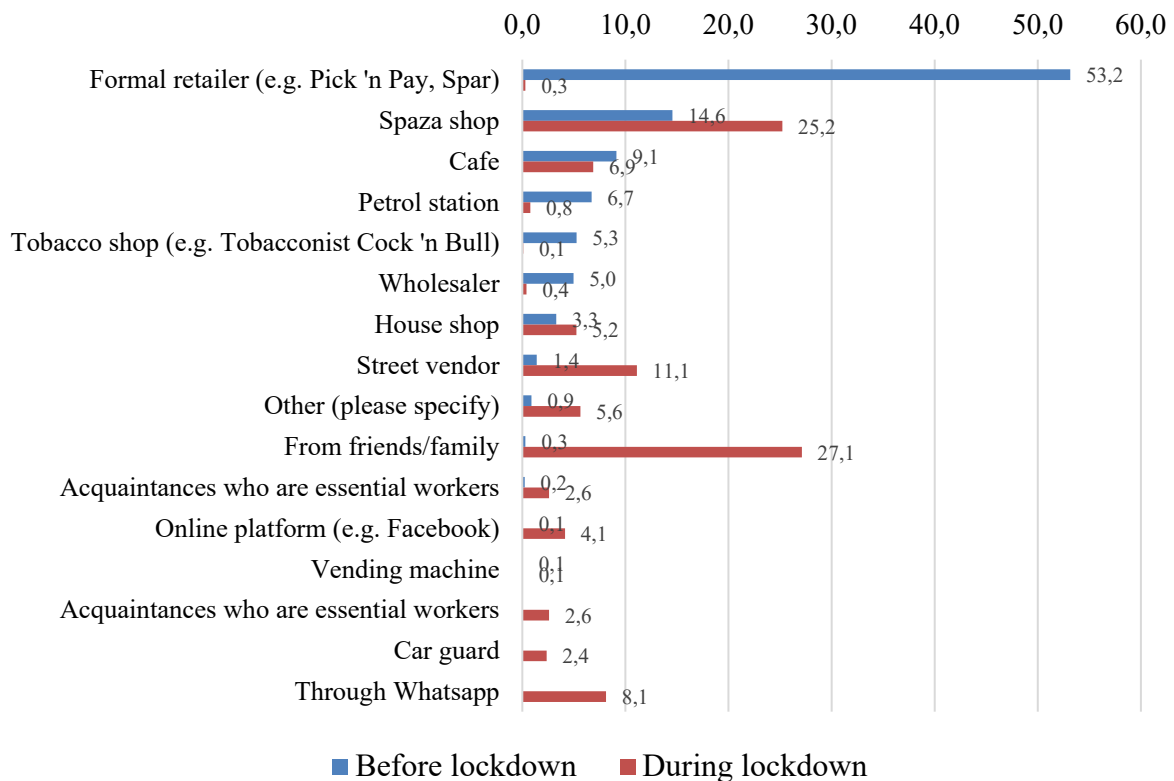
Note: N = 21 150 for pre-lockdown and N = 19 962 for lockdown

The cigarette distribution network has shifted significantly during the lockdown period. In the pre-lockdown period, formal retail outlets dominated in the sample, with more than 53% of the market. Including other formal, yet less dominant, outlet types such as petrol stations (6.7%), tobacco shops (5.3%) and wholesalers (5%), brings the total "formal" share of retailers to over 70% of the purchases pre-lockdown. This suggests that, under normal competitive conditions, respondents prefer these outlet types. In the lockdown period however, formal outlets play a negligible role. The most important outlet type in our sample during lockdown was "through friends and family" (27%). Spaza shops (25%) and street vendors (11%) also became important outlets during 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), 34% of the 5.6% (i.e. 2% overall) of people who selected the 'other' option used terms such as 'drug dealers', 'smugglers', 'black market traders', 'underground' or 'illicit traders' to describe their purchase outlet (not explicitly shown in Figure 1).

(d) Packaging type

We asked respondents to identify the packaging type in which they typically purchased cigarettes pre-lockdown and to identify the packaging type bought in their most recent purchase during the lockdown. The questions were as follows: "In what quantities/packaging did you usually buy cigarettes?" for the pre-lockdown section, and "For your **most recent** cigarette purchase (during lockdown), what packaging type did you buy? If you bought more than on pack type, choose one" for the purchase during lockdown. The distribution of cigarette packaging types before and during lockdown are shown in Table 11.

Table 11. Distribution of different types of packaging of cigarettes pre-lockdown and during lockdown

	Pre-Lockdown				During Lockdown			
	N	Packs	Cartons	Singles	N	Packs	Cartons	Singles
Males	7 152	57.4	36.7	6.0	6 635	42.7	38.9	18.4
African	1 395	67.0	8.7	24.4	1 214	37.2	5.8	57.0
Coloured	1136	78.8	16.0	5.2	1 048	53.4	12.2	34.4
Indian	546	69.4	29.1	1.5	504	47.0	43.1	9.9
White	4 075	46.5	53.0	0.5	3 869	40.9	56.0	3.0
Females	12 369	52.9	45.3	1.8	11 701	46.3	44.2	9.5
African	496	67.9	13.3	18.8	394	47.2	12.7	40.1
Coloured	2 625	77.1	19.4	3.4	2 456	55.8	15.6	28.7
Indian	457	68.3	30.9	0.9	414	46.1	44.9	8.9
White	8 791	44.0	55.6	0.4	8 437	43.5	54.0	2.5
Race and/or gender undisclosed	1 953	54.2	43.1	2.7	1 773	46.4	43.2	10.4
Total	**21 471**	**54.5**	**42.2**	**3.3**	**20 106**	**45.1**	**42.4**	**12.5**

Prior to the lockdown, 20-packs of cigarettes were the most common packaging type for all races and genders, except for Whites, who reported that 54% of their purchases were of cartons of cigarettes. Except for White females, the lockdown period has been characterised by a shift away from packs toward single cigarettes. On aggregate, while only 3.3% of people purchased single cigarettes before lockdown, 12.5% reported that their most recent purchase was of a single cigarette, while the proportion who purchased packs of cigarettes declined by around 9 percentage points, accounting for the increase in purchases of single cigarettes. The proportion of people buying cartons remained broadly unchanged, at around 42% both before and during the lockdown.

(e) Sharing cigarettes

One of the reasons for banning the sales of tobacco products, as explained by the Minister of Cooperative Governance and Traditional Affairs, is that people spread the virus when they share cigarettes (i.e. different smokers smoking the same cigarette).[vii] We investigated the prevalence of sharing cigarettes by asking the following two questions in different sections of the questionnaire: "Before lockdown, how regularly did you share the **same cigarette** with another person? (This does not include offering another person a cigarette from the same box)"), and "In the last month,

how regularly have you shared the **same cigarette** with another person? (This does not include offering another person a cigarette from the same box)"). In each case the options were the same, namely "never", "rarely (less than 10% of the cigarettes I smoked were shared with others)", "sometimes (between 10% and 50% of cigarettes I smoked were shared with others)" and "often (more than 50% of cigarettes I smoked were shared with others)".

In Figure 2, we show the percentage of respondents who have shared the same cigarettes, based on the categories defined above. Figure 3 shows the percentage change in the proportion of people who selected each category, pre- and during lockdown. The results indicate that the number of people sharing cigarettes has increased during the lockdown period. While 82% of people in our sample had never shared the same cigarette before the lockdown, this decreased to 74% during lockdown (the difference being statistically significant at the 1% level). At the same time, the percentage of people who shared cigarettes 50% or more of the time grew from 1.7% of the sample before the lockdown, to almost 9% of the sample during the lockdown (also statistically significant at the 1% level). The equates to a 430% increase in the number of people reporting sharing cigarettes more than 50% of the time (Figure 3) .

Figure 2. Percentage of respondents who have shared the same cigarette, pre-lockdown and during lockdown (n= 21 526)
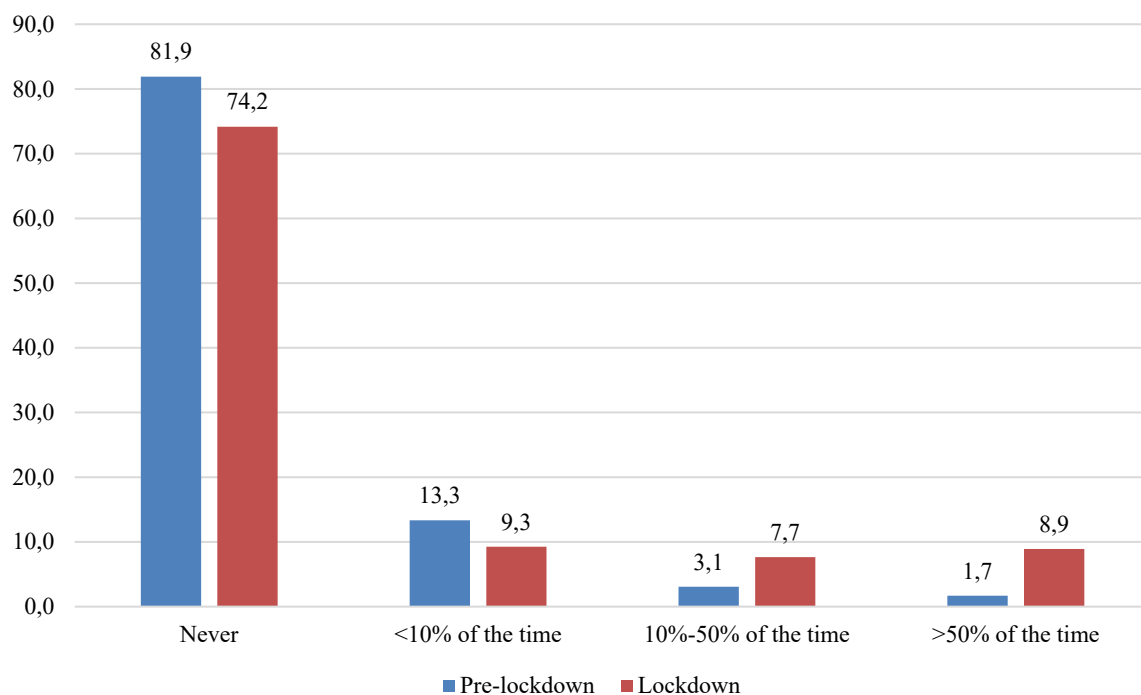
Note: For differences in proportions test, the tests for all four groups produce P-values of 0.00, thus significant at the 1% level.

Figure 3. Percentage change in number of people who have shared the same cigarette between the pre-lockdown period and the period during lockdown
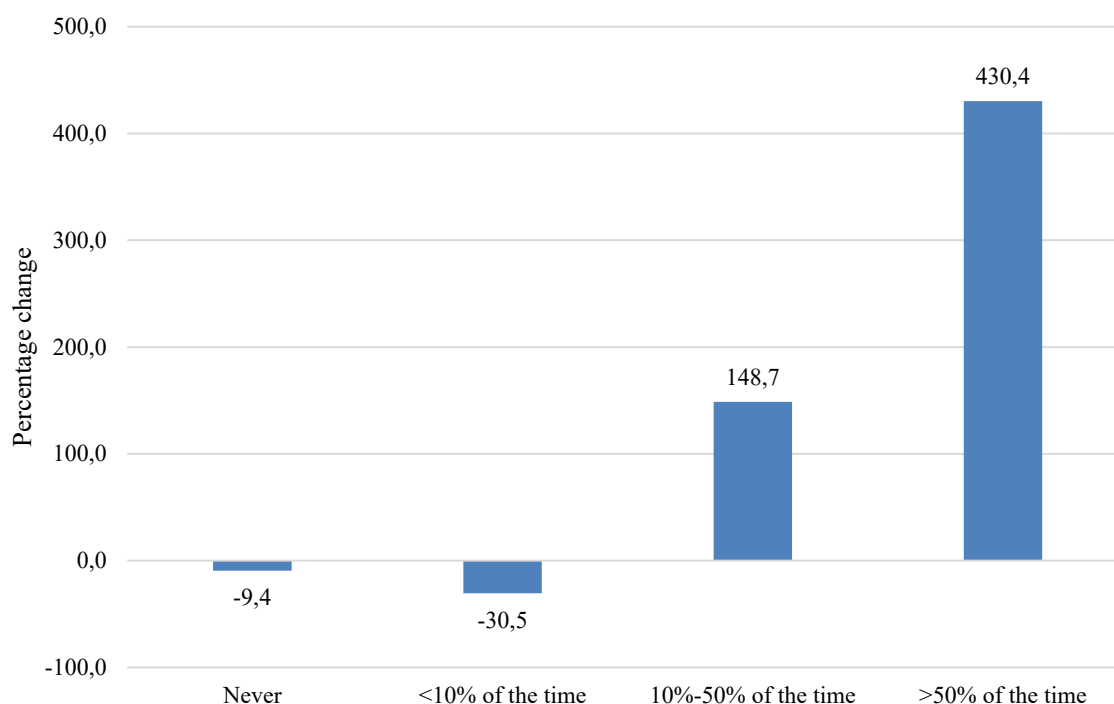
(f) Cigarette brands and their manufacturers

There has been a proliferation of new brands during the lockdown. For purchases during lockdown, 93 distinguishable brands were identified by respondents. We were able to identify the manufacturers of 72 brands; the manufacturers for the remaining 21 brands are labelled as "other". Using these manufacturers, we categorise each brand into one of two groups, either multinational companies (MNCs, comprising British American Tobacco (BAT), Philip Morris International (PMI), Japan Tobacco International (JTI) and Imperial Tobacco) and non-MNCs. The non-MNC brands are mostly produced by local/regional companies, many (although not all – Amalgamated Tobacco Company being an important exception) affiliated with the Fair-Trade Independent Tobacco Association (FITA). Non-MNC brands also covers a small percentage of brands that are imported, and include a broad category of brands labelled with a Sinitic language (i.e. no Western script on the pack) (1%).

In Table 12 we indicate the percentage of respondents, broken down by race and gender, who smoked MNC brands before the lockdown (based on round 2 data), between 29 April and 11 May (based on round 1 data), and between 4 and 19 June 2020 (based on round 2 data). The percentage of smokers who smoked non-MNC brands is simply 100 minus the numbers reported in Table 12. Appendix C notes in detail why one should be careful when comparing round 1 and round 2 data. In this case, since we consider the evolution of the tobacco market over the duration of the lockdown period, we include round 1 data in the table, but we nevertheless urge the reader to use caution in interpreting the results.

Table 12. Percentage of smokers who smoked multinational companies' brands pre-lockdown and during lockdown

	Pre-Lockdown		29 April - 11 May (Round 1)		4 June - 19 June (Round 2)	
	N	Percentage	N	Percentage	N	Percentage
Males	6 985	77.2	3331	37.5	6454	19.9
African	1 344	74.6	665	35.2	1166	23.9
Coloured	1 093	77.8	517	37.1	1015	16.4
Indian	535	84.5	238	55.9	491	35.0
White	4 013	76.9	1911	36.2	3782	17.6
Females	12 176	76.4	3217	38.2	11416	17.4
African	479	83.7	172	50.6	381	24.4
Coloured	2 563	82.9	727	40.4	2396	17.5
Indian	452	81.9	130	53.1	404	32.2
White	8 682	73.8	2188	35.6	8235	16.3
Race and/or gender undisclosed	1 901	80.2	569	40.8	1699	19.5
Total	**21 062**	**77.0**	**7 116**	**38.1**	**19 569**	**18.4**

Notes: The pre-lockdown columns relate to round 2 data. Multinational companies include British American Tobacco, Philip Morris International, Japan Tobacco International, and Imperial Tobacco.

Results show a marked shift away from MNC brands toward non-MNC brands during the lockdown. Before the lockdown, 77% of respondents smoked brands produced by the MNCs. This proportion essentially halved by the time of the round 1 survey, in which only 38% of smokers indicated that they smoked MNC brands. By the time of the second survey, only 18.4% of smokers reported that they smoked MNC brands.

In Table 13, we indicate the shares of the most popular cigarette manufacturers before the lockdown and during the lockdown (for both rounds of data collection). For this analysis, we weight each respondent's response with the average daily number of cigarettes smoked by him/her in the various time periods, to get a sense of the full market within our sample. For example, a person who smokes 20 cigarettes a day will have double the weight in this analysis of a person who smokes 10 cigarettes a day. Please note that we do not claim that this categorisation is nationally representative, since our sample is not representative of the smoking population.

Table 13. Individual companies' share of cigarettes bought by respondents in our survey, pre-lockdown and during lockdown: Round 1 and Round 2

Manufacturer	Before lockdown proportion	Round 1 proportion	Round 2 proportion
BAT	48.0	19.7	8.7
JTI	15.3	7.2	4.1
GLTC	12.2	27.1	26.3
Philip Morris	11.5	9.2	4.4
Carnilinx	5.5	11.9	14.3
Pacific Cigarette Company	1.9	3.6	7.9
Amalgamated Tobacco	1.9	4.4	9.6
Best Tobacco	1.5	6.3	10.7
Afroberg Tobacco Company	0.5	3.6	3.4
Protobac	0.4	2.2	0.4
Olomide	0.2	0.2	2.2
Folha	0.1	0.5	0.4
Smokey Treats	0.1	0.0	0.0
Imperial Tobacco	0.0	0.0	0.0
Mastermind Tobacco	0.0	0.3	0.4
Other	1.1	3.8	7.3
Total	100	100	100

Notes: Pre-lockdown shares are based on round 2 data; shares for 29 April to 11 May 2020 are based on round 1 data; shares for 4 June to 19 June are based on round 2 data. All individual responses are weighted by their declared consumption. The observations, weighted by consumption, for each category are N=345 992 (pre-lockdown), N=108 691 (round 1) and N=242 541 (round 2).

Results show that the distribution of producers has changed dramatically between the pre-lockdown period and during the lockdown. Before the lockdown, the market for cigarettes was concentrated in the top 4 producers, who made up 87% of the market.[2] By the time of the round 2 survey, this same market share (87%) is made up by the top 8 producers. This indicates that the market for cigarettes has become substantially less consolidated during the lockdown.

The relative position of MNCs and non-MCS has also changed considerably during the lockdown (Table 13). While three of the top five producers were MNCs prior to the lockdown, no MNCs are in the top five in the "during-lockdown" period. In fact, all four MNC producers (British American Tobacco, Philip Morris, Japan Tobacco International and Imperial Tobacco) have lost substantial market share during the lockdown, while the market shares of the local producers have increased.

British American Tobacco (BAT) has taken the biggest knock as a result of the sales ban. While around 48% of smokers in our sample bought BAT brands before the lockdown, BAT's market

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[2] Please note that when we mention "market share", we are referring to the *sample*, where each person is weighted by his/her daily consumption. We do not claim that this is representative of the national market shares, as they would be reported in publications by Euromonitor or Global Data, for example.

share had shrunk to 20% when we did the first survey and to a mere 9% by the time of the second survey.

Gold Leaf Tobacco Corporation (GLTC), which, before the lockdown, was the third largest market player in the sample, is now in first place, with a market share of 26%. Carnilinx, which was previously number 5 with a sample market share of 5%, is now in second place, with a market share of 14%. Best Tobacco Company (BTC) is currently in third place, having increased its market share of sales among our sample from 1% pre-lockdown to 11%. Amalgamated Tobacco Company (ATC) is in fourth place, having increased its market share from 2% pre-lockdown to 10% in June 2020.

There has been a shift in the market shares between the first and the second surveys. For example, of the non-MNC companies, Amalgamated Tobacco Company, Best Tobacco Company and Pacific experienced increases in market share between the first and the second surveys, while Gold Leaf Tobacco, Afroberg Tobacco, and Protobac experienced declines in sales, suggesting that non-MNCs are still jostling for market share.

In Table 14, we show the shares of the 20 most common brands pre-lockdown, as indicated by the round 2 survey respondents. The shares are weighted by the daily consumption of smokers. We also indicate the shares of the brands in the 29 April to 11 May period (based on round 1 survey results) and the 4 June to 19 June period (based on round 2 survey results).

Table 14. Percentage of cigarettes purchased by respondents before and during lockdown

Brand	Producer	Pre-lockdown share	Lockdown share 29 April - 11 May	Lockdown share 4 June - 19 June
Pall Mall	BAT	12.3	3.0	1.3
Peter Stuyvesant	BAT	11.5	7.1	2.4
Camel	JTI	7.4	4.7	2.3
Marlboro	Philip Morris	7.2	7.3	3.5
Benson & Hedges	BAT	6.9	1.8	0.5
Winston	JTI	6.5	1.9	1.0
Kent	BAT	4.5	1.0	0.4
Dunhill	BAT	4.4	2.6	1.2
Chesterfield	Philip Morris	4.3	1.8	0.9
Rothmans	BAT	3.7	0.9	1.2
Voyager	GLTC	3.2	2.1	1.1
Rudland & George (RG)	GLTC	3.0	7.8	11.6
Sharp	GLTC	2.6	13.2	5.7
JFK	Carnilinx	2.3	4.8	6.1
Courtleigh	BAT	1.7	1.5	0.8
Chicago	GLTC	1.7	1.5	5.4
Remington Gold	Pacific Tobacco	1.4	2.5	5.3
Caesar	BTC	1.4	5.2	8.1
Vogue	BAT	1.0	0.1	0.1
Savannah	GLTC	1.0	1.2	2.0
Other		12.0	28.0	39.3

Notes: The table is ordered according to the pre-lockdown brand rank (top 20). Pre-lockdown shares are based on round 2 data; shares for 29 April to 11 May 2020 are based on round 1 data; shares for 4 June to 19 June are based on round 2 data. All individual responses are weighted by their declared consumption.

Before lockdown, the top ten brands, all of which are owned by MNCs, comprised 69% of the cigarette purchases of the respondents in our survey. BAT-owned Pall Mall and Peter Stuyvesant were the most popular brands, making up 12.3% and 11.5% of total sales before the lockdown, followed by JTI's Camel (7.4%) and Phillip Morris's Marlboro (7.2%). In the first survey these ten MNC brands made up 32% of respondents' purchases, and by the second survey this had decreased to 14% of all purchases. None of the MNC brands feature in the top ten brands in either round 1 or round 2.

The evolution of the 'other' category shows how highly fragmented the cigarette market has become. Before lockdown, brands outside of the top 20 made up only 12% of the market. In fact, pre-lockdown, the top ten brands made up almost 70% of cigarettes consumed in our sample. During lockdown however (round 2), the brands outside of the top 20 pre-lockdown brands comprised 39% of the market. This indicates that the lockdown market is spread across the 93 available brands, as opposed to being highly concentrated amongst the most popular brands, as it was before the lockdown. A complete list of brands with their share of purchases among respondents is shown in Appendix D.

(g) Cigarette prices

There have been numerous reports in the media that the prices of cigarettes have increased dramatically during the lockdown period. We found that cigarette prices had increased by an average of about 90%, relative to the pre-lockdown period, in the first survey. Also, based on an analysis in which we regressed the percentage change in the price of cigarettes on a number of explanatory variables, we reported that the price of cigarettes increased by an average of 4.4% per day (relative to the price pre-lockdown) in the 13 days that we conducted the survey (i.e. between 29 April and 11 May 2020). These results were based on weighted data, and should not be confused with the estimates reported in tables below.

Table 15 shows the average price increase for the round 2 data by first converting the reported prices (for the pre-lockdown period and during the lockdown period) to a price per cigarette. The average price for a single cigarette (across all packaging types) before the lockdown was R1.63, which increased to R5.69 per cigarette (average across all packaging types) during lockdown. This is an increase in the mean price of nearly 250%. The dispersion of prices has also changed considerably during the lockdown. In particular, before the prohibition on tobacco sales, the price ranged between R0.45 per stick and R4 per stick. During lockdown, however, the price ranges from R2 to about R25 per stick.

In Table 16 we show the pricing dynamics for the 20 brands that were most purchased by our sample of respondents before the lockdown and during the lockdown. As we did for Table 15, we converted all the prices to a per-cigarette price.

Table 15. Per-stick cigarette prices pre-lockdown and during the lockdown, by race and gender

	Pre-Lockdown				Lockdown				% change	
	Mean	Median	SD	N	Mean	Median	SD	N	Mean	Median
Males	1.68	1.75	0.58	6 633	5.63	5.00	2.65	6 577	235	186
African	1.93	2.00	0.73	1 204	5.90	5.00	2.56	1 200	206	150
Coloured	1.65	1.65	0.49	1 051	7.63	7.50	2.71	1 032	363	355
Indian	1.73	1.75	0.50	513	5.03	4.75	2.06	499	190	171
White	1.61	1.60	0.54	3 865	5.09	4.00	2.46	3 846	216	150
Females	1.60	1.60	0.53	11 639	5.71	5.00	2.77	11 607	256	213
African	1.95	2.00	0.65	440	5.94	5.00	2.88	384	204	150
Coloured	1.66	1.65	0.44	2 477	7.94	8.00	2.73	2 433	378	385
Indian	1.72	1.75	0.50	417	5.20	4.50	2.14	411	203	157
White	1.56	1.60	0.53	8 305	5.07	4.00	2.45	8 379	225	150
Race and/or gender undisclosed	1.67	1.65	0.52	1 820	5.82	5.00	2.84	1 744	249	203
Total	**1.63**	**1.65**	**0.55**	**20 092**	**5.69**	**5.00**	**2.74**	**19 928**	**248**	**203**

Notes: All prices (irrespective of the packaging type in which the respondent reported) are converted to a per stick price.

Table 16. Per-stick cigarette prices pre-lockdown and during the lockdown, by cigarette brand

Brand	Producer	Pre-Lockdown				Lockdown				% change	
		Mean	Median	SD	N	Mean	Median	SD	N	Mean	Median
Pall Mall	BAT	1.42	1.35	0.25	2 316	5.63	4.50	3.10	260	298	233
Peter Stuyvesant	BAT	1.95	2.00	0.33	2 602	6.88	6.50	3.12	519	252	225
Camel	JTI	1.97	1.90	0.33	1 597	6.36	6.00	2.69	449	223	216
Marlboro	Philip Morris	2.04	2.00	0.32	1 709	7.40	7.50	2.92	804	263	275
Benson & Hedges	BAT	1.64	1.60	0.21	1 289	5.78	5.00	3.22	113	252	213
Winston	JTI	1.55	1.50	0.25	1 163	6.48	6.00	2.74	188	319	300
Kent	BAT	1.98	2.00	0.23	782	5.99	6.00	2.42	59	203	200
Dunhill	BAT	2.22	2.25	0.31	910	6.08	6.00	2.47	236	174	167
Chesterfield	Philip Morris	1.67	1.60	0.28	829	5.70	5.00	2.90	178	242	213
Rothmans	BAT	1.67	1.60	0.26	916	5.48	4.00	3.22	217	228	150
Voyager	GLTC	1.27	1.25	0.30	524	4.80	4.00	2.31	195	278	220
Rudland & George (RG)	GLTC	1.06	1.00	0.51	564	4.14	3.60	1.59	2 003	292	260
Sharp	GLTC	0.83	0.70	0.56	442	4.33	4.00	1.70	1 070	423	471
JFK	Carnilinx	0.85	0.75	0.32	384	6.74	6.50	2.18	1 291	698	767
Courtleigh	BAT	2.30	2.25	0.45	509	6.64	7.00	2.13	234	188	211
Chicago	GLTC	1.10	1.00	0.38	391	8.11	8.00	2.13	1 302	636	700
Remington Gold	Pacific Tobacco	0.82	0.75	0.55	239	4.23	3.75	1.85	950	413	400
Caesar	BTC	1.01	1.00	0.49	279	7.25	7.50	2.78	1 949	616	650
Vogue	BAT	2.16	2.22	0.28	194	7.20	7.50	3.71	13	234	237
Savannah	GLTC	1.14	1.00	0.50	222	5.00	4.50	2.05	453	338	350
Overall		**1.63**	**1.65**	**0.55**	**19 922**	**5.69**	**5.00**	**2.73**	**19 810**	**248**	**203**

Notes: All prices (irrespective of the packaging type in which the respondent reported) are converted to a per stick price. The table is ordered according to the pre-lockdown brand rank (top 20).

From Table 16, we calculate that before the lockdown, the average and median price for MNC brands was R1.90, while the average price of non-MNC brands was R1.00 (median = R0.93). Non-MNC brands do not have the brand recognition and reputation of the international brands produced by the MNCs. Because traditional advertising has not been allowed in South Africa since 2001, the only way that the non-MNC producers could get into the market was to compete on price. It is also possible that the MNC brands have a reputation for being of higher quality than the non-MNC brands.

During the lockdown, the average price of MNC brands rose to R6.30 (a 232% increase), and the average price of non-MNC brands rose to R5.57 (a 457% increase). While prices increased across the board during lockdown, non-MNC brands experienced a much larger price increase relative to the non-MNC brands, because of the substantially lower base values at the outset.

The descriptive analysis clearly indicates that the ban on cigarette sales has had a significant impact on the prices that smokers pay for cigarettes. As we did in the first survey, 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 during lockdown.[3]

Using OLS, we regress the percentage change in the price of cigarettes on the following: (1) geographic variables (province and type of area where the respondent lives), (2) household income bracket, (3) two demographic variables (race and gender), (4) age of respondent and duration of smoking, (5) type/types of retail outlet where smokers purchased cigarettes during the lockdown, (6) the packaging type/types bought during the lockdown, and (6) whether the respondent switched from MNC brands to non-MNC brands (or vice versa). Similarly to what we did in the analysis based on the first survey, we also included the day on which the respondent completed the survey (4 June 2020 = day 1, 5 June 2020 = day 2, ... 19 June 2020 = day 16) in the regression equation to determine whether cigarette prices were changing over the course of the survey period.

We discuss the coefficients from round 2 as they appear chronologically in Table 17. Table 17 also shows the results of the regression using unweighted round 1 data. Please note that the round 1 regression results presented here differ from those presented in the report of 15 May 2020, because those results were weighted, while these are not. While our discussion is primarily focussed on the more recent round 2 data, we do indicate instances where the results of the round 1 and round 2 surveys differ substantially.

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[3] For round 1, the lockdown price is averaged across all reported packaging types, while in round 2 respondents reported one single price.

Table 17. OLS regression: correlates of the increase in cigarette prices

Dependent variable: % change in price before and after lockdown					
Round 1 (29 April – 11 May 2020)			**Round 2 (4 June – 19 June 2020)**		
Independent variables			Independent variables		
Base: Western Cape	**Coefficient**	**T-stats**	**Base: Western Cape**	**Coefficient**	**T-stats**
1. Eastern Cape	-27.82***	-4.8	1. Eastern Cape	-103.4***	-12.3
2. Free State	14.33	1.3	2. Free State	-202.6***	-22.5
3. Gauteng	8.328***	2.7	3. Gauteng	-206.0***	-45.8
4. KwaZulu-Natal	-8.196*	-1.9	4. KwaZulu-Natal	-200.9***	-35.1
5. Limpopo	-21.39*	-2.0	5. Limpopo	-249.2***	-15.4
6. Mpumalanga	-15.47*	-1.9	6. Mpumalanga	-267.9***	-27.4
7. North-West Province	-9.485	-1.2	7. North-West Province	-194.7***	-17.8
8. Northern Cape	24.13	1.5	8. Northern Cape	-19.8	-1.1
Base: City			**Base: City**		
Farm	0.555	0.1	Farm	11.8	1.2
Informal settlement	-32.03**	-2.4	Informal settlement	-45.33*	-1.8
Rural	-8.027	-0.9	Rural	-15.73*	-1.7
Suburb	-0.493	-0.1	Suburb	2.1	0.4
Town	-0.24	0.0	Town	-0.9	-0.1
Township	-35.40***	-4.2	Township	-27.71**	-2.2
Base: R0-R400			**Base: R0-R400**		
R401-R800	-0.467	0.0	R401-R800	51.1	1.5
R801–R1 600	25.09*	1.7	R801–R1 600	23.7	0.9
R1 601–R3 200	18.19	1.4	R1 601–R3 200	14.8	0.7
R3 201–R6 400	16.36	1.6	R3 201–R6 400	16.8	0.8
R6 401–R12 800	10.28	1.1	R6 401–R12 800	1.6	0.1
R12 801 – R25 600	10.5	1.1	R12 801 – R25 600	-3.2	-0.2
R25 601-R51 200	6.071	0.6	R25 601-R51 200	-9.8	-0.5
R51 201–R102 400	8.096	0.8	R51 201–R102 400	-4.6	-0.2
R102 401–R204 800	11.99	1.1	R102 401–R204 800	-0.2	0.0
R204 801 or more	33.11***	2.7	R204 801 or more	-7.6	-0.3
Base: African			**Base: African**		
Asian/Indian	4.543	0.6	Asian/Indian	60.25***	5.4
Coloured	2.529	0.4	Coloured	59.16***	6.0
White	-10.07	-1.5	White	59.57***	6.1
Prefer not to answer	-8.801	-1.1	Prefer not to answer	67.14***	5.7
Base: Female			**Base Female**		
Male	-3.332	-1.4	Male	-10.93***	-3.2
Prefer not to answer	-18.47	-1.4	Prefer not to answer	-9.0	-0.4
Consumption per day before LD	0.594***	3.5	Consumption per day before LD	1.500***	6.9

	Coef.	t		Coef.	t
Age	-0.863***	-3.2	Age	-2.265***	-5.4
Smoking duration	0.215	0.8	Smoking duration	1.296***	3.1
Store Type			**Store Type (Base: Café)**		
Street vendor	7.976***	2.6	Street vendor	17.82**	2.2
Spaza shop	-1.679	-0.6	Spaza shop	5.42	0.8
House shop	0.954	0.3	House shop	-5.082	-0.5
Formal retailer (e.g. Pick n Pay. Spar. etc.)	-16.58**	-2.0	Formal retailer (e.g. Pick n Pay. Spar. etc.)	-75.93***	-3.6
Through Whatsapp	7.025**	2.1	Through Whatsapp	16.67**	2.4
Online platform (e.g. Facebook. online tobacco shop. etc.)	24.32***	3.1	Online platform (e.g. Facebook. online tobacco shop. etc.)	0.84	0.1
Acquaintances who are essential work	2.99	0.8	Acquaintances who are essential work	5.35	0.5
From friends/family	-0.155	-0.1	From friends/family	-13.05**	-2.1
			Tobacco shop (e.g. Tobacconist, Cock 'n Bull. etc.)	-106.9**	-2.4
			Vending machine	-97.54	-1.4
			Wholesaler	88.23**	2.4
			Car guard	24.88**	2.1
			Petrol station	-8.885	-0.5
Other (please specify)	12.29***	3.1	Other (please specify)	21.19**	2.4
Switching behaviour (Base: Always MNC)			**Switching behaviour (Base: Always MNC)**		
MNC to non-MNC	-22.45***	-9.8	MNC to non-MNC	-48.46***	-13.4
Always non-MNC	52.44***	9.5	Always non-MNC	229.9***	32.5
Non-MNC to MNC	77.77***	3.3	Non-MNC to MNC	198.5***	7.7
Packaging			**Packaging (Base: 20 pack)**		
Single	45.83***	7.8	Single	137.4***	15.3
10 pack	28.15***	4.5	10 pack	140.7***	4.3
20 pack	7.335*	1.8			
30 pack	-5.55	-0.6	30 pack	-42.73	-1.2
200 carton	-2.705	-0.7	200 carton	-69.95***	-18.8
Day	5.995***	7.9	Day	-1.2	-1.3
Constant	62.14***	4.5	Constant	402.9***	16.3
Observations	4.672		Observations	15.007	
R-squared	0.236		R-squared	0.462	

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust t-statistics. The dependent variable indicates the individual level % increase in price between pre-lockdown and lockdown. The interpretation on "Store" and "Packaging" differs for rounds 1 and 2. In round 1, respondents could select more than one category for these questions, therefore each category is treated as a binary independent variable. In round 2, respondents could only select 1 category for each

question, and therefore these variables are treated as categorical variables (to avoid perfect multicollinearity, a base category was arbitrarily selected).

Holding all else constant, there are substantial differences between provinces in the price increases. The Western Cape is experiencing much higher price increases than any other province. Results show that, relative to the Western Cape, all other provinces have experienced lower increases in cigarette prices (some in the order of around 200 percentage points lower than the Western Cape). The Northern Cape's price increase is statistically insignificant from that of the base province (i.e. the Western Cape).

Table 18 provides context for these differences. Gauteng, where most South African-made cigarettes are produced, has one of the smallest price increases (152%). Provinces closer to the Mozambican and Zimbabwean borders such as Mpumalanga and Limpopo also experienced relatively subdued price increases of 141% and 123%, respectively, compared to the Western Cape (379% increase), Northern Cape (367% increase) and Eastern Cape (281% increase), which are further away.

Table 18. Price increases by province

	Before lockdown			Lockdown			% change
	Mean	**SD**	**N**	**Mean**	**SD**	**N**	
Eastern Cape	1.55	0.56	1198	5.89	2.14	1185	281
Free State	1.51	0.61	634	4.57	1.77	656	203
Gauteng	1.65	0.59	7208	4.16	1.75	7140	152
Kwazulu-Natal	1.61	0.55	2333	4.59	1.89	2317	185
Limpopo	1.64	0.62	307	3.65	2.19	291	123
Mpumalanga	1.47	0.62	598	3.54	1.65	597	141
North-West Province	1.52	0.61	544	4.41	1.94	534	191
Northern Cape	1.52	0.56	341	7.09	3.12	334	367
Western Cape	1.68	0.45	6930	8.02	2.42	6874	379
Overall	**1.63**	**0.55**	**20 093**	**5,69**	**2.74**	**19928**	**248**

The area where people live also had an impact on the cigarette price increase that they experienced during the lockdown (Table 17). Respondents living on farms and in the suburbs experienced higher (although not statistically significant) price increases than people living in more densely populated areas. Cigarette prices increased by 28 percentage points less in townships than in the cities (the base category). In informal settlements, the price increase was about 45 percentage points less than in the base category and in rural areas the price increases were around 16 percentage points less than in the cities.

There is no clear link between income and price increases. Demographic variables emerge as an important covariate of the price changes in the second survey, which was not the case in the first survey. All other race groups experienced relatively higher price increases, in the order of 60 percentage points, than those experienced by Africans (the base category). Compared to females, males experienced statistically significant lower (about 11 percentage points) increases in the price of cigarettes.

The coefficient on age is negative and statistically significant across both rounds, which suggests that, in both rounds, older smokers 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 a more addicted person to be more desperate to purchase cigarettes and therefore more willing to pay a higher price than a less addicted person. In the second survey, the coefficient on "smoking duration" is 1.29 and statistically significant, indicating that for every additional year of smoking, the average price that smokers pay for their cigarettes is 1.29 percentage points higher, holding all other things constant. However, one needs to compare the coefficient on smoking duration with the coefficient on the respondent's age (which is -2.26). Age and smoking duration are strongly collinear, as most people start smoking at similar ages (15-21). Given that the two variables move in opposite directions, the net effect of age and smoking duration on the price increase during lockdown is small and negative.

Similarly to the first survey's results, the second survey shows that the outlet where smokers bought cigarettes during the lockdown period has a substantial impact on the magnitude of the increase in the prices paid. However, the two surveys' results are not comparable since in the first survey, participants could indicate more than one outlet where they purchased cigarettes during the lockdown, which was not the case in the second survey.

The small number of smokers who bought their cigarettes at formal retailers (0.3% of all respondents in our sample) experienced a 76-percentage point smaller increase in price than those who purchased cigarettes from cafés (the base category). Similarly, smokers who purchased their cigarettes through a tobacco shop during the lockdown experienced a significantly smaller increase in price (107 percentage points) than smokers who purchased cigarettes from cafés. People who bought cigarettes from friends and family experienced a more modest price increase discount of 14 percentage points compared to those who purchased at cafés. Virtually all other categories paid a premium compared to cafés, with the most significant premium occurring for those who purchased cigarettes from a wholesaler. The price that these smokers paid was about 88 percentage points higher than in the base category.

Many smokers changed cigarette brands during the lockdown period, with most shifting from MNC brands to non-MNC brands. The base category in this case are smokers who smoked an MNC brand before the lockdown and who continued smoking an MNC brand during the lockdown. The magnitudes of the coefficients are significantly higher for the regressions based on the second survey than for the first survey, though the sign on the coefficients is the same across the both rounds. The large difference in the size of the coefficients between rounds 1 and 2 can be ascribed to the much larger price increases in the prices in the second survey, compared to the first.

Smokers who switched from MNC brands to non-MNC brands experienced a substantially smaller increase in the prices that they paid (of 49 percentage points). This means that those who "downgrade" to non-MNC brands would pay a relatively lower price than if they continued smoking MNC cigarettes.

Smokers who smoked non-MNC brands pre-lockdown, and continued smoking non-MNC cigarettes during the lockdown, experienced a 230 percentage points higher price increase than smokers who smoked MNC brands before and during the lockdown. This does not imply that the absolute prices of non-MNC brands are higher during the lockdown period (they are not, as we saw in Table 18), but rather that the percentage increase in the price of non-MNC cigarettes is much higher than that of the MNC brands. This suggests that non-MNC companies are capitalising on the desperation of smokers.

Smokers who switched from non-MNC cigarettes pre-lockdown to MNC cigarettes during the lockdown are also worse off, as the price they pay for their MNC cigarettes is almost 200 percentage points higher than the prices that smokers who smoked MNC brands before and during the lockdown paid for their cigarettes.

As in the discussion on outlets where respondents purchased cigarettes, the coefficients on packaging types between the first and second surveys are not directly comparable, as respondents could provide more than one option in the first round, but only one option in the second. We will discuss primarily the results of the second round of data collection, where we take the base category as a pack of 20 cigarettes.

Smokers buying larger packs (30 packs and cartons) experienced a "volume discount" compared to smokers who purchase 20-packs, in that the price increase is substantially lower (43 percentage points (albeit not significant) for 30-packs and 70 percentage points for cartons). On the other hand, smaller packaging types (singles and ten packs) have experienced substantially larger increases (of 137 percentage points and 140 percentage points respectively) than 20-packs.

A much-reported result of the first survey was the finding that the price of cigarettes had increased by 4.4 percentage points per day during the two weeks that the survey was being conducted (29 April to 11 May 2020). Repeating that exercise, but with unweighted data, indicated that the price had increased by 6 percentage points per day, relative to the pre-lockdown prices, over the round 1 survey period. A similar analysis for the second survey indicates that, holding all other factors constant, cigarette prices had not increased during the two-week period of the survey.

3.3   Perceptions

In the penultimate section of the questionnaire we asked respondents their views on the ban on the sale of tobacco products and alcohol during the various levels of the lockdown. Respondents could agree or disagree with a number of statement, or indicate that they didn't know. In Table 19 we indicate the percentage of respondents that agree with five different statements. We discuss responses to each statement in turn below.

Only 15% percent of respondents agreed with the ban on sales of tobacco products during lockdown level 5. Males (20%) were slightly more supportive than females (12%) and there are large differences in support by race. Forty-nine per cent of Africans who provided an opinion were supportive of the level-5 ban, which is more than double of the next-most supportive group (Coloureds, 19.2%). Disagreement with the ban was most pronounced among Whites; 93% did not support the ban on the sale of tobacco products during lockdown level 5.

On aggregate, support for the extension of the ban on the sale of tobacco products into lockdown levels 4 and 3 stood at 6%. Africans are the only group for which support for the extension of the ban was above 10%. In fact, 35% of African males and 41% of African females support the ban on the sale of cigarettes in lockdown levels 4 and 3. Support for the sales ban in lockdown levels 4 and 3 is strongly correlated with quitting behaviour. The simple correlation coefficient between successful quitting and support for the sales ban into lockdown level 3 is 0.5715 (P-value 0.000). Since a large percentage of African respondents indicated that they have quit successfully during lockdown, high support for the extension of the lockdown within this group is not surprising.

There was much greater support for the ban on alcohol sales in levels 4 and 5 (45%) than for the ban on tobacco products. The majority of respondents (53%) supported the policy to allow the sale of alcohol during lockdown level 3, though support amongst women was lower (50%) than amongst men (58%).

On the matter of the risk of contracting Covid-19 from sharing a cigarette, less than a majority (48%) of respondents think that a person can get COVID-19 from sharing a cigarette. Men (55%) are substantially more likely to believe that one can get COVID-19 from sharing a cigarette than women (43%). The correlation coefficient between having shared a cigarette during lockdown and believing that one can contract Covid-19 from sharing a cigarette is 0.0643 (P-value 0.000). Thus, despite there being a positive (yet small) correlation between believing one can contract COVID-19 from sharing a cigarette, respondents with this belief still reported sharing cigarettes during lockdown.

Table 19. Percentage of respondents that agree with different statements: Round 2 data only

	N	The ban on the sale of tobacco products during lockdown level 5	The extension of the ban on the sale of tobacco products into lockdown levels 4 and 3	The ban on the sale of alcohol during lockdown levels 5 and 4	The policy to allow the sale of alcohol during level 3 of the lockdown	Do you think you can get COVID-19 from sharing a cigarette
Males	8 271	20.3	11.0	45.2	58.2	55.0
African	2 132	46.4	35.0	62.2	53.3	69.6
Coloured	1 285	22.0	9.3	53.4	46.1	50.6
Indian	585	16.6	4.2	50.1	45.1	51.3
White	4 269	7.6	1.0	34.1	65.9	49.9
Females	13 272	12.4	4.8	44.8	49.6	43.2
African	931	52.0	40.9	63.4	51.5	75.8
Coloured	2 851	16.4	6.2	57.5	33.8	45.1
Indian	488	14.7	4.8	56.3	32.2	42.9
White	9 002	7.1	0.8	38.5	55.2	39.4
Race and/or gender undisclosed	2 088	12.6	4.1	44.8	50.1	46.0
Total	**23 631**	**15.2**	**6.9**	**44.9**	**52.7**	**47.6**

4. Discussion

4.1   About the sample

This study is a follow-up study to an earlier study, which was published on 15 May 2020. Whereas the first report was based on 12 204 valid responses, the current study uses 23 835 valid responses for the section on respondents' quitting behaviour and 23 631 responses for the rest of the analysis.

We want to re-emphasise the fact that, because the study was based on an online survey, it does not have an experimental design that allows us to reweight the data in a way that makes it nationally representative. The survey attracts smokers with above-average levels of income, and who are more educated and more urbanised than the general South African (smoking) population. In terms of race and gender, the survey substantially oversampled women and Whites, and undersampled males and Africans. In order to provide a more nuanced and deeper understanding of the data, and taking cognisance of the fact that race and gender are still strongly correlated with smoking patterns in South Africa, we typically reported the results by race and gender. However, even at the level of race and gender, we cannot claim representativeness, because the survey has typically not captured smokers at the lower socio-economic levels within each of those race-gender groupings.

We appreciate that many readers of this report would like to extrapolate the results from the sample to the whole smoking population. We attempted to do that in the first report, by weighting the data according to race, gender and province. In that report we acknowledged that such a strategy may have flaws of its own, because each race-gender-province sub-sample may not, in fact, be representative of the underlying smoking population. In subsequent discussions with sampling experts, we were persuaded that the disadvantages of weighting the data may well exceed the advantages, because it creates an impression of representativeness that is, in fact, misplaced.

According to wave 5 of NIDS, South Africa's smoking population aged 18 and older was comprised of 63.8% African males, 5.1% African females, 10.4% Coloured males, 8.1% Coloured females, 2% Indian males, 0.7% Indian females, 5% White males, 4.9% White females, and 0.1% with unspecified gender. As can be seen in Table 1, these shares are very different from the data collected in our survey. For this reason, we do not endorse the weighting of lockdown data based on national race/gender shares, because it may introduce biases that are impossible to quantify. We therefore position this research as reporting on the results of the *sample* of respondents that completed our survey/s.

4.2   Quitting behaviour

It is generally acknowledged that quitting smoking is very difficult because of the addictive nature of nicotine. In fact, one of FITA's main arguments in the case to get the sales ban lifted was that cigarettes are addictive and should therefore be regarded as an essential product.[i] There is substantial evidence showing that most smokers regret that they started smoking and would like to quit.[ii] Pro-health NGOs in South Africa have encouraged smokers to quit during lockdown.

At the aggregate level, roughly 27% of smokers in our sample indicated that they had attempted to quit smoking cigarettes during the lockdown. Of the smokers who tried to quit, 33% had successfully quit by the time they completed the survey, while 67% of those who attempted to quit

were unsuccessful. Thus, approximately 9% (27% x 33%) of people who were smokers at the start of the lockdown were able to quit successfully (at least at the time of the second survey).

Our survey indicates that there are very large racial and gender differences in attempts to quit and successful quitting during lockdown. More than a third of the African males and nearly half of the African females in our sample reported that they have successfully quit smoking cigarettes. At the other end of the spectrum, fewer than 4% of White males and fewer than 2% of White females in our sample reported that they have quit smoking during the lockdown.

Given the large differences in successful quitting rates between different demographic groups, the *de facto* sampling frame will have a substantial impact on the results. Because our sample substantially oversampled White females, which have the lowest rate of successful quitting, and undersampled Africans (both male and female), which have the highest rate of successful quitting, the actual quitting rate of cigarettes (across all races and genders) in the country is probably higher than the 9% that we report in this study.

Most (59%, plus presumably a substantial proportion of the 8% who "don't know") of the respondents who successfully quit smoking did so in the first four weeks of lockdown. In fact, other than for White males and females (which have a larger proportion of respondents who "don't know" when they smoked their last cigarette), more than 70% of respondents who quit smoking did so before 2 May 2020, i.e. during Level 5 lockdown.

During Level 4 lockdown, the percentage of respondents who quit smoking decreased to a trickle (15% of the respondents who quit successfully during the lockdown, or about 1% of the total number of respondents to the survey). Fewer than 4% of respondents who quit did so after 1 June 2020, when the Level 3 lockdown became effective and the ban on cigarette sales was still not lifted.

The smokers in our sample who successfully quit smoking during lockdown smoked substantially fewer cigarettes per day (7.8) before the lockdown than smokers who tried to quit but were unsuccessful and smokers who did not attempt to quit (16.4). This suggests that the smokers who successfully quit were probably less addicted than those who were unsuccessful or did not even try to quit.

On 15 June 2020, the media reported on a study that found that nearly 50% of a sample of 2 013 smokers who participated in an online survey, using a data-free platform (M4JAM), indicated that they had quit smoking during the lockdown.[iii] We were unable to locate the original report, so we are reporting here from media reports. The survey did not report the demographics of the respondents, but did indicate that the median number of cigarettes smoked by smokers in their sample pre-lockdown was between 4 and 5 cigarettes per day. In a South African context, this is very low. According to wave 5 of the National Income Dynamics Study, the median consumption of smokers in South Africa is about 8 cigarettes per day.[iv] The average cigarette consumption of the M4JAM sample is also substantially lower than the pre-lockdown average consumption of any race-gender group in our sample of those who have quit smoking during lockdown.

Given our finding that successful quitters tend to be much lighter smokers than continuing smokers, that African respondents in our sample have successfully quit smoking in substantial numbers (36% for males and 48% for females), and that the M4JAM survey was probably completed mainly by African respondents, their finding that nearly half of smokers quit smoking during lockdown seems believable. However, in the same way as it would be wrong to extrapolate

our results to the whole population, because our sample over-represents smokers at the higher end of the socio-economic spectrum and under-represents smokers at the lower end, it would be wrong to extrapolate the M4JAM study to the whole population, because they have substantially undersampled heavy and even moderate smokers. The conclusion to be drawn from this comparison between our results and the M4JAM survey is that the percentage of smokers who have successfully quit smoking during lockdown is somewhere between our estimate of 9% and the M4JAM estimate of 49%, but without more information it is not possible to give a more accurate estimate than this very wide interval. It would be wrong and unscientific to "guestimate" the percentage of quitters in the total smoking population at the average of the two percentages.

The most common reason that respondents gave for wanting to quit smoking is because cigarettes have become too expensive. The second most common reason for wanting to quit smoking is the unavailability of cigarettes. The third most common reason, given by 11% of respondents in our sample, was the ban on cigarette sales. Health concerns, and not wanting to be addicted to cigarettes, and requests or pressure from family and friends were relatively unimportant reasons for wanting to quit.

Wanting to quit smoking because of the ban on cigarette sales has a strong racial character. A substantially larger proportion of Africans (for both male (22%) and female (24%)) mentioned this as the main reason why they attempted to quit smoking cigarettes, compared to the other racial groups, and especially Whites (6% for males and 4% for females).

The ban on the sale of cigarettes, *per se*, has been ineffective in getting people to quit smoking. For the 9% of respondents in our sample who did quit smoking, the primary reason why the sales ban has encouraged smokers to quit smoking is that it has made cigarettes relatively unavailable and has created a black market, which in turn has greatly inflated the prices of cigarettes (see the section below). "Doing the lawful thing" and responding positively to the government's request not to smoke during the lockdown played a relatively minor role in driving people's attempts to quit. The government's argument that smokers run a higher risk of getting worse illnesses as a result of COVID-19 seems to have been a secondary concern to smokers.

4.3   Price patterns

In the first report we indicated that, for the period in which the survey was conducted (29 April to 11 May 2020), the average price of cigarettes had increased by 90%, compared to pre-lockdown levels. Based on a regression analysis, the price of cigarettes increased by 4.4% per day during the period that we conducted the survey.

Subsequent to the first round of data collection, the prices have increased further. Of the 91% of continuing smokers in our sample, 93% were able to obtain cigarettes during the lockdown. On average, for the respondents in the second survey (4 to 19 June 2020), the average price has increased by about 250% and the median price by more than 200%, compared to prices in the pre-lockdown period. The reported average price during June 2020 was R5.69 per stick, which equates to about R114 per pack of 20 cigarettes. The median price was R5.00 per stick or R100 per pack.

Figure 4 indicates the average increase in the price, relative to pre-lockdown prices, for each day that we collected data during the two rounds of data collection. The horizontal axis indicates days since the sales ban started (i.e. 27 March 2020). The gaps in the scatter plot are the days on which we did not collect data. Cigarette prices have increased dramatically, and fairly consistently, over the lockdown period.

Considering the slope of the line during our first survey (29 April to 11 May 2020), one can see that cigarette prices were increasing very rapidly during those two weeks. Had we performed the study earlier, say in the middle of April 2020, it is likely that we would not have seen significant price increases, as people had not yet run out of stock. In fact, in the second survey we asked people if they had stocked up before the lockdown and how long they had expected their stock to last. 64% of respondents indicated that they had stocked up, and of them, the median period for which they expected their stock to last was between 3 and 4 weeks.

The price of cigarettes increased substantially between our two surveys, although the rate of increase was not as rapid as between 29 April and 11 May (the slope of an imaginary line between 11 May 2020 (day 46 of lockdown) and 4 June 2020 (day 70 of lockdown) is less than the slope of the line between 29 April and 11 May 2020). Even though Figure 4 indicates a positive slope between 4 and 19 June 2020, there is a substantial amount of variation in the prices over this period, and the regression analysis, which controls for other factors, shows that the slope is in fact not significantly different from zero.

Figure 4 Average percentage change in cigarette prices (compared to pre-lockdown prices) by day of lockdown
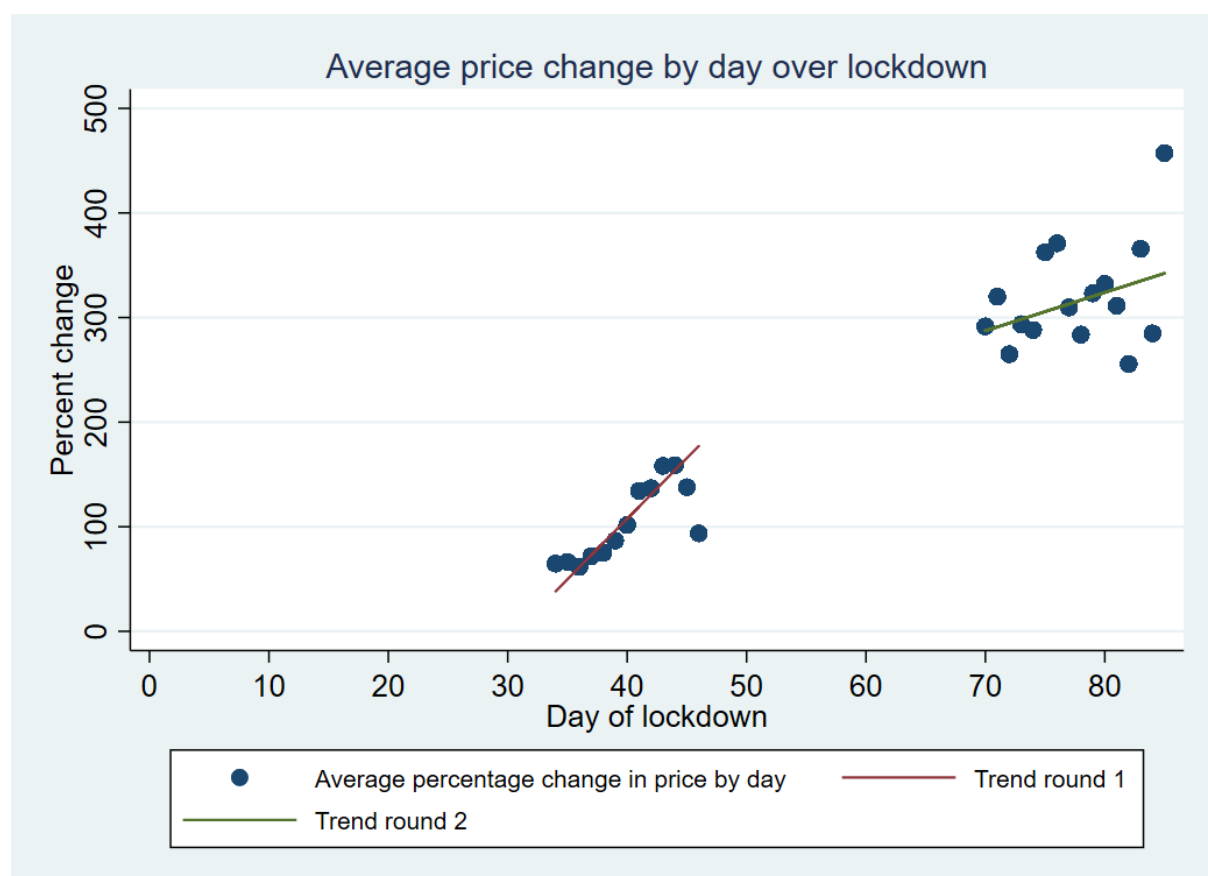
Notes to Figure 4: Average price change is calculated by averaging out the individual increases in price per stick between pre-lockdown and lockdown, for each day of lockdown where a survey took place (either round 1 or 2). "Day of lockdown" is 1 on 27 March 2020 and is 85 on 19 June 2020.

There were modest inter-provincial differences in the percentage change in the first round of data collection, but these differences have been greatly amplified in the second round of data collection.

The Western Cape and Northern Cape, followed by the Eastern Cape, have experienced the largest price increases by far. Limpopo, Mpumalanga and Gauteng have experienced substantially lower price increases. The fact that Limpopo and Mpumalanga border Zimbabwe and Mozambique, and that many of the domestic factories are based in Gauteng, suggests that relatively higher supply (through smuggling and domestic production, respectively) may have resulted in somewhat less extreme price increases in those provinces than in other provinces. It is also possible that the cost of transporting cigarettes from the places of origin to the markets has increased, given the increased risk.

The price of cigarettes produced by the MNCs is somewhat higher (R 6.30 per stick) than of the non-MNC brands (R 5.57 per stick) in our June 2020 sample, but the difference is small. However, because the prices of non-MNC brands were substantially lower than those of the MNC brands pre-lockdown, the percentage change in the non-MNC brands is substantially higher because of the sales ban (231% for MNCs vs 457% for non-MNCs).

4.4   *The irony of the FITA court case*

The Fair-Trade Independent Tobacco Association (FITA), which represents most of the local, non-multinational tobacco producers, challenged the legality of the sales ban in the North Gauteng High Court. FITA's main argument was that, given the addictiveness of cigarettes, they should be regarded as an essential product. The case was heard on 10 June 2020 and judgment was passed on 26 June 2020. The court dismissed FITA's application with costs, on the grounds that cigarettes, even though they are addictive, are not an essential product.[i] TISA has applied to appeal the High Court decision. At the time of writing this report, the outcome of the application to appeal was not yet known.

British American Tobacco South Africa (BATSA) initially indicated that they would challenge Minister Dlamini-Zuma's decision to extend the cigarette sales ban when the country moved from lockdown Level 5 to Level 4 on 1 May 2020. After discussions with the government, and after production for export was allowed, they withdrew their threat. However, when the sales ban was not lifted after the country moved from Level 4 to Level 3 lockdown on 1 June 2020, BATSA approached the Cape Town High Court to have the sales ban lifted. The case would have been heard on 30 June 2020, but has been moved to early August 2020.

The fact that FITA, rather than the multinational tobacco companies (MNCs), was the first to take the matter to court is ironic, because according to our findings, the FITA members have likely been the biggest beneficiaries from the tobacco sales ban. According to the FITA website, their seven members are Afroberg Tobacco Manufacturing, Best Tobacco Company, Carnilinx, Folha Manufacturers, Gold Leaf Tobacco Corporation, Home of Cut Rag, and Protobac. Many of these producers have greatly increased their market share among all race-gender groups in our survey.

Before the lockdown, less than 20% of cigarettes purchased by the respondents to our survey were from the seven FITA members, compared to the 75% of cigarettes purchased that were MNC brands. For the second sample, we were unable to allocate 27% of cigarettes to either the FITA members or the MNCs; these cigarettes are either imported or locally produced by local companies that are not members of FITA. Specifically, Amalgamated Tobacco Company (ATC) and Pacific Tobacco Company (PTC) are not listed as FITA members, nor are they regarded as MNCs, but 10% of cigarettes purchased by survey respondents in June 2020 were from ATC, and another 8% were from PTC.

Other than greatly increasing their sales volumes, the prices that consumers have paid for cigarettes have substantially increased. By early May 2020, cigarette prices, on average, had increased by 90% from their pre-lockdown levels. The second survey, conducted in early June 2020, indicated that the average price of all cigarettes (i.e. also including the MNCs and other unaccounted-for brands) had increased by about 250% from their pre-lockdown levels. The FITA members' brands had increased by an average of 488% by June 2020, compared to pre-lockdown prices for FITA-brands. As cigarette sales were officially illegal, it is unlikely that the manufacturers paid excise tax on these sales, making the profit margin even larger.

The supply chain of cigarettes, in a period where sales are officially banned, will be more complex and more expensive than in normal periods. It seems likely that wholesalers and retailers will take a larger margin to compensate for the additional risk of engaging in illicit activities. However, previous investigations by members of REEP indicate that the retail margin is small (typically less than 10%). Generally, the manufacturers capture the largest part of the retail price.

According to Yusuf Kagee of Amalgamated Tobacco Company, the cost of producing a pack of 20 cigarettes in 2017 was about R2.00 (https://iono.fm/e/883933). Accounting for the effect of inflation, that is about R2.50 in 2020. Given the high prices being paid for cigarettes during lockdown, and the fact that cigarettes are probably not taxed, cigarette producers are making extraordinarily high margins during the lockdown period.

We did not contact FITA to find out why they challenged Minister Dlamini-Zuma in court about the sales ban. We speculate that, by taking the matter to court, FITA (as an industry body) wants to portray itself as a serious, "clean" player in the tobacco space, and wants to distance itself from illicit trade. Well-publicised studies in 2018 and 2019 by the now-defunct Tobacco Institute of Southern Africa (TISA), the industry organisation representing the MNCs, aimed to show that FITA members (and especially Gold Leaf Tobacco Corporation) were responsible for most of the illicit trade in the country. Independent studies by REEP on smoking patterns in six South African townships also showed that FITA's members' brands were often sold at prices at which it is impossible that the full tax burden (excise and tax) was paid.[v]

FITA claims that their members are tax-compliant and that they do not engage in illicit trade.[vi] However, the evidence suggests that the comments of the industry body do not align with the actions of its members. The fact that so many people have been able to purchase cigarettes, primarily FITA members' brands, during the lockdown period, indicates that these companies have been flouting the lockdown regulations, and have been selling large volumes of cigarettes despite the sales ban.

The market shares of BATSA and the other MNCs have been drastically reduced during the lockdown. In June 2020 their brands were purchased by 17% of the round 2 respondents, compared to about 75% in the pre-lockdown period. The substantially higher prices of cigarettes sold during lockdown would have made up some of the loss, but it would be fair to say that the MNCs have not gained from the lockdown. In contrast to the FITA members, the MNCs have reason to be unhappy. Nevertheless, no cigarettes were supposed to have been sold during the lockdown, and the evidence suggests that all cigarette companies have broken the law during the lockdown period. The Illicit Economy Unit at SARS would do well to investigate all tobacco companies' behaviour during the lockdown.

4.5   The contradiction of allowing production but banning cigarette sales

The government allowed the production of tobacco products for export, as the country went from Level 5 to Level 4 lockdown, but has maintained the ban on the sale of tobacco in South Africa. At both an ethical and a practical level this decision is peculiar.

The ban on cigarette sales was imposed to reduce the health burden of the disease. This was Minister Dlamini-Zuma's main defence in the case against FITA. However, by allowing the export of cigarettes, South Africa's government is applying double standards: we care about the health and wellbeing of our own citizens, but we are quite happy to sell a deadly product, during a pandemic where smoking worsens the outcomes of patients contracting the virus, to other countries. If the detrimental effect of smoking is so pronounced that the government bans the sale of cigarettes during the COVID-19 pandemic, it seems hypocritical, even cynical, to allow the export of these products to other countries, where they would have the same devastating health effects. The fact that cigarette sales in the importing countries are legal (as they are in practically all countries) does not take away from the fact that allowing the export of cigarettes from South Africa is opportunistic and morally reprehensible in light of the argument for banning sales in South Africa.

At a practical level, allowing the production and export of cigarettes, while banning their sale in South Africa, does not make sense. The tobacco industry has a long history of involvement in the illicit trade and undermining government institutions. In "Rogue" and "Tobacco Wars" Johann van Loggerenberg describes in detail how the tobacco industry was leading the dismantling of SARS's investigative units. The recent book by Telita Snyckers ("Dirty Tobacco: Spies, lies and mega-profits", 2020) describes, also in detail, how multinational tobacco companies have been involved in illicit trade for decades. For example, they have illegally smuggled their own product into closed markets in order to prise open the market. They have paid billions of dollars in fines for racketeering, bribery and corruption. They have filled out the paperwork necessary to export the cigarettes, but have bribed customs officials to look the other way as they divert the product to the domestic market. The companies do not pay excise taxes on these "ghost exports", as exports are not subject to excise taxes.

In the context of a market that is starved for cigarettes, where profit margins are disproportionately high, and where all producers are scrambling to increase their market share (in the case of the non-MNCs) or to protect what little market share they have left (in the case of the MNCs), the temptation to divert the "exported" product into the domestic market becomes overwhelming. Our sampling methodology does not allow us to determine the size of the cigarette market during lockdown, but all indications are that it is significant. The legal loophole of producing cigarettes for the export market has been exploited fully by the tobacco industry. The result is that the illicit market will become more entrenched, even when the sales ban is lifted.

4.6   Sharing cigarettes

One of the reasons for the ban on the sale of cigarettes, as explained by Minister Dlamini-Zuma, is that smokers will spread the coronavirus when they share cigarettes.[vii] We asked smokers about whether they shared cigarettes before or during the lockdown. About 18% of the respondents indicated that, before the lockdown, they shared cigarettes. This percentage increased to 26% during the lockdown. The intensity of sharing also increased; there was a five-fold increase in smokers who indicated that at least half of the cigarettes that they smoke are shared with others.

The fact that more people share cigarettes with others is hardly surprising, in the context of cigarettes having become substantially more expensive. It is a rational response, even if it is risky for virus transmission. Our results align fairly closely with the M4JAM survey, in which they reportedly found that 79% of smokers said that they were not sharing their cigarettes under lockdown, implying that 21% of their respondents who were sharing their cigarettes.[iii]

4.7   Could the government have achieved a similar result without a sales ban?

Hindsight is always clearer. We argued in our first report that, although well-intentioned at the outset, the extension of the cigarette sales ban into lockdown Level 4 was an error. Based on the results of the second survey, we believe that the further extension of the sales ban, into lockdown Level 3, amplified the error. In this section, we consider an alternative strategy that the government could have taken at the start of the lockdown, in order to reduce COVID-19 transmission. This strategy, namely substantially increasing the excise tax, together with strong and sophisticated tax enforcement, would ensure a decrease in cigarette consumption, without losing the entire tax base to the illicit market, and even possibly increasing tobacco excise tax revenue. This would likely have a better long-term public health outcome than the temporary sales ban.

As indicated in the discussion of quitting behaviour during the lockdown (section 4.2), the economic imperative (i.e. the price of cigarettes) was by far the most important reason for smokers deciding to quit smoking. An extensive literature (see, for example, reviews in IARC, 2011 and World Bank/NCI, 2017) has indicated that increasing the price of cigarettes (typically through an increase in the excise tax) is the single most effective way of decreasing the demand for the product. During the lockdown, there was an unintentional increase in the price of cigarettes because of the sales ban, not because of an increase in the excise tax. Had the National Treasury, hypothetically, substantially raised the excise tax during this period (say from the current level of R17.40 per pack to R50 per pack, or even more), the impact on consumption could have been similar to that of the current sales ban. There is substantial evidence from South Africa showing that an increase in the price of cigarettes causes a decrease in cigarette consumption.[viii, ix, x, xi] This decrease in consumption is attributed to a decrease in both smoking prevalence and smoking intensity (i.e. the number of cigarettes smoked per day by the remaining smokers).

Substantially higher excise taxes would have raised the retail price of tax-paid cigarettes and incentivised many smokers either to quit smoking or to cut back on their consumption. Opponents to such a strategy would point out that it would increase illicit trade. We acknowledge that it would increase the *incentive* for tobacco companies to engage in illicit trade, but effective countermeasures by the South African Revenue Services (SARS), such as digital tax stamps and a well-functioning track and trace system, can greatly reduce illicit trade.[xii] Even if illicit trade increases because of an increase in the excise tax, it would certainly not increase to 100% of the market, as is the case under the current sales ban.

The main difference between the sales ban and the hypothetical scenario of a massive increase in the excise tax on tobacco products is that currently the government loses a substantial amount of revenue from tobacco taxes, while the tobacco industry is making huge profits. The revenue that the government could have received from tobacco excise taxes would go some (small) way towards bolstering the desperate financial state of the South African government.

Under the sales ban, the extraordinary profits go into the pockets of the tobacco industry and other criminal elements in the supply chain. These profits can be used to undermine the government's tobacco control policy. For example, it could fund lawsuits to oppose the Control of Tobacco

Products and Electronic Delivery Systems Bill or to oppose the introduction of an effective track and trace solution to control the illicit trade of tobacco products. The money can also be used to engage in a price war with competitors. After the lockdown is lifted, the MNCs would want to retrieve some of their lost market share. The non-MNCs would want to hold on to their new-found market dominance. Both parties have an incentive to decrease prices well below pre-lockdown levels once the sales ban is lifted and the market is "normalised".

Currently 29% of respondents who quit smoking indicated that they would resume smoking when the sales ban is lifted. Presumably these quitters are simply biding time because they cannot afford cigarettes during the lockdown, but there is no real commitment to quit smoking. A permanently higher excise tax would encourage quitters to stay non-smokers, because there is no return to normal "low" prices.

Within the space of less than four months, the sales ban has changed the cigarette market in South Africa more dramatically than the country's tobacco-control policies and the industry's pricing strategy have done in 25 years. The established order, where large MNCs run the show, and small companies ride on their coattails, has been fundamentally changed. The MNCs have been severely affected, although their foreign-based headquarters are likely to support them financially to help them gain back some of the market share that they have lost during the lockdown. It seems likely that they would want to do that by means of an aggressive pricing campaign. The non-MNCs are unlikely to give up their newly-gained market share without a fight, and with the large profits they gained during the lockdown period, they likely have the ammunition to fight a price war for a long time. The consequences of the market disruption may take years to play out.

The positive lesson from the sales ban is that smokers in South Africa have shown that they are willing to pay substantially higher prices for cigarettes than they were paying pre-lockdown. Our study shows that cigarette prices have increased by an average of 250% within the space of three months. This could inform how National Treasury formulates excise tax policy going forward. We suggest that the government immediately lifts the ban on tobacco sales and implements a sufficiently high excise tax. Currently the "rule", followed by the Treasury for nearly 20 years, is that excise taxes should comprise at least 40% of the retail price of the most popular brand. Given that it is likely that there will be much turbulence in the market after the sales ban is lifted, we suggest that the tax not be set to target some percentage of the retail price. Rather, it should be increased substantially (for example, by 100% or more) immediately after the sales ban is lifted, and Treasury should commit to increase the excise tax at well above the inflation rate in subsequent years. Of course, such a strategy would require that sufficient controls are in place to counter illicit trade.

A substantially higher excise tax would allow the National Treasury and SARS to claw back some of the revenue that they lost during the lockdown period and would substantially increase the revenue potential of cigarettes in future. It would discourage smoking more than a temporary ban on the sales of cigarettes, because smokers and would-be smokers would realise that it is not a temporary situation, but a permanent feature. The literature has shown that the long-term impact, in the form of reduced consumption, of a permanent increase in the price of cigarettes is substantially larger than the short-term impact.[xiii, xiv, xv,ix.] This would result in a substantial public health gain.

4.8 *Limitations*

We note several weaknesses and caveats to our analysis. First, the data is not representative of the South African population, as has been pointed out at length in various parts of the report. Second, our results do not capture the proportion of smokers who may have quit smoking cigarettes, but have substituted to other tobacco and/or nicotine products (e.g. roll-your-own tobacco and e-cigarettes). To the extent that there was substitution to other tobacco products, instead of quitting, the public health benefit reported by round 2 respondents who have quit may be overstated. Also, it is possible that respondents who reported smoking cigarettes were in fact smoking roll-your-own tobacco products, and should therefore have been excluded from the survey. Furthermore, we do not know to what extent cigarette smokers have substituted to other and potentially more dangerous drugs, including cannabis, cocaine, heroin, and methamphetamine. Anecdotes in the media suggest that some people have switched to other drugs, but this is not something that we can comment on with our sample.

Our sample size has been reduced as a result of data cleaning and the removal of price reporting errors. In doing this, we followed rules, based on logic and our experience of the market, but it is possible that we have removed some legitimate observations that were potentially influential. At the same time, some incorrect data has not been cleaned in our cleaning processes. There may also be measurement error, insofar as individuals may not have answered truthfully about whether they were able to purchase cigarettes, for fear of being caught, or the number of cigarettes they smoked, because there may be stigmas associated with smoking, especially for specific demographic and cultural groups.

We analysed the data as fairly and objectively as possible. However, what is objective to one person might be biased and subjective to another. The study was reviewed by colleagues in the research unit, but it has not been externally peer reviewed. We will submit some papers, based on these results, to international journals, where they will go through a rigorous peer review process.

5. CONCLUSION

In our first report we concluded that the ban on cigarette sales was failing to do what it intended to do. Our conclusion, based on a second round of data collection, supports our first report's conclusion.

A substantial number of people have quit smoking cigarettes, but the extension of the ban has not substantially increased the number of quitters. The price of cigarettes has increased significantly from when we performed the first survey. The market structure has changed dramatically, as the hold of the MNCs has been weakened and the local manufacturers have been able to break into the market. The illicit trade in cigarettes, which was already a problem before the lockdown, is likely to be even more entrenched after the sales ban is lifted. A price war, driven by a desire to maintain market share (for the non-MNCs) and to regain market share (for the MNCs) is very likely.

The very high prices that smokers are willing to pay for their cigarettes indicates that there is much tax potential in cigarettes. The National Treasury should increase the excise tax on tobacco products the moment the sales ban is lifted, to counter the likely impact of a price war on the retail price of cigarettes, and to claw back some of the revenues that it lost during the lockdown period. However, it is crucial that the authorities have strong measures in place to reduce the prevalence of illicit trade.

APPENDIX A

June 2020

Dear respondent,

Thank you for taking the time to answer this survey. This survey is targeted at people who smoked at least one cigarette per day before the lockdown. This includes people who quit smoking during lockdown. We want to understand how you have responded to the cigarette sales ban, particularly since it has been extended to lockdown level 3.

This survey is 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. 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.

Between 29 April and 11 May 2020 we performed a similar survey. The results of this survey received substantial media attention. This is a new survey. If you completed the first survey, you are encouraged to take part in this one as well.

If you complete this survey, you can win one of ten R500 Takealot vouchers. The draw will take place on Friday the 19th of June. If you have any questions about the survey please contact Professor Corné van Walbeek at cornelis.vanwalbeek@uct.ac.za.

Questions:

Section A1: Screening and determining smoking status

A1.1) (Q1) Are you 18 or older?*
    Yes
    No   If <18, end survey here

A1.2) (Q2) Were you a regular cigarette smoker (at least 1 cigarette per day) in the week before the lockdown started (19−26 March)?*
    Yes
    No   If no, end survey here

Section A2: Quit behaviour

A2.1) (Q3) Have you attempted to quit smoking since the sale on cigarettes was banned due to lockdown (since 27 March)?*

        Yes

        No   If no, skip to (A3.1)

A2.2) (Q4) What was the main reason for your quit attempt during lockdown?
1. The ban on cigarette sales motivated me to quit
2. The ban on cigarette sales: I cannot find cigarettes
3. The ban on cigarette sales: cigarettes have become too expensive during lockdown
4. Health concerns
5. Requests/pressure from family and friends
6. I do not want to be addicted to cigarettes
7. Other [please specify]   [select one]

A2.3) (Q5) Have you successfully quit smoking during the lockdown?*

        Yes

        No   If no, go to (A3.1)

A2.4) (Q6) Roughly when did you smoke your last cigarette?*

        Between 22 March and 4 April

        Between 5 and 18 April

        Between 19 April and 2 May

        Between 3 and 16 May

        Between 17 May and 31 May

        Since 1 June

        Don't know

A2.5) (Q7) How many cigarettes did you typically smoke per day before lockdown?*

               [whole number between 1 and 99]

A2.6) (Q8) Do you intend to start smoking again after the lockdown is over?*

        Yes

        No

        Don't know   Skip to (C1.1)

Section A3: Smoking behaviour before lockdown

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

A3.1) (Q9) How many cigarettes did you typically smoke per day?*

               [Fill out whole number between 1 and 99]

A3.2) (Q10) In what quantities/packaging did you usually buy cigarettes?*
1. Single stick
2. Box of 10 cigarettes (note that this is NOT a carton with 200 cigarettes)
3. Box of 20 cigarettes
4. Box of 30 cigarettes
5. Bulk pack (carton) of 200 cigarettes (10 boxes of 20 cigarettes)   [Select one]

A3.3) (Q11) How much did you typically pay for one {{ A3.2 }} (in Rands and cents)? Please provide the number only (R/c not necessary)*

[Number with max 2 decimals, between 0 and 600]

A3.4) (Q12) Which brand of cigarettes did you usually buy?

Aspen

Atlantic

Bastille

Benson & Hedges

Bishops Court

Black & White

Caesar

Camel

Cape Navy

Carvela

Chartered

Chelsea

Chesterfield

Chicago

CK

Consulate

Courtleigh

Craven A

Derby

Ds

Dullahs

Dunhill

Embassy

Express Royal

F1

Fortune

Forum

Gauloises Blondes

Glamour

Golden Flake

GT

Gunston

JFK

John Rolfe

Kent

Kingdom

Kings

Kyro

Lexington

Liberty

Liggett Ducat (LD)

Lucky Strike

Madison

Malimbo

Marlboro

MC

Mega 20

Mills Special

Milo

M's

Ossum

Oxford

Pacific

Pall Mall

Paul Revere

Peter Stuyvesant

Peterman

Phoenix

Pine

Premium

Princeton

Rainbow

Ransom

Red & Black

Rembrandt van Rijn

Remington Gold

Rudland & George (RG)

Richman

Rothmans

Royals

Safari

Sahawi

Savannah

Seville's

Sharp

Shasha

Stix

Supermatch

Texan

VIP

Vogue

Voyager

Westleigh

Winfield

Winston

Wish

Woodland

Other (please specify)   [Select one]

A3.5) (Q13) Where did you usually buy cigarettes?
1. Formal retailer (e.g. Pick n Pay, Spar, etc.)
2. Petrol station
3. Wholesaler
4. Tobacco shop (e.g. Tobacconist, Cock 'n Bull, etc.)
5. Cafe
6. Vending machine
7. Spaza shop
8. House shop
9. Street vendor
10. Online platform (e.g. Facebook, online tobacco shop, etc.)
11. From friends/family
12. Other (please specify)   [Select one]

A3.6) (Q14) Before lockdown, how regularly did you share the **same cigarette** with another person?
(This does not include offering another person a cigarette from the same box)*
1. Never
2. Rarely (less than 10% of cigarettes I smoked were shared with others)
3. Sometimes (between 10% and 50% of cigarettes I smoked were shared with others)
4. Often (more than 50% of cigarettes I smoked were shared with others)

Section B1: stock up
B1.1) (Q15) Did you stock up on cigarettes in preparation for the lockdown (before 27 March)?*
     Yes
     No
     Don't know   If no or don't know, skip to (B2.1)

B1.2) (Q16) When you stocked up, how long did you expect your stock to last during the lockdown?*
1. Less than a week
2. Between 1 and 2 weeks
3. Between 2 and 3 weeks
4. Between 3 and 4 weeks
5. More than 4 weeks

6. Don't know

Section B2: consumption over lockdown

B2.1) (Q17) How many cigarettes have you smoked on average per day **in the last month**?
[Insert a whole number between 0 and 99]

B2.2) (Q18) In the last month, how regularly have you shared the **same cigarette** with another person? (This does not include offering another person a cigarette from the same box)*
1. Never
2. Rarely (less than 10% of cigarettes I smoked were shared with others)
3. Sometimes (between 10% and 50% of cigarettes I smoked were shared with others)
4. Often (more than 50% of cigarettes I smoked were shared with others)

B2.3) (Q19) During lockdown, have you purchased cigarettes?*
Yes
No   If no, go to (C1.1)

Section B3: Purchases during lockdown

B3.1) (Q20) Think about your **most recent** purchase of cigarettes (even if it was only a single stick). Where did you buy your cigarettes from?*
1. Street vendor
2. Spaza shop
3. House shop
4. Car guard
5. Café
6. Vending machine
7. Formal retailer (e.g. Pick n Pay, Spar, etc.)
8. Petrol station
9. Wholesaler
10. Tobacco shop (e.g. Tobacconist, Cock 'n Bull, etc.)
11. Through WhatsApp
12. Other online platform (e.g. Facebook, Twitter)
13. Acquaintances who are essential workers
14. Through friends/family
15. Other (please specify)   [Select one]

B3.2) (Q21) For your **most recent** cigarette purchase (during lockdown), what packaging type did you buy? If you bought more than on pack type, choose one)*
1. Loose/single stick
2. Box of 10 cigarettes (note that this is not a carton with 200 cigarettes)
3. Box of 20 cigarettes
4. Box of 30 cigarettes
5. Bulk pack (carton) of 200 cigarettes   [Select one]

B3.3) (Q22) For your most recent cigarette purchase (during lockdown), how much did you pay (in Rands and cents) for one {{ B3.2 }}? Please provide the number only (R/c not necessary)*
[Number with max 2 decimals, between 0 and 5000]

B3.4) (Q23) Which brand of cigarettes was this product (most recent purchase during lockdown)?

Aspen

Atlantic

Bastille

Benson & Hedges

Bishops Court

Black & White

Caesar

Camel

Cape Navy

Carvela

Chartered

Chelsea

Chesterfield

Chicago

CK

Consulate

Courtleigh

Craven A

Derby

Ds

Dullahs

Dunhill

Embassy

Express Royal

F1

Fortune

Forum

Gauloises Blondes

Glamour

Golden Flake

GT

Gunston

JFK

John Rolfe

Kent

Kingdom

Kings

Kyro

Lexington

Liberty

Liggett Ducat (LD)

Lucky Strike

Madison

Malimbo

Marlboro

MC

Mega 20

Mills Special

Milo

M's

Ossum

Oxford

Pacific

Pall Mall

Paul Revere

Peter Stuyvesant

Peterman

Phoenix

Pine

Premium

Princeton

Rainbow

Ransom

Red & Black

Rembrandt van Rijn

Remington Gold

Rudland & George (RG)

Richman

Rothmans

Royals

Safari

Sahawi

Savannah

Seville's

Sharp

Shasha

Stix

Supermatch

Texan

VIP

Vogue

Voyager

Westleigh

Winfield

Winston

Wish

Woodland

Other (please specify)   [Select one]

Section C: Perceptions
C1.1) (Q24) Do you agree with the following:

	Yes	No	Don't know
The ban on the sale of tobacco products during lockdown level 5?			
The extension of the ban on the sale of tobacco products into lockdown levels 4 and 3?			
The ban on the sale of alcohol during lockdown levels 5 and 4?			
The policy to allow the sale of alcohol during level 3 of the lockdown?			
Do you think you can get COVID-19 from sharing a cigarette?			
Before lockdown, did you ever pick up and smoke a cigarette butt ("stompie") off the ground?			
Since lockdown, have you ever picked up and used a cigarette butt ("stompie") off the ground?			

[Tick one per row]

Section D: Demographic and socio-economic information
D1.1) (Q25) What is your gender?*
1. Male
2. Female
3. Prefer not to answer

D1.2) (Q26) What year were you born?*
        [Four-digit number]

D1.3) (Q27) How old were you when you started smoking cigarettes regularly?
        [Whole number between 1 and 90]

D1.4) (Q28) What population group do you belong to?*
1. African
2. Coloured
3. Asian/Indian
4. White
5. Prefer not to answer

D1.5) (Q29) What is the highest level of education that you have completed?
1. No formal schooling
2. Some primary school completed (Grade 7 not completed)
3. Completed primary school (Grade 7 completed)
4. Some secondary school completed (Grade 12 not completed)
5. Completed secondary school (Grade 12)
6. Completed a tertiary qualification
7. Post-graduate degree completed
8. Don't know
9. Prefer not to answer

D1.6) (Q30) What was your household's monthly after-tax total income (before the lockdown)? This includes all sources of income, like social grants, UIF, etc.
1. R0 – R400
2. R401 – R800
3. R801 – R1 600
4. R1 601 – R3 200
5. R3 201 – R6 400
6. R6 401 – R12 800
7. R12 801 – R25 600
8. R25 601 - R51 200
9. R51 201 – R102 400
10. R102 401 – R204 800
11. R204 801 or more
12. Prefer not to answer
13. Don't know

D1.7) (Q31) In which province do you live?*
1. Eastern Cape
2. Free State
3. Gauteng
4. KwaZulu-Natal
5. Limpopo
6. Mpumalanga
7. Northern Cape
8. North-West Province
9. Western Cape

D1.8) (Q32) Which of the following best describes the area where you live?
1. Farm
2. Informal settlement
3. City

4. Rural
5. Suburb
6. Town
7. Township

Section E: Further comments

E1.1) (Q33) Any further comments? [Open ended response]

Section F: Contact information

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 the 19th of June.

F1.1) (Q34) Phone number   [Ten-digit number]

F1.2) (Q35) Email address   [Email format]

F1.3) (Q36) We do not know what will happen with the ban on cigarette sales in the weeks and months to come. We may want to do a short follow up survey once the ban has been lifted. May we contact you again?
    Yes
    No

Notes: Red text indicates skip logic and answer formats. Asterisks (*) indicate compulsory questions.

APPENDIX B

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 were obviously wrong or entered erroneously did not contaminate the results of the study. Based on previous experience of cleaning prices, the REEP team applied cleaning rules to the current data set.

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 set of general rules below (for example, a carton price quoted as a 20 pack price). Extreme prices without obvious errors (for example, R7 for a single stick before lockdown) 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 in what packaging they usually buy their cigarettes, with the following options: (1) single cigarettes, (2) box of 10 cigarettes, (3) box of 20 cigarettes, (4) box of 30 cigarettes, and (5) cartons of 200 cigarettes (packs with 10 boxes of 20 cigarettes each). In the next question, respondents were asked how much they usually pay for a single unit of the packaging that they had selected.

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 acquired 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 (contact 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 > R4.5 and price < R10, remove from sample.
4. For all packaging types, if price ≥ R10 and price < R15 and brand=MNC, remove from sample.
5. For all packaging types other than cartons and packs of 30, replace packaging with carton if price ≥ R50 and brand = non-MNC.
6. For all packaging types other than cartons, replace packaging with carton if price ≥ R150 and brand = MNC.
7. For all packaging types other than 30 packs, if price > R60 and price < R150 and brand=MNC, remove from sample.
8. For packs of 30, if price > R90 and price < R150 and brand=MNC, remove from sample.
9. For packs of 30, if price > R90 and price < R150 and brand=non-MNC, allocate to carton.
10. For packs of 30, if price < R30, remove from sample.
11. For packs of 10, if price > R30, remove from sample.
12. For cartons, if price < R50, allocate packaging to 20 packs.

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 R25 per single cigarette stick, R150 for a pack of 10 cigarettes, R300 for a pack of 20 cigarettes, R450 for a pack of 30 cigarettes, and R3000 for a carton of 200 cigarettes are plausible. If the price is higher than this, we assume that there has been an error.

As with 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. For packaging types other than singles, if price > R15 and price ≤ R20 and brand = MNC, remove from sample.
4. For packaging types other than cartons and packs of 30, if price > R300 allocate to cartons.
5. For single sticks, if price > R25 and price ≤ R300, allocate packaging to 20 pack.
6. For packs of 10, if price > R150 and price ≤ R300, allocate packaging to 20 pack.
7. For packs of 30, if price > R15 and price ≤ R40, allocate packaging to 20 pack.
8. For packs of 30, if price > R450 allocate to cartons.
9. For cartons, if price > R3000, remove from sample.

APPENDIX C

Comparing Rounds 1 and 2 of the REEP Lockdown Survey

From Table 1, we see that, while the respondents in both rounds 1 and 2 are substantially different from the national smoker population, there are also differences between the samples for the two rounds. Specifically, the second survey attracted a higher proportion of females and Whites than the first survey. For round 2, there was a concerted effort to attract more lockdown quitters. The questionnaire, although based on round 1's questionnaire, was also altered, with the inclusion of new questions, the removal of others, and the rewording of some questions. Besides these differences in methodologies across the two rounds, the smoking population may have changed in the period between the two rounds, resulting in differences in the two samples. For example, relatively more, and possibly lighter, pre-lockdown smokers may have quit by the time the second round took place, which means that the remaining smoking respondents are more addicted and heavier smokers, than the remaining smokers in the first round.

In order to test the similarity of the two samples, we compared the pre-lockdown cigarette consumption of respondents for the two rounds. Table C1 indicates the average number of cigarettes smoked per day before the lockdown, as reported in the two rounds of the survey. We test for statistical differences within the groups. The questions in the section "Smoking behaviour before lockdown" in the two surveys were identical, namely "How many cigarettes did you typically smoke per day?"

Table C1. Average number of cigarettes smoked per day (pre-lockdown) for smokers that did not quit during lockdown (round 1 and round 2)

	Round 1 (pre-lockdown)			Round 2 (pre-lockdown)			
	Mean	**SD**	**N**	**Mean**	**SD**	**N**	**P-values**
Males	15.4	10.3	4 475	16.2	9.7	7103	0.000
African	8.4	8.0	1 032	8.3	6.2	1 382	0.897
Coloured	11.7	8.1	681	12.2	7.5	1 122	0.239
Indian	12.3	8.6	374	13.1	7.0	542	0.098
White	20.0	9.7	2 388	20.4	9.2	542	0.063
Females	15.2	8.8	4 565	16.5	8.7	12 280	0.000
African	7.5	5.7	336	7.8	6.4	489	0.522
Coloured	10.8	6.8	1 041	11.3	6.2	2 600	0.019
Indian	10.2	5.5	194	11.8	7.3	456	0.007
White	18.0	8.6	2 994	18.8	8.4	8 735	0.000
Race and/or gender undisclosed	14.4	8.8	834	15.9	8.7	1 922	0.000
Total	**15,3**	**9,5**	**9 873**	**16,4**	**9,0**	**21 305**	**0,000**

Notes: P-values are from a t-test for the difference in means. The table only includes continuing smokers (those who did not quit during lockdown) as we did not ask quitters for pre-lockdown consumption per day in round 1.

If the two samples were similar (in terms of smoking behaviour, proxied by consumption), the average consumption would be similar for the two rounds, overall and within the groups. If this was the case, the P-values for a differences in means test would be large (P-value > 0.10). For all groups besides Africans (male and female) and Coloured males, average cigarette consumption is statistically significantly higher (at least the 10% level of significance) in round 2 than in round 1. Thus, according to the results in Table C1, the sample for rounds 1 and 2 are statistically different in terms of consumption (overall and for most subgroups), and therefore any direct comparisons between the rounds should be done with caution, and with this fact kept in mind.

For this reason, we avoid comparisons between rounds 1 and 2 for most of this report. In some cases, where smoker behaviour and population groups are not compared, for example brand and market information, we include round 1 results. This allows us to provide an overview of the changes in the market over the lockdown period, as round 1 provides insight into what occurred earlier in the lockdown. While we believe that this adds an interesting perspective on how the market has developed over the lockdown period, we urge caution in the interpretation of these results.

APPENDIX D

Percentage of cigarettes purchased by survey respondents before and during lockdown, ranked in descending order pre-lockdown

Brand	Producer	Pre-Lockdown	Lockdown (4-19 June)
Pall Mall	BAT	12.3	1.3
Peter Stuyvesant	BAT	11.5	2.4
Camel	JTI	7.4	2.3
Marlboro	PMI	7.2	3.5
Benson & Hedges	BAT	6.9	0.5
Winston	JTI	6.5	1.0
Kent	BAT	4.5	0.4
Dunhill	BAT	4.4	1.2
Chesterfield	PMI	4.3	0.9
Rothmans	BAT	3.7	1.2
Voyager	GLTC	3.2	1.1
Rudland & George (RG)	GLTC	3.0	11.6
Sharp	GLTC	2.6	5.7
JFK	Carnilinx	2.3	6.1
Courtleigh	BAT	1.7	0.8
Chicago	GLTC	1.7	5.4
Remington Gold	Pacific	1.4	5.3
Caesar	Best	1.4	8.1
Vogue	BAT	1.0	0.1
Savannah	GLTC	1.0	2.0
Craven A	BAT	1.0	0.4
Atlantic	Carnilinx	1.0	2.1
Liggett Ducat (LD)	JTI	0.8	0.4
Sahawi	GLTC	0.8	0.6
Premium	Carnilinx	0.6	1.4
Derby	Carnilinx	0.5	1.5
Pacific	Pacific	0.5	2.2
CK	AMT	0.5	3.3
F1	Carnilinx	0.5	1.2
Malimbo	AMT	0.4	1.7
Glamour	JTI	0.4	0.1
Seville's	Other	0.4	0.6
Mega 20	Carnilinx	0.4	1.2
MC	AMT	0.4	2.4
Bastille	Protobac	0.3	0.2

Ds	AMT	0.3	0.9
Carvela	AMT	0.2	0.8
Wish	Other	0.2	0.3
Gunston	BAT	0.2	0.0
Red & Black	Afroberg	0.2	2.3
Black & White	Afroberg	0.2	0.7
Aspen	JTI	0.1	0.4
Shasha	Carnilinx	0.1	0.4
Kings	Other	0.1	0.6
Chelsea	Olomide	0.1	1.6
Richman	Best	0.1	2.5
Ossum	Afroberg	0.1	0.2
Westleigh	Folha	0.1	0.4
Paul Revere	BAT	0.1	0.0
John Rolfe	BAT	0.1	0.0
VIP	Carnilinx	0.1	0.2
Consulate	BAT	0.1	0.0
Express Royal	Olomide	0.1	0.6
Woodland	Smokey Treats	0.1	0.0
Lucky Strike	BAT	0.1	0.1
Ransom	BAT	0.1	0.0
Embassy	BAT	0.1	0.0
Stix	Carnilinx	0.1	0.1
Kingdom	AMT	0.1	0.2
Princeton	BAT	0.1	0.0
Kyro	Protobac	0.1	0.1
Mills Special	BAT	0.1	0.0
Rembrandt van Rijn	BAT	0.0	0.0
Forum	Other	0.0	0.1
Lexington	BAT	0.0	0.0
Texan	BAT	0.0	0.0
Winfield	BAT	0.0	0.1
Peterman	Other	0.0	0.3
Royals	BAT	0.0	0.1
Rainbow	Afroberg	0.0	0.1
Phoenix	Other	0.0	0.5
Gauloises Blondes	Imperial Tobacco	0.0	0.0
Pine	Other	0.0	0.8
Oxford	Other	0.0	0.0
Sinitic brands	Other	0.0	1.0

Dullahs	Other	0.0	0.0
Golden Flake	Afroberg	0.0	0.1
Ms	AMT	0.0	0.4
Yes	Other	0.0	0.0
Madison	BAT	0.0	0.0
Bishops Court	Other	0.0	0.0
GT	Other	0.0	0.7
Fortune	Other	0.0	0.0
Liberty	Other	0.0	0.1
Sun	Other	0.0	0.4
Supermatch	Mastermind	0.0	0.4
Safari	BAT	0.0	0.1
Cape Navy	Afroberg	0.0	0.0
Chartered	Other	0.0	0.0
Pegasus	Pacific	0.0	0.4
666	Other	0.0	0.2
Caspian	Other	0.0	0.0
Rico	Other	0.0	0.1
Other	Other	0.1	1.5
Total		**100.0**	**100.0**

Notes: BAT: British American Tobacco, PMI: Philip Morris International, JTI: Japan Tobacco International, Pacific: Pacific Cigarette Company, Mastermind: Mastermind Tobacco Kenya, Carnilinx: Carnilinx Tobacco Company, Folha: Folha Tobacco Manufacturers, AMT: Amalgamated Tobacco Manufacturers, GLTC: Gold Leaf Tobacco Corporation, Best: Best Tobacco Company, Afroberg: Afroberg Tobacco Manufacturing, "Other" includes any brands whose manufacturers could not be identified.

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