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# THREE YEARS OF PLAIN PACKAGING FOR TOBACCO PRODUCTS IN AUSTRALIA

Have the Expectations Been Met?

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## Contents

1	Background	3
2	Plain Packaging Has Not Reduced the Rate of Smoking	4
3	Plain Packaging Has Not Reduced Tobacco Consumption	7
4	Conclusion	9

### Three Years of Plain Packaging for Tobacco Products in Australia – Have the Expectations Been Met?

In December 2012, the Australian Government implemented plain packaging for tobacco products in order to curb smoking. But three years later, governmental data and related research show that neither the rate of smoking, nor tobacco consumption have declined as a result of plain packaging.

#### 1 Background

The 1st of December 2015 marks the third anniversary of plain (or standardized) packaging for tobacco products in Australia. Since its introduction, the new tobacco control measure has captured the attention of researchers and media worldwide. Several other countries – including Ireland, the UK, New Zealand and France – are now considering, planning or have already passed plain packaging legislation. But is Australia's landmark tobacco control legislation, which bans cigarette brand logos on packs, really reducing smoking?

The Australian Government introduced plain packaging with the main objective to improve public health through “*encouraging smoking cessation and discouraging people from using any tobacco products*”.<sup>1</sup> Consequently, if the measure were successful, the *rate of smoking* (or “smoking prevalence”) would drop, that is, fewer Australians would be smoking. Furthermore, tobacco *consumption* in Australia would decline, that is, Australians would be smoking less, in comparison to a situation without plain packaging.

For the purposes of evaluating plain packaging, the Australian Government Department of Health funded the Australian National Plain Packaging Tracking Survey (NPPTS). In March of this year, a group of tobacco control researchers analyzed the NPPTS data and published their findings in a special volume of the journal *Tobacco Control*.<sup>2</sup> However, the authors of those papers did not evaluate the effect of plain packaging on the *rate* of smoking. They specifically state that “*the studies in this volume examine the impact of Australia's tobacco plain packaging legislation and the simultaneously introduced enlarged graphic health warnings, not on smoking prevalence*”. Since the key smoking-related metric, the *rate of smoking*, is ignored, this research cannot answer the question of whether plain packaging has curbed smoking in Australia.<sup>3</sup>

This overview now discusses the evidence on *smoking rates and tobacco consumption*.<sup>\*</sup> We consider *publicly available (governmental) tobacco usage data*, as well as related results from empirical research on the effectiveness of plain packaging in Australia.

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<sup>\*</sup> There are other potential effects of plain packaging (not related to the rate of smoking or tobacco consumption), such as an impact on the illicit

tobacco trade or a shifting in tobacco price categories, which we have not addressed in this paper.

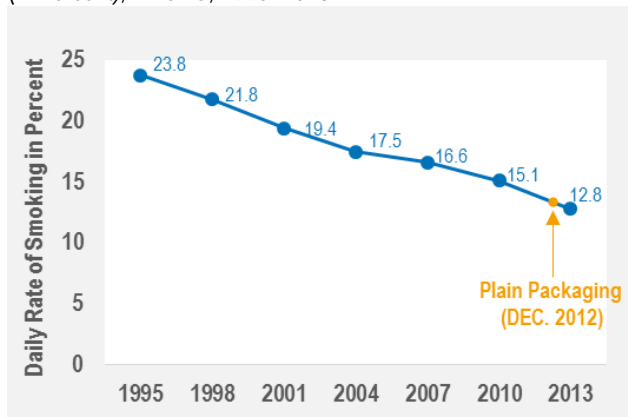


## 2 Plain Packaging Has Not Reduced the Rate of Smoking

The percentage of smokers in the population (i.e., the rate of smoking) is the key smoking-related metric for evaluating plain packaging. The Australian National Drug Strategy Household Survey (NDSHS) indicates a decline in the rate of smoking from 15.1 in 2010 to 12.8 percent in 2013. Tobacco control researchers have portrayed this decline as evidence of plain packaging's effectiveness. However, the NDSHS data cannot validly be used to evaluate the (potential) plain packaging effect for several reasons. In particular, the data provide information on smoking rates in 2010 and in 2013, but plain packaging was introduced only in late 2012. Unlike the NDSHS, official state-level data enable a comparison of smoking rates right before and after the implementation of plain packaging. These data show no evidence of a plain packaging effect and this finding is in line with existing empirical research.

Every three years, the Australian Institute of Health and Welfare (AIHW) conducts the Australian National Drug Strategy Household Survey (NDSHS), which includes around 24,000 people. NDSHS provides information on national smoking rates and the most recent data from 2013 indicates a decline in the daily rate of smoking from 15.1 percent in 2010 to 12.8 percent in 2013.

Figure 1: Daily Smoking Rate (Smoking Prevalence) in Australia (in Percent), NDSHS, 1995–2013



Source: NDSHS.

Tobacco control researchers and advocates have celebrated the release of this single 2013 data point as “a massive decline in smoking prevalence in Australia following the introduction of standardized packaging.” Causality was also quickly established: “[T]he elephant-in-the-room explanatory variable was the implementation of plain packaging in December 2012”.<sup>4</sup>

For three closely related reasons, it is not legitimate to interpret the NDSHS data as evidence of a plain packaging effect.<sup>5</sup>

Firstly, the decline continues the existing downward trend in smoking. According to AIHW itself, “in 2013, the proportion of people aged 14 or older smoking daily declined from 15.1% to 12.8%, continuing a downward trend from 1991.” Due to the already existing downward trend, the rate of smoking in Australia was anyhow likely to decline in 2013, with or without plain packaging.<sup>6</sup>

Secondly, noteworthy tobacco control measures other than plain packaging were implemented in Australia between 2010 and 2013. These include public smoking bans,<sup>7</sup> point-of-sale display bans in all Australian states,<sup>8</sup> larger graphic health warnings (introduced together with plain packaging)<sup>9</sup> and a fundamental change in tobacco tax policy (comprising four pre-announced staggered tax increases).

Thirdly, and most importantly, the two NDSHS data points in 2010 and in 2013 are essentially two snapshots in time, taken three years apart. As a result, the two data points do not provide information on when the decline in the rate of smoking happened. Since plain packaging was not introduced until December 2012, there is, prima facie, no evidence that the decline in NDSHS data can be attributed to plain packaging.

Unlike the NDSHS, there are *annually* collected governmental<sup>10</sup> state-level surveys that might allow inferences to be made on the impact of plain packaging by comparing smoking rates between 2012 and 2013.<sup>11</sup> These data cover the five largest Australian states (representing 95 percent of the Australian population).<sup>12</sup> Figure 2 shows that in four of these five states (Queensland, South Australia, Victoria, and Western Australia), the rate of smoking was higher in 2013 than in 2012. Only in New South Wales, does the rate of smoking seem to have declined. Statistically, neither the four increases, nor the decrease in New South Wales are different from zero. In other words, **none of the state-level surveys indicates a decline in smoking rates in 2013. Thus, based on the state-level data, there is no evidence of a plain packaging effect.** Initial results for the year 2014, which



was subject to the effect of two and sizeable tobacco tax increases (one in December 2013 and one in September 2014), show that smoking rates in most states have continued to decline again, in accordance with the existing downward trend in smoking.<sup>13</sup> This finding suggests that the continuing downward trend was due to tobacco taxation, rather than the plain packaging measure. This tentative assessment is in line with evidence for many other countries where “extensive research has demonstrated that increasing tobacco taxes and prices is the single most cost-effective tobacco control measure”.<sup>14</sup>

These observations conform to available research based on state-level data:

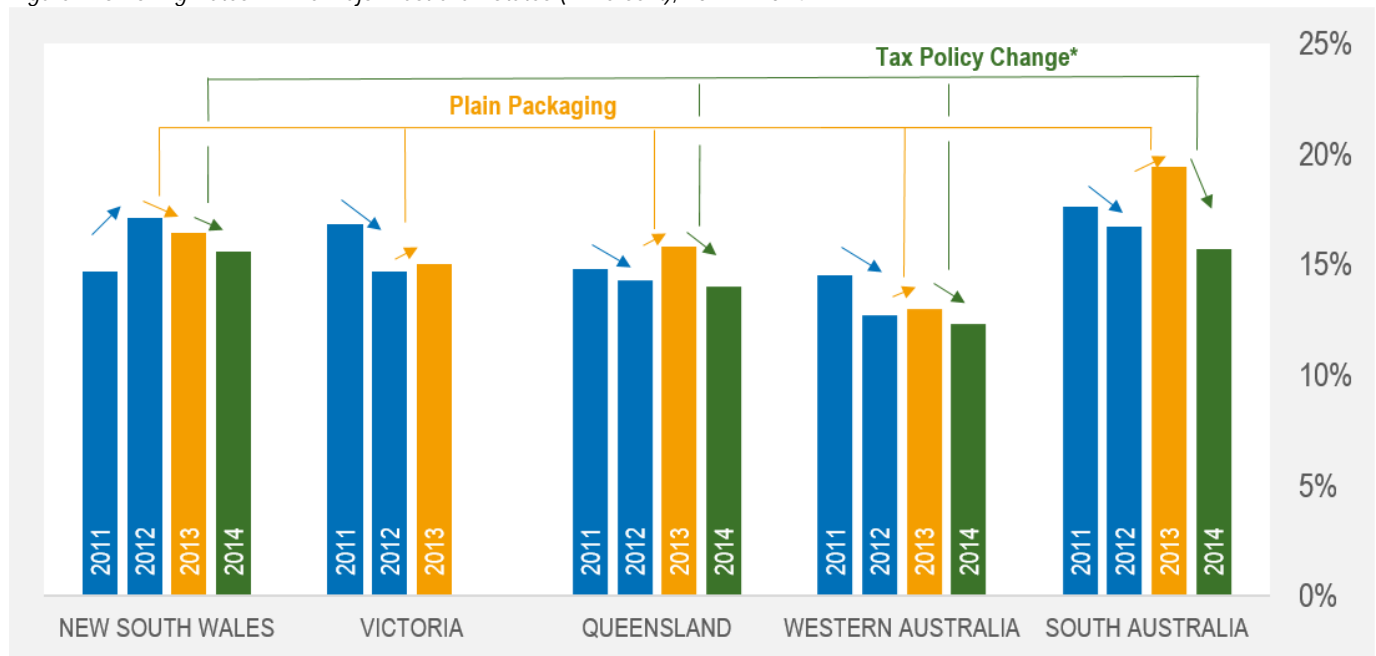
Firstly, Queensland's State Department of Health conducted a statistical trend analysis to analyze whether the observed decline in the rate of smoking in this state is statistically significant. According to the analysis, the percentage of adults who smoked daily, decreased by an average of 2.4 percent per year between 2002 and 2013.<sup>15</sup> Contrary to the trend, smoking rates in Queensland *increased by more than 10 percent* (1.5 percentage points) from 14.3 to 15.8 between 2012 and 2013. This development is at odds with the claim that plain packaging has reduced smoking.

Secondly, McKeganey and Russel (2015)<sup>21</sup> published a research article based on the governmental state level data. The authors find that smoking rates “*appear to have increased*” in Queensland, New South Wales, South Australia and Western Australia.<sup>22</sup> The authors conclude:

*“What these data do show, however, is that the overwhelming confidence on the part of tobacco control researchers, and others, that plain packaging would rapidly result in a reduction in smoking prevalence is by no means being borne out by the data being reported by the government of these major Australian states.”*  
 McKeganey and Russel (2015)

Based on their analysis, the authors further point out: “*What these data also show is a disparity between the popular rhetoric around plain packaging – what it will achieve and how quickly – and the reality of what is actually happening in the one country so far to have implemented the policy.*”

Figure 2: Smoking Rates in Five Major Australian States (in Percent), 2011 – 2014



Source: New South Wales, Healthstats NSW;<sup>16</sup> Victoria, Victorian Smoking and Health Survey;<sup>17</sup> Queensland, Queensland Preventive Health Indicators;<sup>18</sup> Western Australia, Western Australian Health and Wellbeing Survey;<sup>19</sup> South Australia, SA Health Omnibus Survey.<sup>20</sup> \*Tax Policy Change refers to the four pre-announced staggered tax increases in Australia between 2013 and 2016.



Focusing on Australia as a whole, empirical evidence based on Roy Morgan Single Source (RMSS) data suggests that plain packaging has not reduced smoking rates. RMSS has two important advantages over NDSHS:

Firstly, the annual sample size is twice as large as that of NDSHS (about 50,000, as opposed to the 24,000 of NDSHS).

Secondly, the survey is conducted on a monthly basis, which allows for a more refined analysis of smoking rates before and after plain packaging. RMSS<sup>23</sup> has therefore been used by several tobacco control researchers to analyze smoking behavior in Australia.<sup>24</sup> Kaul and Wolf (2014a) conducted a trend analysis based on RMSS taking the existing decline in smoking behavior into account. They find no evidence of a plain packaging effect on the rate of smoking; that is, the implementation of plain packaging is not associated with a statistically significant reduction in the rate of smoking.<sup>25</sup>

Whereas the NDSHS data provide no useful information on the impact of plain packaging on smoking rates, neither the governmental state-level data nor the RMSS data employed by Kaul and Wolf (2014a and 2014b)<sup>26</sup> indicate a decline in the rate of smoking of adults or minors that could legitimately be attributed to plain packaging. Instead, Australian state-level data and research by McKeganey and Russel (2015) suggest that smoking rates may actually have increased in the first year after the implementation of plain packaging. Consequently, the combined evidence supports the conclusion that plain packaging has not reduced smoking rates. Furthermore, state-level data indicate that only after the drastic increases in Australia's tobacco taxation in 2013 and 2014 did smoking rates continue to decline.

**Box 1: First Evidence on a (Possible) Plain Packaging Effect on Minors**

For adolescents, NDSHS data suggest that the rate of smoking (daily smokers) has *not* declined between 2010 and 2013. Instead, reported rates among 12–17 year olds increased from 2.5 to 3.4 percent between 2010 and 2013. Although this observation is not necessarily related to plain packaging, it clearly does not substantiate claims about the success of plain packaging on smoking rates of minors. Topline results from the Australian Secondary Students' Alcohol and Drug (ASSAD) survey indicate that the rate of smoking (current smokers) among 12–17 year olds decreased from 6.7 percent in 2011 to 5.1 percent in 2014.<sup>27</sup> These different observations conform to the state-level evidence for adult smokers, suggesting that the increase in Australia's tobacco taxation (in December 2013 and September 2014) has led to a reduced smoking rate of minors. Using *annually collected* governmental state-level surveys, McKeganey and Russel (2015) extend their analysis to several subgroups, finding, for example, that New South Wales has seen a large increase in the rate of smoking rates for individuals aged 16–24 years *after* plain packaging.<sup>28</sup> Using *monthly* RMSS data and applying a statistical trend analysis, Kaul and Wolf (2014b) specifically analyze whether plain packaging has reduced smoking rates of 14–17 year olds.<sup>29</sup> They find no evidence of a plain packaging effect.



### 3 Plain Packaging Has Not Reduced Tobacco Consumption

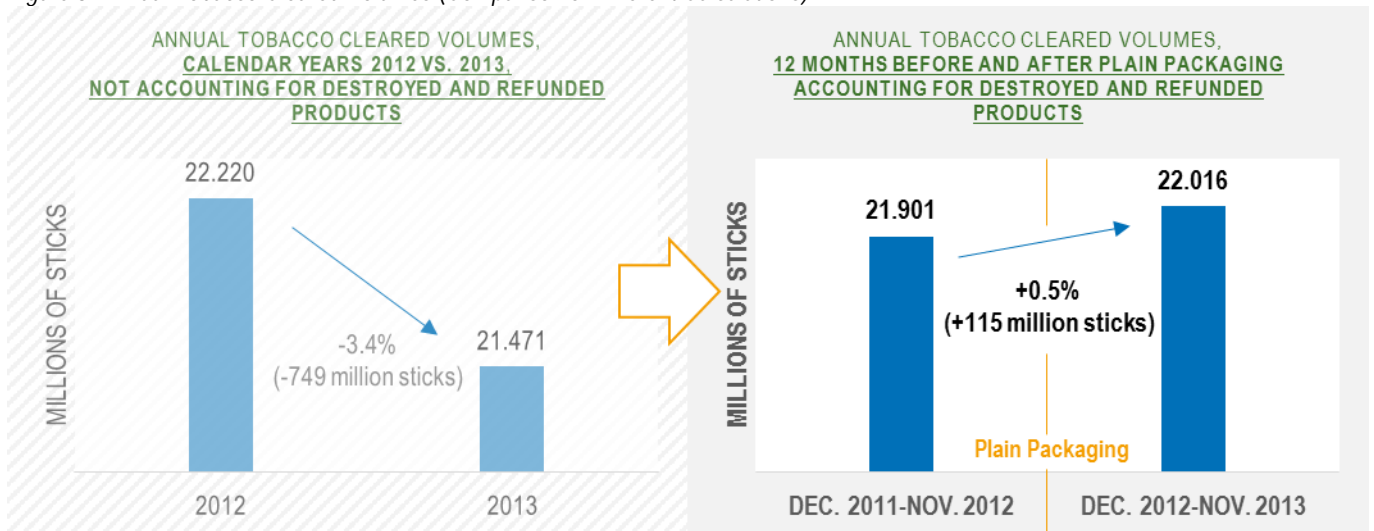
The amount of tobacco consumed is another important measure of actual smoking behavior. Since cigarette sales (a common indicator of tobacco consumption) are not publicly available, researchers must rely on proxy variables (for example, tobacco clearances and expenditure on tobacco) or survey data (for example, NPPTS). Empirical evidence based on both kinds of data (proxy variables and survey data) suggest that plain packaging has not reduced (legal) tobacco consumption.

According to the Australian Department of Health (DoH), *tobacco clearances*,<sup>30</sup> a proxy for tobacco consumption, declined by 3.4% in 2013 relative to 2012. The DoH noted that the “*Treasury has advised that tobacco clearances (including excise and customs duty) fell by 3.4% in 2013 relative to 2012 when tobacco plain packaging was introduced.*”<sup>31</sup> This statement has had an impact on the public perception of the success of plain packaging and thereby on the policy-making of other countries. In fact, the UK Department of Health used this number in its impact assessment of plain packaging.<sup>32</sup> The French Government relied on this number in justifying its EU notification regarding a “government amendment relating to the introduction of neutral packets for tobacco products” for the EU Commission and the other Member states of the Union.<sup>33</sup>

However, it is not appropriate to use the Australian Treasury’s estimated 3.4 percent figure to evaluate plain packaging for two reasons, as was revealed by economics professor Sinclair Davidson.<sup>35</sup> Firstly, the Australian Treasury used calendar years instead of comparing the 12 post-implementation months (“PP year one”<sup>36</sup>) to the 12 pre-implementation months. Secondly, the Australian Treasury did not account for destroyed (due to now unlawful packaging) branded tobacco products in its calculation. These cigarette packs are included in the amount of clearances before the implementation of plain packaging, *even though no one ever consumed those cigarettes*. They must therefore be removed from the analysis to obtain a sound assessment of a plain packaging effect on tobacco consumption, as explained in more detail in Box 2. When calculating correctly, **the very same Australian Treasury data suggest that legal tobacco consumption in Australia did not decline by 3.4 percent, but instead increased by 0.5 percent in the first post-plain-packaging year.**

When comparing the correct time periods (December 2012 through November 2013 to December 2011 through November 2012) and accounting for destroyed and refunded products, tobacco consumption measured with the same data on clearances *increased* by 0.5 percent in “PP year one”. In the 12 months after the increase in Australia’s tobacco taxation (December 2013 through November 2014), tobacco clearances fell by about 12 percent, further indicating that the decline is a result of the tax hikes.

Figure 3: Annual Tobacco Cleared Volumes (Comparison of Different Calculations)



Source: Tobacco Cleared Volumes, Australian Bureau of Statistics (ABS).<sup>34</sup>

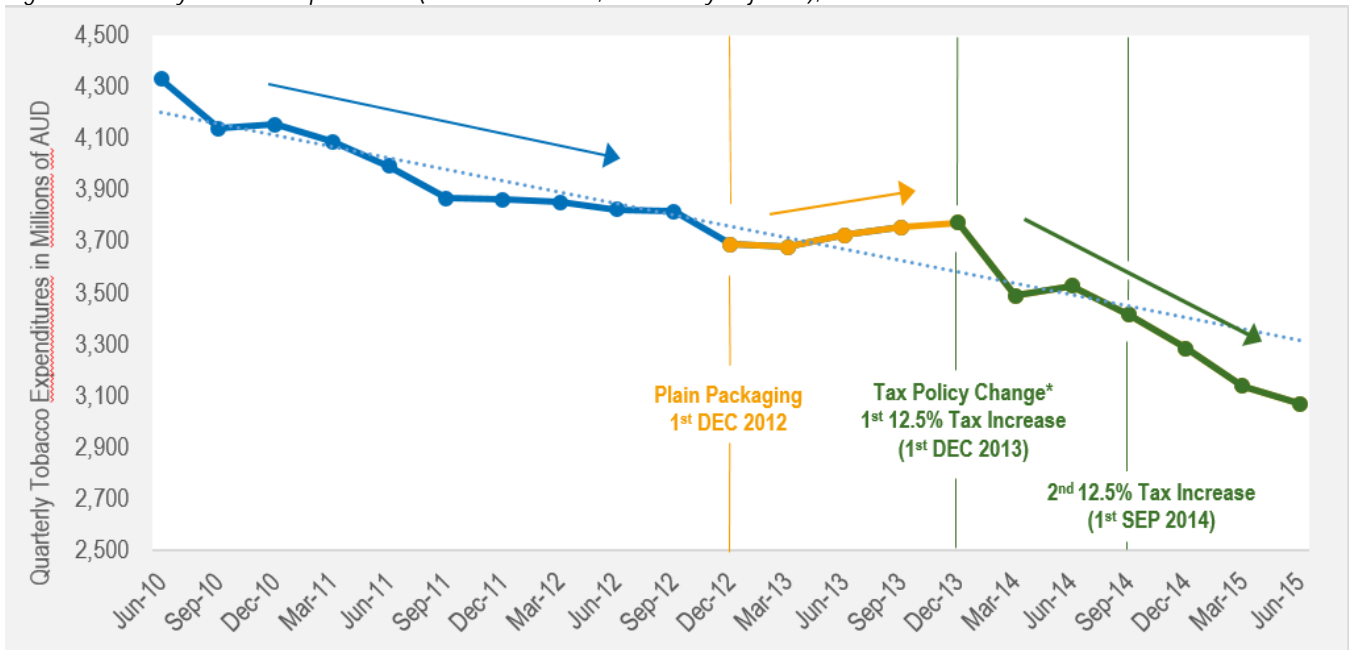


**Box 2: Tobacco Clearances as a Legitimate Proxy for Legal Tobacco Consumption: An Explanation**

“The term ‘clearance’ refers to the product being entered into home consumption and broadly covers all tobacco sold legally in Australia”.<sup>37</sup> Since retail sales on cigarette and tobacco products are often not publicly available, clearances serve as a proxy for actually smoked amounts of legally sold tobacco (tobacco consumption). With the introduction of plain packaging, a certain number of branded tobacco products had to be destroyed and refunded, after having previously been cleared for tax purposes. In the data on clearances provided by the Australian Customs and Border Protection Service (Customs) these packs are included *even though these cigarettes were never consumed*.<sup>38</sup> To be precise, the Customs’ Tobacco Refund Scheme refunded the duty previously paid on 191,848,090 cigarette sticks (about 1 percent of all sticks in the 12-month period before plain packaging) and 73,742.32 kilograms of tobacco products (about 4 percent of all kilograms of tobacco products in the 12-month period before plain packaging). Consequently, these products must be deducted from the calculated tobacco consumption before the implementation of plain packaging, in order to obtain meaningful results.

*Tobacco expenditures* are another proxy variable for tobacco consumption. The Australian Bureau of Statistics (ABS) publishes Quarterly Tobacco Expenditures. Consistent with other smoking-related metrics, historical ABS data show that tobacco expenditures have been declining for decades. However, the most recent declines were still publicly interpreted as a proof of the effectiveness of plain packaging.<sup>40</sup> As shown in Figure 4 (depicted as a blue line), tobacco expenditures had already declined before the introduction of plain packaging. Given this (existing) trend, even a continuing decline after implementation of the measure cannot be interpreted as indicating an impact of plain packaging on tobacco consumption.<sup>41</sup> What is more, with the implementation of the measure, the rate of decline seems to have changed (depicted as an orange line). Specifically, expenditures after the introduction of plain packaging and before the change in Australian tax policy (for example, the March, June and September quarter of 2013) suggest a break in the downward trend. Only with the first tax increase in December 2013 did the decline in tobacco consumption again pick up momentum (depicted as a green line).

Figure 4: Quarterly Tobacco Expenditures (in Millions of AUD, Seasonally Adjusted), 2010 – 2015



Source: Quarterly Tobacco Expenditures, seasonally adjusted, Australian Bureau of Statistics (ABS).<sup>39</sup> \*Tax Policy Change refers to the four pre-announced staggered tax increases in Australia between 2013 and 2016. The blue dotted line depicts a linear trend (based on the data before the introduction of plain packaging).





Published research again supports the finding of no evidence of a plain packaging effect. Using ABS Quarterly Tobacco Expenditures and *accounting for trend and prices* in their analysis, Davidson and De Silva (2014) find:

*"At best, we can determine the plain packaging policy introduced in December 2012 has not reduced household expenditure of tobacco, once we control for price effects, or the long-term decline of tobacco expenditure, or even the latent attributes of the data. To the contrary, we are able to find a suggestion that household expenditure of tobacco has, ceteris paribus, increased."* Davidson and De Silva (2014)

Using NPPTS data, Scollo et al. (2015) also find that:

*"Consumption did not change in PP [plain packaging] year 1 among daily, regular or current smokers or among smokers of brands in any market segment."* Scollo et al. (2015)

The authors also confirm that *"reported consumption declined following the December 2013 tax increase."*<sup>42</sup>

The combined evidence of different measures of tobacco consumption, namely tobacco clearances, ABS Quarterly Tobacco Expenditures, and the NPPTS points in just one direction: All three data sets indicate that tobacco consumption has not declined due to plain packaging. It was only following the recent tax increases that the historical decline in tobacco sales continued its momentum.

## 4 Conclusion

In 2012, the Australian Government introduced plain packaging to "curb smoking". Three years later, publicly available data reveal that plain packaging has **not reduced smoking rates or tobacco consumption**. Even though the data were collected by different organizations, in different states, and in different ways, they tell a consistent story that does not support claims of plain packaging as an effective public health measure.

There is a large body of literature on the evaluation of tobacco control measures in the fields of economics and of public health. According to this literature, certain measures are very effective. Plain packaging is *not* one of them. There are several possible reasons for the ineffectiveness of plain packaging. For example, smokers may have switched to cheaper or illicit products, or they simply do not care enough about whether a pack is branded or not.

Given the huge discrepancy between the initial expectations of what plain packaging can achieve and the actual results after three years of experience with the measure, further research on the reasons for the ineffectiveness of plain packaging is certainly needed.

<sup>1</sup> "The objects of this act are: (...) to improve public health by (...) (i) discouraging people from taking up smoking, or using tobacco products; and (ii) encouraging people to give up smoking, and to stop using tobacco products; and (iii) discouraging people who have given up smoking, or who have stopped using tobacco products, from relapsing; and (iv) reducing people's exposure to smoke from tobacco products; (...)". See [https://www.comlaw.gov.au/Details/C2013C00190/Html/Text#\\_Toc356804095](https://www.comlaw.gov.au/Details/C2013C00190/Html/Text#_Toc356804095) (last viewed on 25 November 2015).

<sup>2</sup> See the special volume of the journal "Tobacco Control", 2015, 24, Suppl. 2.

<sup>3</sup> In addition plain packaging is evaluated in combination with the introduction of larger graphic health warnings on cigarette packages (which was implemented together with plain packaging).

Moreover, only two of the studies investigate the potential consequences of plain packaging on *reported* tobacco consumption: (i) see Scollo, M.; Zacher, M.; Coomber, K.; Bayly, M.; and, Wakefield, M. (2015): *Changes in use of types of tobacco products by pack sizes and price segments, prices paid and consumption following the introduction of plain packaging in Australia*. Tobacco Control 2015; 24: Suppl. 2: ii58–ii65. (ii) see Miller, C.L.; Ettridge, K.A.; and, Wakefield, M.: *You're made to feel like a dirty filthy smoker when you're not, cigar smoking is another thing all together.* Responses of Australian cigar and cigarillo smokers to plain packaging. Tobacco Control 2015; 24: Suppl. 2: ii58–ii65.



<sup>4</sup> See Chapman, S. and Freeman, B. (2015): *Removing the emperor's clothes*, 175. See [http://ses.library.usyd.edu.au/bitstream/2123/12257/7/9781743324295\\_Chapman\\_RemovingtheEmperorsClothes\\_FT.pdf](http://ses.library.usyd.edu.au/bitstream/2123/12257/7/9781743324295_Chapman_RemovingtheEmperorsClothes_FT.pdf) (last viewed on 25 November 2015).

<sup>5</sup> On a related note, the NDSHS detailed report (2013) contains very specific questions on factors that motivated changes in smoking behavior. However, these factors do not include plain packaging. The NDSHS data was not designed to be used to evaluate plain packaging. See <http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129549848> (last viewed on 30 November 2015).

<sup>6</sup> A continuing trend should therefore be taken into account in evaluating the effectiveness of plain packaging. In their guidelines for so-called post-implementation reviews (PIRs), the Australian Office of Best Practice Evaluation (OBPR) states: "Where appropriate, the analysis should also take account of any trends that were apparent in the benchmark situation. For example, if consumers had already begun to adopt a certain new technology, and a regulation were introduced to accelerate the uptake, the analysis should not assume that all of any observed increase is due to the new regulation". The OBPR's PIR guideline thus explicitly stipulates that the downward trend in smoking has to be accounted for appropriately when evaluating the effectiveness of plain packaging and cannot be mingled with evidence of a plain packaging effect.

See [http://ris.dpvc.gov.au/files/2012/03/pir\\_guidance\\_note.pdf](http://ris.dpvc.gov.au/files/2012/03/pir_guidance_note.pdf) (last viewed on 30 November 2015).

<sup>7</sup> Scollo, M. and Winstanley, M.H. *Tobacco in Australia: Facts and issues*. Chapter 15. Melbourne: Cancer Council Victoria; 2015. See <http://www.tobaccoaustralia.org.au/chapter-15-smokefree-environment/15-7-legislation> (last viewed on 25 November 2015).

<sup>8</sup> Scollo, M. and Winstanley, M.H. *Tobacco in Australia: Facts and issues*. Chapter 11. Melbourne: Cancer Council Victoria; 2015. See <http://www.tobaccoaustralia.org.au/chapter-11-advertising/11-4-state-and-territory-legislation> (last viewed on 25 November 2015).

<sup>9</sup> Plain packaging was introduced *at the same time* as increased graphic health warnings on the front of cigarette packages (covering 75 percent on the surface instead of 30 percent).

<sup>10</sup> The survey conducted in Victoria is an exception, that is, it is not government data. Instead, smoking rates are derived from a published research paper that is based on the Victorian Smoking and Health Survey (conducted by Cancer Council Victoria), see Scollo, M.; Zacher, M.; Durkin, S.; and Wakefield, M. (2014): *Early evidence about the predicted unintended consequences of standardized packaging of tobacco products in Australia: a cross-sectional study of the place of purchase, regular brands and use of illicit tobacco*. *BMJ Open* 2014:4.

<sup>11</sup> The state-level surveys are conducted at different times of the year. New South Wales, February through December, see [http://www.healthstats.nsw.gov.au/Indicator/beh\\_smo\\_age](http://www.healthstats.nsw.gov.au/Indicator/beh_smo_age) (last viewed on 25 November 2015); Queensland, varying periods, for example, September 2011 through April 2012 and February 2013 through May 2013, see <https://www.health.qld.gov.au/research-reports/population-health/preventive/data/preventive-health-surveys/default.asp> (last viewed 25 November 2015); Western Australia, January through December, see <http://www2.health.wa.gov.au/Reports-and-publications/Population-surveys> (last viewed on 25 November 2015); South Australia, September through November, see [https://health.adelaide.edu.au/pros/docs/reports/hos\\_prospectus\\_spring\\_2012\\_.pdf](https://health.adelaide.edu.au/pros/docs/reports/hos_prospectus_spring_2012_.pdf) (last viewed on 25 November 2015).

<sup>12</sup> See <http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0> (last viewed on 25 November 2015).

<sup>13</sup> Australia's tobacco excise taxation changed fundamentally in 2013. This legislation comprises a package of four staggered tobacco taxation increases, starting from December 2013. They collectively amount to a tobacco tax increase of 60 percent over a four-year period (2013–2016). The "pre-announced" nature of these tax hikes implies that consumers can anticipate the increasing cost of smoking over time (Classic papers on anticipation effects in the literature on smoking behavior include: Becker, G.S. and Murphy, K.M. (1988): *A Theory of Rational Addiction*, *Journal of Political Economy*, 96, issue 4, p. 675-700; Becker, G.S.; Grossman, M.; and Murphy, K.M. (1991): *Rational Addiction and the Effect of Price on Consumption*. *American Economic Review* 84: 396-418; and Chaloupka, F.J. (1991): *Rational addictive behavior and cigarette smoking*. *Journal of Political Economy*, 99(4), 722-742. Strong anticipation effects of anticipated changes in tax policy are also well-documented empirically. See, for example, Mertens, K. and Ravn, M. (2012): *Empirical Evidence on the aggregate effects of anticipated and unanticipated US tax policy shocks*. *American Economic Journal: Economic Policy*, 4(2):145-81.). In particular, average cigarette prices passed the psychologically important threshold of AUD 20 per pack, see <http://www.couriermail.com.au/news/queensland/cigarette-packets-to-cost-more-than-20-as-smokers-hit-with-53-billion-in-extra-taxes/story-fnihsrf2-1226689145482> (last viewed on 25 November 2015). It is therefore very likely that the Australian tobacco tax reform had an unusually large effect on smoking rates.

<sup>14</sup> See Tauras, J.A.; Chaloupka, F.J.; Quah, A.C.K.; and Fong, G.T. (2014): *The economics of tobacco control: evidence from the International Tobacco Control (ITC) Policy Evaluation Project*. Tobacco Control 2014-051547; or, for example, Chaloupka, F.J. (1998): *How effective are taxes in reducing tobacco consumption*. In: *The social cost of smoking*. Lausanne: Switzerland, 1998. See



[http://tigger.uic.edu/~fjc/Presentations/Papers/taxes\\_consump\\_rev.pdf](http://tigger.uic.edu/~fjc/Presentations/Papers/taxes_consump_rev.pdf) (last viewed on 25 November 2015).

<sup>15</sup> They found this decrease to be highly statistically significant, with a p-value of less than 0.1 percent. See <https://www.health.qld.gov.au/publications/research-reports/population-health/trends-qld-2002-2013.pdf> (last viewed on 30 November 2015).

<sup>16</sup> See [http://www.healthstats.nsw.gov.au/Indicator/beh\\_smo\\_age](http://www.healthstats.nsw.gov.au/Indicator/beh_smo_age) (last viewed on 25 November 2015).

<sup>17</sup> See Endnote 10. Note that data on 2014 is not available for Victoria.

<sup>18</sup> See <https://www.health.qld.gov.au/research-reports/population-health/preventive/data/preventive-health-surveys/default.asp> (last viewed on 25 November 2015).

<sup>19</sup> See <http://ww2.health.wa.gov.au/Reports-and-publications/Population-surveys> (last viewed on 25 November 2015).

<sup>20</sup> See [https://www.sahmri.com/user\\_assets/1785280bbe4eb537684265591d82ab6f7e0a05b9/key\\_smo\\_king\\_stats\\_for\\_sa\\_2014\\_-\\_final\\_-\\_300415.pdf](https://www.sahmri.com/user_assets/1785280bbe4eb537684265591d82ab6f7e0a05b9/key_smo_king_stats_for_sa_2014_-_final_-_300415.pdf) (last viewed on 25 November 2015).

<sup>21</sup> See McKeganey, N. and Russel, C. (2015): *Tobacco plain packaging: Evidence based policy or public health advocacy?* International Journal of Drug Policy, Volume 26, Issue 6, pp. 560–568.

<sup>22</sup> McKeganey, N. and Russel, C. (2015) only include “smoking prevalence data collected by Australian state governments”. Therefore, Victoria is not part of their analysis. See Endnote 10.

<sup>23</sup> RMSS is a data set provided by the very same company that conducted survey field work for NDSHS.

<sup>24</sup> See, for example, Siahpush, M.; Wakefield, M.; Spittal, M.J.; Durkin, S.J.; and Scollo, M. (2009): *Taxation reduces social disparities in adult smoking prevalence*. American Journal of Preventive Medicine, 36(4), 285–291 or Wakefield, M.; Durkin, S.; Spittal, M.J.; Siahpush, M.; Scollo, M.; Simpson, J.A.; Chapman, S.; White, V.; and Hill, D. (2008): *Impact of tobacco control policies and mass media campaigns on monthly adult smoking prevalence*. American Journal of Public Health, 98(8), 1443–1450.

<sup>25</sup> Kaul, A. and Wolf, M. (2014a): *The (Possible) Effect of Plain Packaging on Smoking Prevalence in Australia: A Trend Analysis*. University of Zurich Department of Economics Working Paper No. 165 (see <http://www.econ.uzh.ch/static/workingpapers.php> (last viewed on 25 November 2015)).

<sup>26</sup> Note that the Kaul and Wolf papers ((Kaul and Wolf (2015a), and, Kaul and Wolf (2015b), see Endnotes 25 and 27) were criticized by the Swiss anti-smoking organization OxyRomandie who requested the retraction of the two papers published on the University of Zurich website. Subsequently, the University of Zurich asked the independent expert Prof. Ben Jann (University of Bern, Switzerland) to assess the allegations leveled against the Kaul

and Wolf papers. From the conclusions of the independent expert report of Prof. Jann, it is clear that there was no basis for Oxyromandie’s critique.

For the original OxyRomandie critique, see <http://www.oxyromandie.ch/files/public/docs/20150129-oxyromandie-letter-to-rector-uzh.pdf> (last viewed 27 November 2015). For a press statement by Prof. Kaul and Prof. Wolf highlighting the main points of Prof. Jann’s report, see <http://www.ipe-saarland.de/app/download/9977891694/IPE+State+ment+5+Aug+2015.pdf?t=1440154063> (last viewed 27 November 2015).

For the full expert report of Prof. Jann, see <http://www.econ.uzh.ch/static/wp/Jann-2015-03-10-Methodological-Report-on-Kaul-and-Wolf.pdf> (last viewed 27 November 2015).

<sup>27</sup> See <http://www.cancervic.org.au/about/media-releases/2015-media-releases/november-2015/tobacco-use-secondary-school-students.html> (last viewed on November 25 2015).

<sup>28</sup> See Endnote 21.

<sup>29</sup> Kaul, A. and Wolf, M. (2014b): *The (Possible) Effect of Plain Packaging on the Smoking Prevalence of Minors in Australia: A Trend Analysis*. University of Zurich Department of Economics Working Paper No. 149 (see <http://www.econ.uzh.ch/static/wp/econwp149.pdf> (last viewed on 25 November 2015)).

<sup>30</sup> “Data on tobacco clearances is collected by the Australian Taxation Office (ATO) and the Australian Customs and Border Protection Service (Customs and Border Protection Service). Tobacco is no longer grown in Australia. Tobacco manufacturing in Australia uses imported loose tobacco and the excise on this tobacco is collected by the ATO after manufacture. Customs and Border Protection collects duty on imported, ready to sell tobacco. The term ‘clearance’ refers to the product being entered into home consumption and broadly covers all tobacco sold legally in Australia.” See <http://ris.dpms.gov.au/files/2013/05/02-25-percent-Excise-for-Tobacco.doc> (last viewed on 25 November 2015).

<sup>31</sup> Senate Economics Legislation Committee: *Answers to Questions on Notice*, Treasury Portfolio, Supplementary Budget Estimates, Question: SBT 26-28, 31 October 2014. See [http://www.aph.gov.au/~media/Committees/economics\\_ctte/estimates/sup\\_1415/Treasury/answers/SBT26-28\\_Leyonhjelm.pdf](http://www.aph.gov.au/~media/Committees/economics_ctte/estimates/sup_1415/Treasury/answers/SBT26-28_Leyonhjelm.pdf) (last viewed on 25 November 2015).

<sup>32</sup> Department of Health: *Standardised packaging of tobacco products*, Impact Assessment. IA No: 3080, 2 February 2015, p. 27, point 86. See [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/403493/Impact\\_assessment.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/403493/Impact_assessment.pdf) (last viewed on 25 November 2015).



<sup>33</sup> French “Government amendment relating to the introduction of neutral packets for tobacco products”, Notification Number: 2015/109/F, message 2, point 9. See <https://www.regjeringen.no/no/dokument/dep/hod/hoering/hoeringsdok/2015/horing-av-forslag-til-innforing-av-standardiserte-tobakkspakninger-og-gjennomforing-av-tobakkskonvensjonen-artikkel-5.3-i-norge/Download/?vedleggId=1a41ad7d-83f4-49b4-9564-29fb7afed440> (last viewed on 30 November 2015).

<sup>34</sup> Treasury: *Total Tobacco Clearances Data*, Response to FOI request 1703. See <http://www.treasury.gov.au/Access-to-Information/DisclosureLog/2015/1703> (last viewed on 25 November 2015).

<sup>35</sup> Sinclair Davidson: *Department of Health telling porkies on Plain Packaging*, 20 August 2015. See, <http://freedomwatch.ipa.org.au/2015/08/department-of-health-telling-porkies-on-plain-packaging/> (last viewed on 25 November 2015).

<sup>36</sup> Using “PP year one” is very common among tobacco control researchers, see, for example, Wakefield, M.; Coomber, K.; Zacher, M.; Durkin, S.; Brennan, E.; and, Scollo, M: *Australian adult smokers' responses to plain packaging with larger graphic health warnings 1 year after implementation: results from a national cross-sectional tracking survey*. *Tobacco Control*, 2015; 24: Suppl. 2 ii17-ii25 doi:10.1136/tobaccocontrol-2014-052050.

<sup>37</sup> Treasury: *Post Implementation Review 25 Percent Tobacco Excise Increase*, February 2013. See <http://ris.dpmc.gov.au/files/2013/05/02-25-per-cent-Excise-for-Tobacco.doc> (last viewed on 25 November 2015).

<sup>38</sup> In this calculation, we assume that the destroyed products were cleared in the 12 months before the introduction of plain packaging.

<sup>39</sup> Australian Bureau of Statistics: *Australian National Accounts: National Income, Expenditure and Product, Jun 2014*. See <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/5206.0Mar%202014?OpenDocument> (last viewed on 25 November 2015).

<sup>40</sup> For example, “The official ABS National Accounts figures confirm once and for all plain packaging is driving down tobacco consumption and saving lives”, said Catherine King, the Australian Shadow Minister for Health in the Federal Parliament, in June 2015. See <http://www.catherineking.com.au/media/alp-plain-packaging-laws-send-tobacco-consumption-/> (last viewed on 25 November 2015). “Tobacco consumption hits a fresh all time low”, said economist Stephen Koukoulas, in December 2014. See <http://www.thekouk.com/blog/tobacco-consumption-hits-a-fresh-all-time-low.html#.VH7WONLF-K8> (last viewed on 25 November 2015). Also, an article of the Guardian links the decline in tobacco consumption to plain packaging. See <http://www.theguardian.com/society/2015/mar/19/cigarette-plain-packaging-laws-reduced-smokings-appeal-to-teenagers-research> (last viewed on 25 November 2015).

<sup>41</sup> See also Endnote 6.

<sup>42</sup> See Scollo, M.; Zacher, M.; Coomber, K; Bayly, M.; and, Wakefield, M. (2015): *Changes in use of types of tobacco products by pack sizes and price segments, prices paid and consumption following the introduction of plain packaging in Australia*. *Tobacco Control* 2015; 24: Suppl. 2: ii66-ii75.



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