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WAVE 3

National Income Dynamics Study (NIDS) – Coronavirus Rapid Mobile Survey (CRAM)

Market impact of the COVID-19 national cigarette sales ban in South Africa

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Market impact of the COVID-19 national cigarette sales ban in South Africa

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Executive summary

Tobacco sales were prohibited between 25 March and 17 August 2020 as part of the government's response to the COVID-19 pandemic.

A number of studies were conducted during the sales ban to investigate smokers' responses to the sales ban. A drawback of these studies was that they were not nationally representative. The current study, as part of the NIDS-CRAM suite of surveys during the lockdown, aims to be broadly nationally representative, and as such provides an opportunity for a broadly representative ex-post investigation into smokers' behaviour related to the national sales ban.

According to weighted data, there were approximately 6.7 [5.8; 7.7] million adult smokers (aged 18+) in South Africa before the start of the lockdown (all numbers in brackets are 95% confidence intervals). Of these, about 536 [335; 738] thousand (7.9%) indicated that they quit during the sales ban period, 5.7 million [4.4; 7.0] million (84.7%) indicated that they continued smoking and nearly 500 [315; 677] thousand (7.3%) declined to answer the question. Depending on the definition used, the percentage of quitters varies between 7.9% and 15.3%. About 262 [116; 408] thousand people who quit during lockdown indicated that they started smoking again after the sales ban was lifted.

The average daily number of cigarettes smoked by smokers decreased from 7.9 [7.5; 8.3] cigarettes in 2017 to 6.5 [5.4; 7.6] cigarettes during the sales ban and up to 8.8 [7.7; 9.9] cigarettes after the ban.

Adjusted for inflation and expressed in constant November 2020 prices, the average price of cigarettes increased by nearly 200% between 2017 and the highest point it reached during the sales ban. Whereas there was not much geographic variation in the price before the sales ban, the retail price differed substantially between provinces during the lockdown. During the sales ban, cigarette prices were substantially higher in the Northern, Western and Eastern Cape than in the other provinces.

Based on self-reported consumption, the total cigarette market in 2017 was estimated at 22.5 [18.2; 24.6] billion cigarettes. Just before the start of the ban, the total market is estimated to have been 19.6 [15.8; 23.7] billion cigarettes. During the sales ban the (annualised) market shrank to 13.6 [9.9; 17.7] billion cigarettes, a decrease of 30%. After the cigarette ban was lifted, the market increased to an (annualised) 18.7 [14.1; 23.7] billion cigarettes.

Using a rule of thumb developed by Jha (one tobacco-related death for every million cigarettes smoked), the decrease in the quantity of cigarettes smoked during the 20 weeks of the sales ban is likely to have prevented about 2 300 future premature tobacco-related deaths. If tobacco consumption after the sales ban remains at a permanently lower level, it is predicted to prevent about 900 future premature tobacco-related deaths each year.

Total expenditure on cigarettes (equivalent to total gross turnover of the tobacco industry) changed from an annualised R32.1 billion just before the ban to an annualised R72.9 billion at the peak of the sales ban, and fell to R31.3 billion after the sales ban.

The sales ban hurt the multinationals (i.e. British American Tobacco, Philip Morris, and Japan Tobacco International), but greatly benefitted the non-multinationals (of which the prominent companies are Gold Leaf Tobacco Corporation, Carnilinx, Best Tobacco Company, and Amalgamated Tobacco Company). The non-multinationals were able to increase their market share substantially during the sales ban period, at the expense of the multinationals. Whereas the multinationals had an estimated market share of more than 70% pre-lockdown, this decreased to 33% during the sales ban. After the sales ban was lifted, the market share of the multinationals recovered to just more than 50%,

but it is still much smaller than before the ban. Very sharp increases in the retail prices (more than 400% at the peak of the sales ban), together with a 70% increase in sales volumes, meant that the total estimated gross turnover of the non-multinationals increased very sharply during the sales ban. Even after the lifting of the ban, the total gross turnover of this group is probably more than double what it was before the ban.

The National Treasury budgeted that R15 billion would be collected from tobacco excise taxes in the 2020/21 financial year. The 20-week sales ban means that the government has lost an estimated R5.8 billion during this period.

There are no angels in the industry: All tobacco companies, both the multinationals and the locally-based companies, have been accused and/or found guilty of various kinds of wrongdoing. The non-multinationals, which, more than the multinationals, have previously been found to sell cigarettes at prices at which it is impossible for the full tax to have been paid, have benefitted disproportionately from the ban. Because they already had well-established distribution channels into the illicit market before the ban, it seems likely that the sales ban has entrenched that market.

A large increase in the excise tax at the start of the lockdown would probably have yielded a similar outcome, in terms of a reduction in cigarette use and a decrease in smoking prevalence, as the sales ban. However, it would probably have been less disruptive, and yielded more revenue for government. The fact that the already well-established illicit market became more entrenched during the sales ban has complicated the task, for SARS and other law enforcement agencies, of reducing the illicit market. Reducing the illicit market should be a national priority. South Africa should ratify the Protocol to Eliminate the Illicit Trade in Tobacco Products, and implement its provisions.

1. Introduction

Between 27 March 2020 and 17 August 2020 the sale of tobacco products was forbidden in South Africa, being one of only three countries in the world to do so. The ban lasted for more than 20 weeks. Botswana imposed a tobacco sales ban for twelve weeks and India for six weeks. The sales ban was heavily and regularly criticised in the media, and drew the ire of many millions of smokers. It was strongly opposed by the tobacco industry.

A number of surveys were conducted during the sales ban period to ascertain how people have responded to the sales ban. These studies generally found that, even though some people stopped smoking, most did not and were able to purchase cigarettes on the illicit market. The present study adds to the existing literature, but has the distinct advantage that it is based on a broadly representative sample of the South African population.

In this paper we analyse the impact of the sales ban on South Africans' smoking behaviour and also how it has impacted the tobacco industry. The paper is structured as follows: In the following subsections we discuss the chronology of the sales ban, and summarise the existing studies that have investigated smokers' behaviour during this time. In section 2 we discuss the data sources and in section 3 the data manipulations that we have performed. The results are presented in section 4. In section 5 we discuss the results in more detail and highlight any policy implications. The paper concludes with a discussion of the limitations in section 6 and a conclusion in section 7.

1.1. Chronology of the tobacco sales ban in South Africa

Following the actions of other countries, and in an attempt to "flatten the curve" of COVID-19 infections, the President of South Africa, Cyril Ramaphosa, declared a National State of Disaster on 15 March 2020. The President created the National Coronavirus Command Council (NCCC), under the terms of the Disaster Management Act. The NCCC is chaired by the President and by the Minister of Cooperative Governance and Traditional Affairs, Nkosazana Dlamini-Zuma, and consists of 20 Ministers and their Directors-General, and representatives from the security agencies in South Africa.

On Monday, 23 March 2020, President Cyril Ramaphosa announced that the government would institute a nationwide, three-week-long lockdown starting at 00h00 on 27 March 2020. All 'non-essential' sectors of the economy were prohibited from producing and trading during this period [1]. On Wednesday, 25 March 2020, the government declared that tobacco products were non-essential and that their sale would therefore be prohibited during the initial, three-week long lockdown period [1].

The government's rationale for the tobacco sales ban changed over time, but throughout the ban it was firmly based on promoting health and protecting the healthcare sector. Because the coronavirus primarily attacks the lungs, and smokers' lungs are already compromised, it seemed intuitive that smokers would be more susceptible to the virus. The act of smoking means that the hand regularly touches the face, and could therefore more easily transmit the virus. Subsequently, the cigarette sales ban was rationalised on the grounds that people tend to smoke in groups, and share cigarettes, which increases the risk of the virus spreading.

On 9 April 2020 the President announced a two-week extension to the lockdown, extending the end date from 16 April to 30 April 2020 [2]. The ban on cigarette sales remained in force during this two-week extension period.

On 23 April 2020 the President announced a relaxation of the lockdown restrictions, including the lifting of the tobacco sales ban, starting from 1 May 2020, but this decision was subsequently overturned by Minister Dlamini-Zuma. The decision to keep the sales ban in place was confirmed by the NCCC, but it seems that this decision was not unanimous. The Minister of Finance, Tito Mboweni, publicly announced that he opposed the further extension of the cigarette and alcohol sales ban, "but I lost the debate and, therefore, I have to toe the line" [3].

The representative body of small domestic tobacco producers, the Fair-trade Independent Tobacco Association (FITA), filed a lawsuit against the South African government in the Pretoria High Court, contesting the continued tobacco sales ban [4]. FITA's case—based on the argument that cigarettes are addictive and should thus be regarded as essential products—was rejected by the court. In an out-of-court settlement, the government did, however, accede to FITA's demand that the cigarette producers should be allowed to produce cigarettes for the export market [4].

When the government did not lift the sales ban as the country moved to lockdown level 3 on 1 June 2020, British American Tobacco South Africa (BATSA) filed a lawsuit in the Western Cape High Court against the South African government on the grounds that the ban was "unjustifiable" and "unconstitutional".

When the case was eventually heard in early August, BATSA's main argument was that the sales ban infringed people's right to dignity, a right enshrined in the Constitution. It also indicated that the negative consequences of the ban, in the form of increased illicit trade, were disproportionate to the benefits. BATSA further argued that the argument by the Human Sciences Research Council (HSRC) -endorsed by Dlamini-Zuma- that smokers would overwhelm the health system [5] was misplaced. Doing some arithmetic using the HSRC data, BATSA showed that only 16 ICU beds were saved by the tobacco sales ban at any moment in time [6].

Judgment on the case was reserved. When the country moved to lockdown level 2 on 18 August 2020, cigarette sales were allowed again, and the urgency of the court case disappeared.

On 11 December 2020, the Western Cape High Court issued its ruling on the matter. The High Court found in favour of BATSA, and indicated that the government was wrong in implementing the tobacco sales ban. On 5 January 2021, the media reported that Government has applied for leave to appeal the High Court ruling [7]. At the time of writing this report, no ruling on this request had been made.

The prohibition of tobacco sales was one of the most controversial aspects of South Africa's COVID-19 lockdown. A key theme underpinning this controversy concerned whether the ban was achieving its objective of getting people to stop smoking. Numerous studies were conducted to measure this outcome.

1.2. Previous research on the tobacco sales ban

A number of surveys were conducted during the sales ban period. The first published results were produced by the Human Sciences Research Council (HSRC), and considered smokers' purchasing behaviour at the start of the lockdown. The Research Unit on the Economics of Excisable Products (REEP) conducted three online surveys – two during the sales ban and one after the ban was lifted. Another survey was conducted by a provider of data-free services. We discuss each of these studies in this section.

a) The HSRC study

The Human Sciences Research Council conducted two nationally representative, behavioural online surveys to investigate South Africans' knowledge, attitudes, perceptions, and practices related to COVID-19 infection [5]. The first survey was conducted among over 50 000 people between 27 March and 2 April, and the second was conducted among nearly 20 000 people between 8 April and 24 April [5]. Included in these surveys was a question on whether people had been able to buy cigarettes during the lockdown. Results of the study showed that only 12% of smokers had purchased cigarettes since the start of the lockdown, which prompted the HSRC to conclude that most smokers were adhering to the ban [5]. People who lived in townships and informal settlements were more likely to purchase cigarettes than people who lived in other locations.

The HSRC did not investigate the tobacco sales ban after the initial study, even though they conducted numerous studies on different aspects related to the government's response to the pandemic.

b) First REEP report

Between 29 April and 11 May 2020, members of the Research Unit on the Economics of Excisable Products (REEP), based at the University of Cape Town, conducted a first survey among smokers [8]. Respondents were recruited via Twitter, Change.org (a petition website) and Moya, a data-free messaging platform. The survey yielded 12 204 analysable observations. An analysis of the demographics indicated that the survey substantially oversampled women and the wealthier segments of society.

Respondents to the REEP survey were asked whether they stocked up on cigarettes before the ban and whether they had quit during the ban. Those smokers who did not quit were asked whether they were able to purchase cigarettes during the ban, where they purchased them, as well as the brand, quantity and price paid for each purchase [8].

The survey showed that 90% of smokers had stocked up on cigarettes before the start of the lockdown.

Approximately 7.4% of smokers in the sample at the start of the lockdown had been able to quit successfully[1] (at least at the time of the survey), while around 90% of survey respondents who did not quit smoking indicated that they had purchased cigarettes despite the ban [8].

In addition, the REEP survey showed that the ban had significantly altered the South African cigarette market. Prior to the lockdown, the South African cigarette market was dominated by multinational companies, specifically British American Tobacco. Other multinationals in the market were Philip Morris, Japan Tobacco International, and Imperial Tobacco [8]. During the lockdown, many smokers had been unable to purchase their pre-lockdown brand. Nearly half of continuing smokers in the sample switched from a multinational brand to a brand produced by a local producer. The local producers are mostly members of the Fair-trade Independent Tobacco Association (FITA) and include companies such as Gold Leaf Tobacco Corporation, Amalgamated Tobacco Company, Carnilinx, and Best Tobacco Company.[2]

Retail distribution outlets had also changed substantially. Whereas 70% of smokers purchased their cigarettes from formal outlets (including retailers, tobacco shops, petrol stations and wholesalers) before the lockdown, this decreased to 3% after the sales ban was implemented. The percentage of smokers who purchased from spaza shops increased from 34% to 44%, and those purchasing from house shops from 4% to 18%. Sales outlets that either did not exist, or that were inconsequential before the lockdown, but that became important sources of cigarettes during the lockdown include street vendors (26% of smokers), friends and family (30%), WhatsApp groups (11%), and “essential worker” acquaintances (10%).

The REEP report further found that smokers were paying a substantially higher price for cigarettes during the lockdown than before, with average per-stick prices increasing by 90% from the pre-lockdown period. During the two-week period of the survey, cigarette prices were increasing at a rate of more than 4% per day.

Taken together, the authors of the REEP study concluded that the ban on cigarette sales was failing in what it intended to do and was fuelling the already-problematic illicit market for cigarettes. Because so many people were able to purchase cigarettes, despite the ban, the authors of the REEP report argued that the ban had caused the illicit market to become more entrenched. They concluded that it was an error for government to continue with the cigarette sales ban into Level 4 lockdown, and that the government should lift the ban on cigarette sales as soon as possible.

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1 In the published report, the authors presented weighted data, where the weighting was based on race, gender and province. According to the weighted data, defined in this way, 16% of smokers had quit smoking by the time the survey was conducted. However, based on subsequent discussions with sampling experts, it became clear that, because some sections of the population (especially the poorer, less digitally-connected groups) were not included in the original sample, it does not make sense to weight the sample. In the two subsequent surveys, the idea of weighting the data was dropped, and the findings were presented in terms of the sample, rather than the population.

2 Gold Leaf Tobacco Corporation withdrew from FITA after the sales ban was lifted. It is not clear whether they withdrew or were expelled from the umbrella body. They subsequently affiliated with a previously unknown body, the South African Tobacco Organisation (SATO).

The REEP report attracted criticism from a number of sources, primarily from members of the public health community. The single most contested issue about the report was that the survey was not nationally representative. The survey oversampled females, Whites and smokers living in the Western Cape and Gauteng and undersampled males, Africans and smokers living in the other seven provinces. Relatedly, it was argued that the survey results disproportionately reflect the views of angry smokers, as opposed to those who had quit, and therefore underestimate the number of quitters during the tobacco sales ban.

c) Second REEP report

As the cigarette sales ban was extended, REEP ran a second, similar survey of lockdown smokers and quitters between 4 and 19 June 2020 [9]. Many questions in the second questionnaire were the same as or similar to those of the first round. The survey yielded 23 631 usable responses. Like in the first survey, the second survey oversampled women, white smokers and the wealthier segments of society. The second survey's results were largely similar to those of the first. The vast majority of smokers in the sample (91%) continued smoking, while only 9% had quit. Of the continuing smokers, around 93% purchased cigarettes during the lockdown [9].

An aspect that had not been investigated in the first survey, but that was investigated in the second, was the issue of the sharing of cigarettes. When the initial decision to lift the sales ban was overturned at the end of April 2020, Minister Dlamini-Zuma explained that the virus could spread through saliva when people shared cigarettes. The survey showed that the percentage of people who shared individual cigarettes increased from 18% pre-ban to 26% during the ban. The percentage of people who regularly shared individual cigarettes (i.e. more than 50% of the time) increased from less than 2% pre-ban to 9% during the ban.

By the time the second survey was conducted in June, the average price of cigarettes had increased by 250% relative to the pre-lockdown period. This was substantially more than the 90% increase recorded in the first survey.

More than half of all cigarettes purchased by respondents in June 2020 were brands from three non-multinational companies, namely Gold Leaf Tobacco Corporation (26%), Carnilinx (14%) and Best Tobacco Company (11%) [9]. British American Tobacco, which had dominated the South African cigarette industry for decades, had fallen to fifth place, with its brands having been purchased by only 9% of survey respondents [9].

Authors of the REEP report commented on the irony of FITA's legal challenge to the sales ban, since FITA primarily represents the non-multinational manufacturers, which had benefitted disproportionately from the ban [9]. The non-multinationals were much better placed to take advantage of the disruption caused by the sales ban because of pre-ban market dynamics. The multinationals' dominant position in the market before the ban meant that the local manufacturers were mostly limited to selling their cigarettes through the informal market. The distribution channels to the informal market were well established. The prices of local brands were also generally lower than those of the multinationals, and in many cases so low that it is impossible that excise and VAT could have been paid [10]. When the tobacco sales ban was implemented in March 2020, the formal distribution channels were closed down. Cigarette manufacturers had to sell their products through informal channels. Because they had previously-developed distribution channels to the informal market, the local producers had a huge competitive advantage over the multinationals.

The results of the second REEP survey pointed the authors to the same conclusion reached in the first report: that the continuation of the ban was an error and that it should be lifted as soon as possible [9]. The second report also added the recommendation that government should substantially increase the excise tax on cigarettes once the sales ban is lifted, since the sales ban had shown that the market could carry much higher prices. This recommendation was given with the important proviso that government must introduce measures to ensure that the illicit trade in cigarettes be brought under control. The authors noted that, even though the illicit operators were able to entrench themselves during the lockdown period, with political will and with the appropriate

use of technology (such as digital tax stamps and an independent Track and Trace solution), the damage can be undone and the illicit trade controlled [9].

d) M4JAM survey

On 4 June 2020, the media reported on a study conducted by Gig technology company 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 [11]. This is significantly higher than the 9% found in the REEP round 2 survey.

While the M4JAM survey did not report the demographics of the respondents, it 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. The respondents to the M4JAM survey are probably poorer and less addicted than the average smoker, which explains why they were able to quit in very substantial numbers. Most respondents indicated that they smoked local brands, but predicted that they would return to their usual brands once the ban is lifted.

Similarly to the REEP study, the M4JAM survey found that those who continued smoking during the sales ban had been able to source new cigarette supplies during lockdown, and that 95% of the M4JAM respondents were paying elevated prices. In addition, 79% of respondents reported that they did not share individual cigarettes, implying that 21% of respondents did share individual cigarettes. The percentage corresponds closely with REEP's estimate.

e) Third REEP report

After the lifting of the sales ban on tobacco in August, REEP conducted a third survey between 19 September and 6 October 2020 [12]. The third survey was limited to those respondents to the second survey who had agreed to be contacted again; 3 766 respondents completed both the second and third surveys.

About 17% of respondents to the third survey indicated that they had quit smoking during the lockdown, but about half of those who had quit had started smoking again by the time they completed the round 3 survey. The multinationals regained a substantial proportion of the market share that they lost during the sales ban, but were in a significantly weakened position, relative to the pre-lockdown period. The non-multinationals, which gained market share during the sales ban, had lost some of it once the ban was ended, but were still in a substantially stronger position than before the sales ban. Post-ban retail prices increased relative to pre-lockdown prices. The average price of multinational brands had increased by nearly 5%, while the average price of non-multinational brands had increased by 30%. The sales ban indicated that smokers are willing to accept a much higher price than was previously thought.

f) Summary of previous studies

The studies discussed above were all independent (of the tobacco industry) and aimed to describe smokers' responses to the lockdown. Information about the sample size, the dates of data collection, and dates of the reports are summarised in *Table 1*. The REEP studies provided the most comprehensive information, both in terms of the characteristics of the respondents that it sampled, and the nature of the market during the sales ban. There were substantial differences in the findings of the various reports. The HSRC study was conducted in the first four weeks of the sales ban period, when people were presumably still smoking cigarettes that they had stocked up. The HSRC did not publish any research results about smokers' behaviour after the ban was extended, which is when the effects of the ban became more obvious.

Table 1: Previous studies that have investigated smoking behaviour during lockdown

Study	N	Dates of data collection	Date report was published	Reference
HSRC	About 70 000	27/3 – 2/04 (N = over 50 000) 8/04 – 24/04 (N = 19 330)	11/05	[5]
REEP (1)	12 204	29/04 – 11/05	15/05	[8]
REEP (2)	23 631	4/06 – 19/06	21/07	[9]
REEP (3)	3 766	19/09 – 6/10	10/12	[12]
M4JAM	2013	Not indicated	4/06	[11]

We were unable to locate the original M4JAM report, but the media reports suggest that, other than a very substantial difference in the quitting percentage, the other conclusions are qualitatively similar to the second REEP report, e.g. the percentage of people sharing individual cigarettes, that continuing smokers substantially decreased their consumption during the sales ban, that nearly all continuing smokers were able to access cigarettes on the illegal market and the fact that cigarette prices increased so sharply. The largest criticism against both the M4JAM and REEP surveys was that the samples are not nationally representative. The findings of the reports pertain only to the sample, and thus do not capture the full market response to the ban.

In this paper, we use data from the tobacco module of NIDS wave 5 and NIDS-CRAM wave 3 to obtain a broadly nationally representative picture of the shifts in the competitive landscape that occurred during the lockdown. We find that the NIDS-CRAM data largely validate the REEP data, especially with respect to prices during the lockdown. Where appropriate, we consolidate these results to provide a fuller picture of the implications of the sales ban. We trust that this report will inform policy makers, especially the National Treasury and the South African Revenue Services, in their policies towards the tobacco industry.

2. Data

The data used in this study are drawn from three sources: the National Income Dynamics Study (NIDS) Wave 5 (collected in 2017); the National Income Dynamics Study – Coronavirus Rapid Mobile Survey (NIDS-CRAM) Wave 3 (collected over November and December 2020); and rounds 2 and 3 of REEP's online surveys.

2.1. The National Income Dynamics Study (NIDS)

NIDS is a broadly nationally representative face-to-face longitudinal panel study run by the University of Cape Town's Southern African Labour and Development Research Unit (SALDRU). The first NIDS survey was conducted in 2008. Subsequently, surveys were conducted in 2010/11, 2012, 2014/15 and 2017 [13]. NIDS collects a wide range of information on individual demographics, the labour market, and health-related topics.

Of particular interest for this study is wave 5's module focussing on tobacco and smoking-related behaviour [13]. This module provides an insight into the prevalence of smoking behaviour amongst South African adults aged 15 years and older, as well as information on the price of cigarettes at the time. This is the most recent broadly nationally representative survey on smoking behaviour.

2.2. The National Income Dynamics Study – Coronavirus Rapid Mobile Survey (NIDS-CRAM)

NIDS-CRAM aims to measure the income, employment and welfare effects resulting from the policies

and restrictions imposed by government to reduce the COVID-19 pandemic [14]. The NIDS-CRAM follows a subsample of approximately 8000 South African adults interviewed in the NIDS Wave 5 survey. A top-up sample of individuals was added in the third wave of NIDS-CRAM to account for attrition from the first two waves of the study.

This study uses the third wave of the NIDS-CRAM, which was in-field from 2 November 2020 to 13 December 2020 [14].[3] This wave included a module on tobacco and smoking-related questions. These questions focused on whether the respondent was a cigarette smoker immediately before the implementation of the tobacco sales ban, smoking behaviour during the sales ban, and smoking behaviour after the lifting of the sales ban on 18 August 2020. The questions also considered cigarette prices during the sales ban, and the brands of cigarette purchased during and after the sales ban. The NIDS-CRAM is the first broadly representative survey on smoking behaviour during the lockdown.

NIDS-CRAM is only broadly representative of the South Africa adult population in 2020 [14]. In fact, more specifically, the NIDS-CRAM is representative of the outcomes of the adults aged 15 and older in 2017 who were followed up on in 2020. As a result, the NIDS-CRAM is not wholly representative of the adult population in 2020, but can be considered "broadly representative". This concern should be borne in mind by the reader throughout the paper.

Whereas NIDS wave 5 defined respondents as "adults" if they were 15 years or older, the NIDS-CRAM, by virtue of the fact that it follows up on members of the 2017 NIDS sample, only considers people aged 18 and over. As such, the populations of the 2017 survey and the 2020 survey are not directly comparable. In order to increase the comparability of the two surveys, we removed all respondents aged 15 to 17 from NIDS wave 5.

2.3. The second and third REEP online surveys

The methodology of the three REEP studies on smokers' behaviour during and after the sales ban are described in the reports themselves (see [8, 9, 12]). For the current study, we use the third REEP report to obtain prices paid by smokers after the sales ban was lifted. Because of length restrictions, we were unable to ask this of NIDS-CRAM respondents. However, as we show in the results section, the prices of cigarettes during the sales ban, as they were recorded in the second REEP survey and the NIDS-CRAM survey, are very closely correlated, which makes us confident that the post-ban prices collected in the third REEP survey can be used in the post-ban analysis of prices in the current study.

3. Method and data manipulations

In general, this paper makes use of the NIDS and NIDS-CRAM surveys as independent cross-sections that are used to investigate changes in smoking behaviour between 2017 and the post-sales ban period in November/December 2020. In order to provide valid estimates of smoking prevalence in South Africa, we made a number of adjustments to the data.

First, although the NIDS and NIDS-CRAM surveys provide design weights that allow sample results to be weighted up to the population level, there is a key shortcoming when considering smoking behaviour. Adult (aged 15+) respondents who personally answered the questionnaire were asked about their smoking behaviour. Where an adult respondent was unavailable at the time of the interview, the questionnaire was completed by a "proxy", and the tobacco and smoking questions were not asked. The design weights created for NIDS Wave 5 account for both actual respondents and proxies. If one does not adjust for this, smoking prevalence will be understated. In order to correct this, we employ the method of Vellios et al. (2020) to "uplift" data for which we have smoking data to include data for which we do not have smoking data [15]. This "uplift factor" increases all

3 Wave 1 and Wave 2 of NIDS-CRAM were run from 7 May to 27 June 2020 and 13 July to 13 August 2020, respectively.

design weights by a constant factor to represent the full size of the adult population in 2017.[4] The assumption is that the smoking patterns of the "proxied" respondents are the same as those of the respondents who personally answered the questionnaire. To the extent that this is not the case, the uplift factor will bias the population estimates regarding smoking behaviour.

Furthermore, the NIDS-CRAM weights rely on the NIDS Wave 5 weights [14], meaning that the same under-representation of the adult population will occur when asking about smoking behaviour. As a result, the NIDS-CRAM Wave 3 design weights are also uplifted. However, because the NIDS-CRAM design weights only make the sample representative of the 2017 population who were followed up on in 2020, we cannot uplift the NIDS-CRAM data to represent the full adult population size in 2020. Instead, we uplift the NIDS-CRAM sample to be the size of the 2017 total adult population. Put differently, the uplift factor used ensures that the NIDS-CRAM sample – who are 18 years and older in 2020 – is weighted to a population the same size as the population aged 15 and older in 2017.

Secondly, all price data in the NIDS and NIDS-CRAM are collected at various times, making it necessary for us to deflate/inflate the data for comparisons to be meaningful. We make use of the tobacco portion of the CPI released by Statistics South Africa to deflate all prices to November 2020 Rands.

Finally, due to constraints on the number of tobacco-related questions that we could include in the NIDS-CRAM questionnaire, certain information is simply not available. Where such information, e.g. post-sales ban prices, was not collected, we supplement the NIDS-CRAM data with REEP round 3 data. We feel that this is justified, given the high degree of correlation between NIDS-CRAM price data and REEP round 2 price data. Since REEP round 3 price data is collected from a subsample of REEP round 2 respondents, such a strategy seems reasonable.

4. Results

a) A description of the sample

In NIDS-CRAM wave three, 6130 respondents out of 8157 potential sample members were successfully interviewed. Of these, 737 indicated that they had smoked cigarettes in the week before lockdown. The demographic composition of the pre-lockdown smokers is shown in *Table 2.*

4 Specifically, the estimated weighted adult population for which there are smoking-related variables in 2017 is approximately 34.5 million individuals. According to the United Nations Population Database (2019), however, there were approximately 40.4 million adults aged 15 and over in South Africa in 2017. The resulting "uplift factor is thus 40.4/34.5 = 1.17.

Table 2: A description of the sample

Characteristic	Number of observations
Number of respondents interviewed in NIDS-CRAM wave 3	6 130
Number of smokers in the sample	737
Of which	
African male	486
African female	36
Coloured male	65
Coloured female	79
Indian male	8
Indian female	6
White male	24
White female	33
Quit during the sales ban	76
Purchased cigarettes during the sales ban	404
Provided enough information to calculate the price paid during the sales ban	386
Indicated the brand purchased during the sales ban*	357
Indicated the brand purchased after the sales ban*	621

* These are brands that could be allocated to a parent company. "Self-grown" cigarettes, for example, are excluded from this number.

The number of smokers in the sample is modest, which prevents us from doing very precise analyses. In terms of demographics, White and Indian smokers seem to be undersampled, while the other groups may be oversampled. Only 35 African females are included in the smoking sample, but this corresponds with the fact that cigarette smoking prevalence among African females is only a fraction of that of African males.

A substantial proportion of respondents refused to answer the question about purchasing cigarettes during sales ban (N = 77; 10.44%), possibly because they did not want to admit to wrongdoing. Because so many respondents refused to answer that question, they were not asked about the prices that they paid or the brand that they purchased. Substantially more respondents were willing to answer the question about the brand they purchased after the ban was lifted and cigarettes were legal again.

In the subsequent analysis, all data are weighted, using the methodology discussed in section 3.

b) Size of the smoking population

In this section, we start by considering the number of cigarette smokers in South Africa before, during, and after the tobacco sales ban. *Table 3* offers an overview of the changes in the number of smokers between 2017 and 2020. Note that these numbers refer only to cigarette smoking. We do not include estimates of the use of other nicotine and tobacco products, like pipes, cigars, water pipes, smokeless tobacco and electronic nicotine delivery systems, because these were not included in the respective questionnaires.

It is estimated that in 2017 South Africa had approximately 7.8 million cigarette smokers, implying

a prevalence rate of 19.3% (for the population aged 15 and older). This paper focuses only on respondents aged 18 and older, because the NIDS-CRAM respondents are three years older in 2020 than they were in 2017. Among the population aged 18 and older, there were about 7.7 [7.1; 8.2] [5] million smokers in 2017. In the week before the lockdown began, the adult (18 years and older) smoking population is estimated at 6.8 [5.8; 7.8] million people. This implies a prevalence rate of 16.9%.

The number of smokers aged 18 and older decreased to approximately 5.7 [4.7; 6.7] million during the sales ban, indicating a decrease of just more than a million smokers, or 15.3%, during the sales ban.

The decrease in smoking prevalence during the lockdown should be interpreted with caution. Respondents to the smoking module in NIDS-CRAM wave 3 were asked how many cigarettes they typically smoked during the sales ban. Respondents who indicated that they did not smoke any cigarettes were classified as confirmed quitters; 536 [335; 738] thousand indicated this. About 496 [319; 672] thousand refused to answer the question or indicated that they did not know. Based on the point estimate of the confirmed number of quitters (i.e., 536 000), the quitting rate during the sales ban is 7.9%. This is likely to be a lower bound.

Thus, based on the NIDS-CRAM data, the percentage of pre-lockdown smokers who quit during the sales ban lies between 7.9% and 15.3%.

At the time of the NIDS-CRAM interview in November/December 2020, approximately 5.8 [4.9; 6.7] million people indicated that they had smoked cigarettes in the past week. This was a slight increase in the number of smokers during the sales ban period, and suggests that some quitters had relapsed. About 262 [116; 408] thousand people indicated that they smoked prior to the lockdown, gave up during the lockdown and then smoked again after the sales ban was lifted, i.e. relapsed. Depending on whether one uses the more expanded definition of the possible number of quitters during the sales ban (536 000 + 496 000), or only the confirmed number of quitters (536 000), this implies a relapse rate of between 25% and 49%. Studies that have investigated quitting behaviour indicate that most quitters require multiple quit attempts before they are ultimately successful [16-18]. Also, the fact that many smokers were "forced" to quit because cigarettes were unavailable or unaffordable, meant that they were less motivated than those smokers who truly wanted to quit.

Table 3: An overview of smokers and smoking behaviour from 2017 to November 2020

	N	Population ('000s)	95% CI ('000s)
Number of smokers in 2017	4 122	7 655	[7,073; 8,236]
Number of smokers before the lockdown	729	6 762	[5,755; 7,768]
Number of pre-sales ban smokers who quit smoking during the sales ban	76	536	[335; 738]
Number of continuing smokers during the sales ban	585	5 729	[4,731; 6,728]
Pre-lockdown smokers who refused to answer	68	496	[319; 672]
Number of post-sales ban smokers	590	5 820	[4,898; 6,743]
Number of post-sales ban relapsers	34	262	[116; 408]

Source: Authors' calculations from NIDS Wave 5 (2018) and NIDS-CRAM Wave 3 (2020)

5 Throughout this report, numbers in square brackets indicate 95% confidence intervals.

c) Changes in the size of the cigarette market

The total cigarette market is the product of the number of smokers and smoking intensity (i.e. the average number of cigarettes smoked per smoker). In the previous section, we saw that the sales ban resulted in a substantial decrease in the number of smokers. This section first considers changes in smoking intensity, and then uses this information to estimate the size of the cigarette market before, during, and after the sales ban period.

In 2017 the average smoker smoked 7.9 [7.5; 8.3] cigarettes per day. There were substantial racial differences in smoking intensity, with White smokers having the highest average daily consumption (14.9 for males and 15.1 for females), and African smokers the lowest (6.7 for males and 5.9 for females).

The average number of cigarettes smoked by continuing smokers decreased to 6.5 [5.4; 7.6] cigarettes per day during the lockdown, but increased sharply to 8.8 [7.7; 9.9] cigarettes per day after the sales ban was lifted. Average consumption after the lifting of the sales ban is higher than average consumption in 2017, although the difference is not statistically significant. The increase in post-ban smoking is also partly explained by the fact that smokers who quit during lockdown smoked fewer cigarettes per day in 2017 than continuing smokers (6.2, [4.0; 8.4]),.

Combining the prevalence and the intensity statistics allows us to estimate the total size of the market. We present annualised figures, because this is typically how the size of the market is defined. From the annualised figures one can easily derive monthly or even daily figures, by dividing by 12 or 365, respectively.

In *Table 4* we derive the annualised market size for four periods, namely 2017, before the 2020 sales ban, during the ban, and after the ban.

Table 4: Cigarette market size estimates: 2017, before the sales ban, during the sales ban, and after the sales ban

	2017	Before the ban	During the ban	After the ban
Number of smokers (weighted, '000s)	7,811	6,762	5,729	5,820
	[6,677; 8,945]	[5,405; 8,118]	[4,449; 7,010]	[4,612; 7,029]
Average number of cigarettes smoked daily)	7.9	7.9*	6.5	8.8
	[7.5; 8.3]	[7.5; 8.3]	[5.4; 7.6]	[7.7; 9.9]
Annual number of cigarettes smoked (millions)	22,513	19,607	13,615	18,734
	[18,225; 24,637]	[15,797; 23,729]	[9,893; 17,729]	[14,141; 23,696]

Source: Authors' calculations from NIDS Wave 5 (2018) and NIDS-CRAM Wave 3 (2020)
***** Because data on the number of cigarettes smoked just before the sales ban was imposed were not collected, we assume that the same smoking intensity applies as in 2017.

Based on NIDS wave 5 data, the size of the tobacco market in 2017 is estimated to be around 22.5 [18.2; 24.6] billion cigarettes. It is possible, because people tend to systematically under-report consumption of harmful and/or socially undesirable products like tobacco and alcohol [15, 19], that this may understate the true size of the tobacco market. The tobacco industry's estimate of the total cigarette market is around 27 billion cigarettes (Van der Merwe, personal communication). While there may be some dispute about the absolute size of the market, the percentage changes in the size of the market are probably more accurate, since the tendency to under-report consumption is unlikely to change.

The cigarette market decreased to an annualised volume of 13.6 [9.9; 17.7] billion cigarettes during the lockdown, a nearly 40% decrease relative to 2017. This decrease in consumption is explained by a 27% decrease in the number of smokers and a 18% decrease in the smoking intensity of continuing smokers.

The NIDS-CRAM data do not allow us to determine the size of the cigarette market in early 2020 (i.e. before the sales ban was imposed), because we do not have data on smoking intensity. However, if we assume that smoking intensity remained unchanged at 7.9 cigarettes per smoker per day between 2017 and early 2020, then the cigarette market is about 19.6 billion cigarettes in early 2020 (see the second column of *Table 4*). On the basis of these numbers, the sales ban decreased the cigarette market by 30%. This decrease can be decomposed into a 15% decrease in the number of smokers and a 18% decrease in the smoking intensity of continuing smokers.

After the sales ban was lifted in August 2020, the cigarette market increased to an annualised volume of 18.7 [14.1; 23.7] billion cigarettes. This represents a 38% increase relative to the sales ban period. The post-ban cigarette market is smaller than it was in 2017 and slightly smaller than the estimated size in early 2020.

The decrease in the size of the cigarette market during the sales ban, and even since the ban was lifted, is a positive public health development. In the Discussion section we provide some rough estimates of what this may mean in terms of premature deaths avoided.

d) An analysis of prices during lockdown

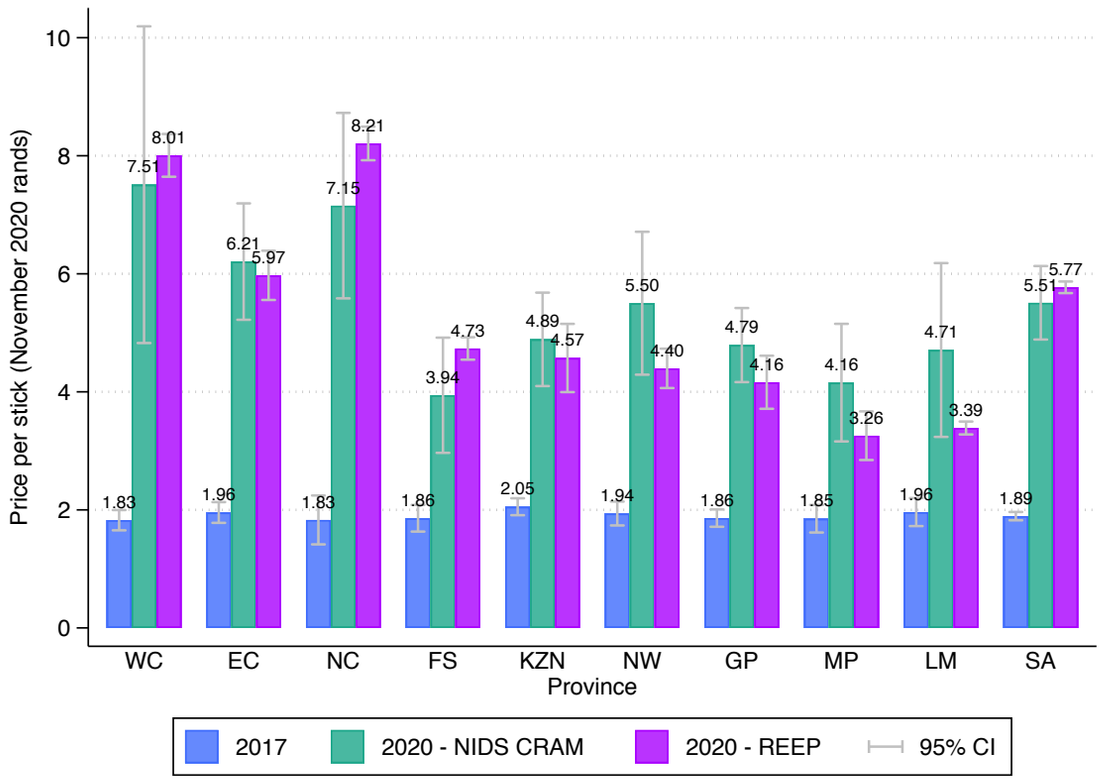
Respondents were asked in what packaging type they most frequently purchased their cigarettes during the sales ban. Options were single sticks, packs of 10, 20 or 30 cigarettes, and cartons of 200 cigarettes. In a subsequent question, they were asked the highest price that they paid during the sales ban for one unit of the pack type they identified. From this information we calculated per-cigarette prices. In order to remove the effect of inflation, we adjusted the prices recorded in NIDS Wave 5 in 2017 to November 2020, using the tobacco CPI figures.

While we appreciate that NIDS-CRAM is not designed to be provincially representative, the second survey by REEP, conducted in June 2020, indicated that there were large provincial differences in prices during the sales ban. The NIDS-CRAM data also indicates this, as is illustrated in *Figure 1*.

During the sales ban, the real price of cigarettes increased by an average of 192% from its 2017 levels. According to the NIDS-CRAM respondents, the highest price they paid for cigarettes during the sales ban period was R5.51 per stick, equivalent to more than R110 per pack of 20 cigarettes. This is very close to the average per stick price of R5.77 (R115 per pack of 20 cigarettes) recorded in the second REEP survey [9]. The difference in prices between NIDS-CRAM and REEP is not statistically significant.

Whereas there were no statistically significant differences in cigarette prices between provinces in 2017 (based on NIDS wave 5 data), there were substantial price differences between provinces during the sales ban. The highest lockdown prices were recorded in the Northern, Western and Eastern Cape, while the lowest lockdown prices were recorded in the Free State and Mpumalanga (but, even so, the real lockdown prices were more than double the levels of 2017). As indicated in *Figure 1*, the NIDS-CRAM average prices for the nine provinces correlate extremely closely with the average prices collected in the second REEP survey ($r = 0.93$). The fact that two independent surveys yield such similar results suggests that the differences in the prices between the provinces is not random, but structural. The fact that the market was illegal during the sales ban period seems to have resulted in significant market inefficiencies.

Figure 1: Average per-stick price of cigarettes by province, 2017 and 2020



Source: Authors' calculations from NIDS Wave 5 (2018), NIDS-CRAM Wave 3 (2020) and REEP Round 3 Survey (2020).
Notes: (1) NIDS-CRAM data is weighted and clustered. The NIDS-CRAM survey aims to be broadly nationally representative but is not truly representative at the provincial level. Similarly, REEP data is drawn from a sample that is not nationally representative. As a result, provincial price estimates are only broadly indicative of trends in price levels. (2) WC = Western Cape; EC = Eastern Cape; NC = Northern Cape; FS = Free State; KZN = Kwa-Zulu Natal; NW = North West; GP = Gauteng; MP = Mpumalanga; LM = Limpopo; SA = South Africa.

Respondents were asked which cigarette brands they purchased during the sales ban and after the sales ban. Since only 357 respondents provided during-lockdown brand information that could be mapped to a parent company, we do not have sufficient information to do an analysis by brand or manufacturer, but we are able to categorise the brands into multinational and non-multinational manufacturers.

The average "highest price" paid for multinational brands during the sales ban was R5.52 [R4.68; R6.36] per stick, while the average "highest price" paid for non-multinational brands was R5.27 [R4.57; R5.97].[6] This implies a premium for multinational brands of nearly 5%. During the sales ban, the premium for multinational brands was substantially reduced. Before the sales ban, multinational brands were sold at an 80% premium over the non-multinational brands, according to the REEP surveys.

By implication, the non-multinationals have experienced a much larger increase in their retail prices than the multinationals. More than that, the non-multinationals have been able to increase their market share greatly, as will be explained in the following section.

e) The competitive situation

Traditionally the South African cigarette market was dominated by the multinationals, in particular British American Tobacco. Since the start of the century and especially in the last decade the

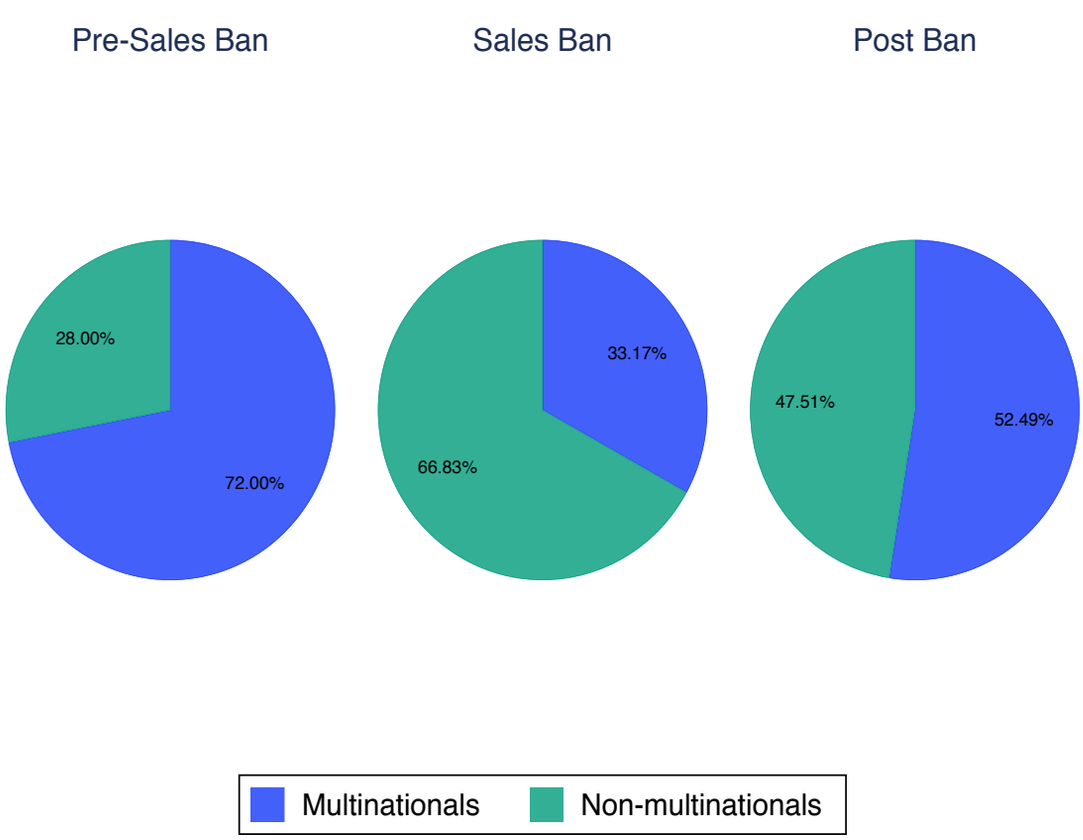
6 The weighted average for multinational and non-multinational brands is less than the average price of R5.51, which is shown in Figure 1. The reason for the difference is that more respondents (386) answered the question about prices during the sales ban, than the brands that they purchased (357). Moreover, only 339 individuals reported both brand and price information, meaning that 47 prices had to be excluded when calculating average prices by company type.

multinationals have lost market share to non-multinationals. These typically started as small independent companies, based in South Africa and neighbouring countries. The more well-known of these are Gold Leaf Tobacco Corporation, Carnilinx, Best Tobacco Company, and Amalgamated Tobacco Company. Many are affiliated with the Fair-trade Independent Tobacco Association (FITA), but very recently a new umbrella organisation, the South African Tobacco Organisation has entered the arena. During the sales ban a number of unusual imported brands were noticed on the market. These were nearly exclusively non-multinational brands.

There is no consensus about the market shares of the two categories of manufacturers before the lockdown. According to Euromonitor, the multinationals held a 92.5% market share in 2019 [20]. This seems unrealistically high. According to a study conducted by IPSOS on behalf of the Tobacco Institute of Southern Africa, nearly 30% of cigarettes sold in South Africa were illicit [21]. They attributed the illicit trade almost exclusively to the non-multinationals. On this reasoning, the share of the multinationals cannot be more than about 70%. Surveys by REEP indicate that the multinationals had a market share of between 72% and 75% before the start of the sales ban [9]. In the subsequent analysis we will assume a pre-ban market share of the multinationals of 72%.

The sales ban resulted in a major shift in the competitive landscape. *Figure 2* shows that the market share of the multinationals was reduced to only 33% during the sales ban, while non-multinational brands made up approximately 67%. After the sales ban was lifted the market share of the multinationals recovered to about 53%, but this is substantially lower than the pre-ban market share. The conclusion to be drawn is that the non-multinationals have greatly benefitted from the sales ban, and that the benefit seems to have carried through to the post-ban period.

Figure 2: Market share of Multinational and Non-Multinational tobacco companies, before, during and after sales ban 2020



Source: NIDS-CRAM Wave 3 (2020)

In *Table 5* we present some rough calculations of the effect of the sales ban on the gross turnover of the multinationals and non-multinationals, based on NIDS-CRAM data and REEP data. To compare the different scenarios, all data have been annualised. The revenues refer to gross turnover. VAT and excise tax (if they are paid) are not excluded from the turnover figures shown. To determine the net-of-tax revenue, one would have to subtract these tax amounts from the gross amounts. It is unlikely that any excise or VAT revenue was paid during the sales ban period, because no sales were allowed. Even before the sales ban, a substantial proportion of these taxes were not paid either.

Also note that the revenues for the sales ban period are based on the highest price that people paid for cigarettes during the sales ban period. The average price paid over the course of the sales ban period is probably lower than the prices used here. Thus, the revenue for the sales ban period is an upper limit. However, despite obvious flaws and drawbacks, we believe that this exercise is instructive to see how the sales ban affected the two groups of companies differently.

Table 5: An analysis of gross turnover of the tobacco industry

Description	Multinationals	Non-multinationals	Total
Before sales ban			
Market share (percentage)	72%	28%	100%
Cigarettes sold (billions, annualised)	14.0	5.5	19.5
Average price (R per stick)	1.90	1.00	1.65
Total gross revenue (R billions)	26.7	5.5	32.1
During sales ban			
Market share (percentage)	33%	67%	100%
Cigarettes sold (billions, annualised)	4.5	9.1	13.6
Average price (R per stick)	5.52	5.27	5.35
Total gross revenue (R billions)	24.8	48.1	72.9
After sales ban			
Market share (percentage)	53%	47%	100%
Cigarettes sold (billions, annualised)	9.9	8.8	18.7
Average price (R per stick)	2.00*	1.30*	1.67
Total gross revenue (R billions)	19.8	11.4	31.3

***** Based on the finding (see the third REEP report) that the prices of multinational brands are 5% higher and non-multinational brands 30% higher than before the sales ban.
Source: Authors' calculations from NIDS Wave 5 (2018), NIDS-CRAM Wave 3 (2020) and REEP Round 3 Survey (2020)

The dominance of the multinationals before the sales ban is clearly illustrated in *Table 5*. They had the largest market share and were able to charge much higher average prices than the non-multinationals, and commanded more than 80% of the gross industry turnover.

The situation changed dramatically during the sales ban. Sales volumes of the multinationals decreased by about two-thirds and even though their average prices increased by more than 150%, total gross turnover decreased. On the other hand, the non-multinationals had a golden age, with a 70% increase in sales volumes and a more than 400% increase in the average price. Their gross turnover increased more than eight-fold. Whereas they had less than 20% of the gross industry turnover before the sales ban, their share increased to 65% during the ban.

After the sales ban was lifted, the gross turnover of the industry reversed to a level resembling the

pre-sales ban period. Overall volumes were down by about 4%, average prices were up marginally and gross turnover was down by about 2%. However, the non-multinationals more than doubled their turnover (relative to the pre-ban period), driven by a 30% increase in prices and a 60% increase in sales volumes, at the expense of the multinationals. The gross turnover of the multinationals is about 25% less post-ban than pre-ban. While the sales ban has been a windfall for the non-multinationals, it has been a disaster for the multinationals.

5. Discussion

a) The health impact

The rationale for the sales ban was to reduce the pressure on the health sector by smokers who were expected to be more vulnerable to Covid-19 than non-smokers. As economists we are not well-placed to evaluate this link, although it is easy to see its intuitive appeal. The medical literature that has investigated this link shows a range of findings [22, 23]. Many of these findings are provisional and have not yet been peer-reviewed. Some findings suggest that smokers experience a greater risk from COVID-19 [24, 25], while others come to an opposite conclusion [26, 27]. It would be fair to say that there is currently no consensus on the matter[28].

Our analysis indicates that cigarette consumption has decreased during the sales ban period and that it has settled at a lower level after the sales ban has been lifted. Given that the general detrimental health effects of tobacco use have been established beyond any doubt, the long-term public health effects of such a decrease in consumption are positive. Between 7.9% and 15.3% of pre-lockdown smokers quit during the sales ban period. As most smokers regret that they started smoking, those quitters will probably look back to the sales ban as a positive experience.

While our data does not allow us to do a full epidemiological study of the impact of this change in consumption patterns, a useful rule of thumb, developed by Jha (2020), is that every one million cigarettes smoked is responsible for one tobacco-related death [29]. During the 20-week sales ban period, cigarette consumption was about 2 300 million sticks less than usual [(19.6 billion – 13.6 billion) x 20/52, see *Table 5*], which suggests that 2 300 future premature tobacco-related deaths have been averted through the sales ban. On the assumption that cigarette consumption will be on a permanently lower level of about 18.7 billion sticks (from the pre-sales ban level of 19.6 billion sticks), this implies an annual decrease in the number of future premature tobacco-related deaths of 900 per year.

b) The economic impact

i) Impact on prices

From an economic perspective, the sales ban was extremely disruptive. Previous studies by REEP indicated that smokers who were unable to quit were forced to pay highly inflated prices for cigarettes and to purchase brands that many smokers would regard as being of inferior quality. The NIDS-CRAM study also finds that retail prices increased dramatically, and that there was a large shift in market shares during the sales ban period.

The 7.9% to 15.3% of smokers that were able to quit smoking would have received not only the health benefit of quitting, but also the financial benefit of not having to purchase (very expensive) cigarettes. However, these people form a minority of pre-ban smokers. Most continuing smokers cut their consumption during the sales ban, but because the price increased so sharply, their total expenditure on tobacco products increased. This would have placed an additional burden on already-strained household budgets.

ii) Impact on tax revenue

An often-heard argument was that the government was losing excise tax revenue because of the tobacco sales ban. The government budgeted to collect R15 billion in tobacco taxation in the

2020/21 financial year (R14.5 billion from cigarettes and cigarette tobacco and nearly R500 million from other tobacco products) [30]. This implies a monthly amount of R1.25 billion and a daily amount of just more than R40 million in excise tax revenues. Thus, during the 20-week period that the sales ban was in place, the government has lost about R5.8 billion in tobacco excise revenues.

Within the context of a budgeted total gross tax revenue amount of more than R1.4 trillion for the 2020/21 financial year, tobacco excise taxation contributes about 1% of the total. While this is a modest percentage, the government's fiscal situation is so serious that it should cherish all taxation sources. Tobacco taxes are a relatively easy source of revenue. These revenues are particularly important in the COVID-19 context, where expanded welfare programs could be supported by increased revenue.

iii) Illicit trade

A larger and more entrenched illicit tobacco sector as a result of the ban is a source of concern. Even before the sales ban, the illicit trade in cigarettes was a problem. Using different techniques, two independent studies indicated that at least 30% of cigarettes smoked in 2017 were purchased at prices that were so low that it was impossible that the full tax amount had been paid [10, 31]. The rapid growth in illicit trade between 2010 and 2017, and especially between 2015 and 2017, has been attributed mainly to the erosion of SARS's investigative capacity during that time. This has been described in detail in Johann van Loggerenberg's books (Rogue, 2016 [32] and Tobacco Wars, 2019 [33]).

The new leadership of SARS created the Illicit Economy Unit in early 2019. In the 2019/2020 fiscal year cigarette tax revenue increased by 19% from the previous year's tax revenue amount. The number of cigarettes on which excise tax was levied increased by about 8.3%, strongly indicating that SARS was starting to turn the tide against illicit cigarettes.

Within this context, the sales ban undid many of the positive developments of 2019. It entrenched distribution channels for illicit cigarettes, especially in the informal retail outlets.

To undo the damage will be difficult. The Protocol to Eliminate the Illicit Trade in Tobacco Products, which South Africa has signed, but not yet ratified, provides a number of 'best practice 'solutions that the government and its agents can implement to reduce the illicit trade in tobacco products [34]. Foremost among these is the implementation of an independent track and trace system. This has been implemented with great success in countries like Kenya, Turkey and Brazil. In 2019, SARS issued a call for tenders to implement such a system, but after a number of extensions, the call was eventually cancelled. It is important that the process be resuscitated.

iv) Competitive issues

The cigarette market in South Africa has two main groups of producers: multinationals and non-multinationals. The multinationals, which are British American Tobacco, Philip Morris, and Japan Tobacco International, position themselves as the providers of legal, fully tax-paid cigarettes, and have dominated the market for decades. Most of their product is sold through formal outlets.

Since 2000, and especially since 2010, the market share of the multinationals has been eroded by a number of producers located in South Africa and neighbouring countries. Many of these companies are affiliated to the Fair-trade Independent Tobacco Association (FITA). Often blocked from access to the formal markets by the multinationals, these companies have primarily targeted the informal market, where they sell their product at substantially lower prices. Studies commissioned by the now-defunct Tobacco Institute of Southern Africa (TISA), the representative body of the multinationals [21], and Tax Justice South Africa [35], apparently a front group for the multinationals, aim to show that the local producers are selling cigarettes that are sold at prices that do not cover the excise tax and the VAT on the products. Independent studies by REEP have largely confirmed these findings [36].

The NIDS-CRAM survey and the REEP surveys indicate that the sales ban has resulted in a significant

upheaval of the competitive landscape. The sales ban has allowed the non-multinationals to increase their turnover multiple times by increasing their sales volumes and by charging massively inflated prices for their products. After the sales ban was lifted, the golden age for the non-multinationals ended, but they are still in a significantly stronger position than they were before the ban.

The long-term consequences of the sales ban have been bad for the multinationals. Their market share was largely obliterated during the sales ban, and even though they have been able to claw back some market share since the ban was lifted, their market share is substantially smaller than it was before the ban was imposed. They are under pressure and believe that the playing field is tilted against them.

The multinationals portray the local companies as the drivers of illicit trade, and themselves as the victims. They want to be seen as "partners" of government in the fight against illicit trade. The situation is far more nuanced than this. The multinationals have a credibility deficit in that, for many years, they have actively undermined government institutions, especially SARS, and have been involved in a range of highly questionable activities. This is described in detail by Johann van Loggerenberg (Tobacco Wars, 2019) [33] and Telita Snyckers (Dirty Tobacco, 2020) [37]. While they may not be as brazen as the non-multinationals in selling illicit cigarettes, the multinationals should not be regarded as "partners" of government.

v) Policy consistency

In all three REEP reports, the authors argued that the government erred in continuing the sales ban after the initial five weeks, on the grounds that it was not having the intended impact [8, 9, 12]. In early May 2020, even though the sales ban continued, the government allowed tobacco companies to produce tobacco products for export. This concession probably created the mechanism for tobacco companies to divert cigarettes to the South African markets. As argued by Snyckers (in Bottomley, 2020), and provisionally confirmed by preliminary REEP research, cigarette exports to Namibia, Lesotho and Zimbabwe spiked in the period from May through July 2020 [38]. It seems unlikely, given these countries' relatively small populations and low smoking prevalence, that they could consume all these cigarettes. These exported cigarettes were probably smuggled back into South Africa or never left the country (i.e. "ghost exports").

The tobacco industry's record of using illicit means to break into new markets has been described in detail [39, 40]. Illicit trade in South Africa had been at problematic levels before the sales ban was introduced. The distribution networks into informal outlets were well established. By the time the industry was allowed to produce for the export market, the local market was starved of cigarettes and the prices had nearly doubled from their pre-ban levels [8]. The incentive to divert cigarettes, ostensibly destined for the export market, into the domestic market, would have been too strong to resist. For government to allow the production of cigarettes, but not allow them to be sold domestically, indicates a serious lack of consideration of the consequences of this policy.

vi) The role of taxation

Could the government have adopted a better approach? There is strong evidence that sharp, permanent increases in the excise tax, which raise the retail price of cigarettes, are particularly effective in discouraging smoking [41]. In contrast, from the moment it was imposed, there was an understanding that the sales ban would be a temporary measure. The only uncertainty was for how long it would continue. Thus, rather than quitting, many smokers seemed to have adopted the attitude of grinning and bearing the disruption caused by the sales ban, and buying cigarettes on the illicit market.

Had the government implemented a very substantial increase in the excise tax at the start of the lockdown (or when the initial hard lockdown was relaxed on 1 May 2020), it would probably have achieved a similar outcome, but with less disruption and with substantial revenue gains. No doubt the tobacco industry would have objected strongly, and would have argued that a sharp increase in the excise tax would increase the illicit market. With good measures in place to reduce illicit trade, this predicted increase in illicit trade is by no means guaranteed to happen. But even if the tax

increase had increased the illicit market, it would not have resulted in a 100% illicit market, as was the case with a sales ban.

Economists typically prefer price interventions, over prohibitions, to change people's purchasing patterns. In fact, the rationale for imposing an excise tax on potentially harmful or undesirable products is based on the principle of discouraging its use, rather than banning it outright. The government has missed an opportunity to substantially increase the excise tax on tobacco products during the lockdown. The disruption caused by the sales ban has made the situation more challenging.

The threat of the illicit market is real. The tobacco industry is likely to argue that the government should not increase the excise tax if the illicit market is not under control. Substantially reducing the illicit market should be a priority of the appropriate government agencies. If progress is being made, we strongly recommend that National Treasury aggressively increases the excise tax in future. It will be good for the fiscus and for public health.

6. Limitations

While the NIDS-CRAM data is broadly nationally representative, the number of observations is relatively small. The result is that the confidence intervals are wide, and that one is unable to investigate fine-grained issues. For example, we are unable to investigate the market shares of individual brands or even individual companies, but have limited the analysis to multinationals vs. non-multinationals.

A substantial number of respondents did not answer questions about the brands they purchased during the sales ban, possibly because they felt that they may incriminate themselves. There may be other types of measurement error, for example, where respondents may deny that they smoke or understate their consumption for fear of being overheard by family members.

The tobacco questions were the last questions on the NIDS-CRAM questionnaire. It is possible that some respondents were tired and that they indicated that they did not smoke cigarettes before the sales ban, in order to complete the questionnaire faster. While the smoking prevalence of 16.9% pre-ban, based on the weighted data, is substantially lower than the smoking prevalence in 2017 (20.5%[18.9%; 22.0%]), it is not so low as to look suspicious. The SANHANES data of 2012 indicated a smoking prevalence of 17.6% [42].

Respondents were asked to indicate the highest price that they paid for cigarettes during the sales ban period. The REEP surveys indicate that prices increased rapidly over the sales ban period, and probably peaked in June or July 2020. Based on anecdotal evidence, received from smokers, prices decreased rapidly from their high lockdown levels, when the end of the sales ban was in sight. The turnover analysis in section 4 (e) is based on the maximum prices achieved during the sales ban. As we indicated there, the turnover figures are upper bounds, and do not apply for the whole sales ban period. The turnover figures are used to illustrate the different experiences of the multinationals and non-multinationals; it should not be used to estimate the profits earned by the various groups of companies.

7. Conclusion

The COVID-19 pandemic will go down in history as one of the most disruptive global shocks of the modern age, with repercussions in all spheres of life. Managing the pandemic was always going to be difficult. The ban on the sale of tobacco products in South Africa, and keeping the ban in place for such a relatively long time, will probably be regarded as one of the most controversial aspects of the lockdown.

The tobacco sales ban has greatly disrupted the cigarette market in South Africa. The evidence indicates that the market has shrunk because of the sales ban, with positive health consequences. However, the sales ban has also entrenched and expanded an already well-established illicit market. SARS had achieved some success in 2019 in their efforts to reduce the illicit cigarette market. The sales ban has overturned all those gains.

As we did in the second REEP report [9], we argue that substantial increases in the excise tax, together with strong measures to curb illicit trade, would have achieved a similar result as a sales ban, and would have yielded substantial revenues for government. The disruption caused by the sales ban has, unfortunately, made that option substantially more difficult to implement.

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