Southeast Asia Tobacco Control Alliance

Press Release

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Failed: Tobacco Industry Funded Research on Illicit Trade of Tobacco Products in Asia

Manila, 30 May 2015: The Southeast Asia Tobacco Control Alliance (SEATCA) has stamped "***Failed***" on a tobacco industry funded research on illicit trade of tobacco products in 14 Asian countries.

Last year, Philip Morris International funded a second research on illicit trade of tobacco products in Asia, called "Asia-14 Illicit Tobacco Indicator 2013" which was carried out jointly by a Washington based group, International Tax and Investment Center (ITIC) and a UK group, Oxford Economics (OE). It is no surprise that the findings of this research, like its predecessor (Asia-11 Illicit Tobacco Indicator 2012), are pro-tobacco industry.

In conjunction with World No Tobacco Day, SEATCA has released "*A Critique of the ITIC/OE Asia-14 Illicit Tobacco Indicator 2013*", saying the research fails in four areas: methods and data issues, lack of sufficient detail to permit assessment and replication, selective presentation of results, and plain mistakes and errors.

According to the main reviewer of the research, Prof. Hana Ross, Principal Research Officer of the Economics of Tobacco Control Project at the University of Cape Town, "The Asia-14 report fails to provide scientifically sound and unbiased information to policy makers and other tobacco market stakeholders. The reason for this is simple. The figures and statistics it reports are products of either incorrect or unverified/unverifiable estimation methods applied to often questionable data from multiple sources that do not blend."

According to Dr. Ross, the quality of the original data collection is questionable due to the lack of representativeness and possibly intended bias. Many secondary data come from sources with an obvious conflict of interest.

The findings are selectively presented, highlighting examples of increasing illicit consumption while neglecting to point out the declines or lack of change in some countries.

More seriously, the report is full of errors and mistakes, which is surprising given the "commercial" quality of the results. For example, the report does not make any distinction between smoking incidence and smoking prevalence, even though these are two very different concepts. It also confuses "sales" and "consumption", two fundamental concepts on which the calculations are based.

While illicit tobacco trade is a problem that requires government attention, it is often blown out of proportion and out of context by the tobacco industry in order to discourage governments from increasing tobacco taxes and implementing other regulatory measures.

Dr. Ulysses Dorotheo, FCTC Program Director of SEATCA said, "Governments should reject partnerships and non-binding agreements with the tobacco industry to solve illicit trade. Instead, governments should secure the supply chain in accordance with measures contained in the FCTC Protocol to Eliminate Illicit Trade in Tobacco Products, which was adopted in 2012 by the 180 Parties to the WHO Framework Convention on Tobacco Control (FCTC). The Protocol also enables governments to collaborate with each other rather than be misled and lied-to by the tobacco industry that is complicit in illicit trade of tobacco."

Failed: A Critique of the ITIC/OE Asia-14 Illicit Tobacco Indicator 2013 (full text), see: http://seatca.org/dmdocuments/Asia%2014%20Critique_Final_20May2015.pdf

For more information on World No Tobacco Day 2015 and the Protocol to Eliminate Illicit Trade in Tobacco Products, see: http://www.who.int/campaigns/no-tobacco-day/2015/en/

A Critique of the ITIC/OE Asia-14 Illicit Tobacco Indicator 2013

By Hana Ross, Ph.D.*

May 20, 2015

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EXECUTIVE SUMMARY

The "Asia-14 Illicit Tobacco Indicator 2013" (Asia-14) report was published by the International Tax and Investment Center (ITIC) and Oxford Economics (OE) as a follow up to their previous attempt to estimate the scope and composition of illicit tobacco consumption in Asia presented in "Asia-11 Illicit Tobacco Indicator 2012" (Asia-11). Both reports were funded by Philip Morris International. The new report claims to take advantage of newly available data and improved methodology and covers all 10 ASEAN member nations plus Australia, Hong Kong, Pakistan, and Taiwan.

As was true for the prior edition, this report finds, echoing the position of the tobacco industry, that the illicit cigarette market represents a significant and increasing portion of the total cigarette market, and that this increase deprives the region's governments of substantial tax revenues.

The key findings of the report include the following:

- In 2013, 10.9% of cigarettes consumed in Asia-14 were illicit.
- In 2013, the share of Illicit Consumption increased in 7 out of the 11 markets that were examined in the previous report.
- Domestic and Non-Domestic Illicit cigarettes both contributed to the rise in Illicit Consumption in Asia.
- Asia-14 government tax revenue losses from Illicit Cigarette Consumption totaled US$ 3.9 billion in 2013.

Similarly to the 2012 report, the Asia-14 report fails to provide scientifically sound and unbiased information to policy makers and other tobacco market stakeholders. The reason for this is simple. The figures and statistics it reports are products of either incorrect or unverified/unverifiable estimation methods applied to often questionable data from multiple sources that do not blend. The results are not comparable across countries and are inconsistent with results of other studies.

The report's problems fall into four general categories: methods and data issues, lack of sufficient detail to permit assessment and replication, selective presentation of results, and plain mistakes and errors. These are the major concerns:

- Different sources and methods are used across countries, leading to results that are not comparable to one another, yet presented for comparison, without acknowledgement of their distinctions.
- As was pointed out in the SEATCA critique of the Asia-11 report, no rationale is given for including or excluding countries from coverage in this report. The report excludes many of the region's largest cigarette-consuming countries, such as China, Japan, and South Korea while including Pakistan, geographically an outlier. The lack of credible data is provided as the main reason for not including countries such as Japan. This is hard to believe since the authors were able to find credible data for countries like Myanmar, Lao PDR, and Cambodia.
- Many methodological approaches are either weak or lack sufficient description that would allow to judge their merits.
- The quality of the original data collection is questionable due to the lack of representativeness and possibly intended bias.
- Many secondary data come from sources with an obvious conflict of interest.

Beyond these weaknesses, the Asia-14 report in many cases fails to provide sufficient description of data used to generate the estimates.

This lack of transparency makes it difficult, if not impossible, for the report to be fully analyzed or critiqued; it certainly prevents replication of the report's estimates and other statistics. Even the authors' self-described attempt to provide more detail in the Annexes of the report falls short of the level of disclosure provided in academic studies and does not permit thorough evaluation.

- The Empty Packs Survey (EPS), which is a crucial component of the "IT Flows model" upon which most of the report is based, does not fully disclose its sampling frame, the timing of data collection, the criteria for distinguishing legal and illegal packs, and other crucial survey parameters, even though the validity of data generated by the survey are very sensitive to such issues.
- No information is provided about the packs that could not be classified as illegal or legal with certainty, and whether or not the collected packs are available for re-inspection.

The findings are selectively presented, highlighting examples of increasing illicit consumption while neglecting to point out the declines or no changes in some markets. In other words, the data are presented selectively to support a particular point-of-view. For example:

- The report fails to report that, even according to its own results, the majority of countries (six out of 11) compared over time experienced a decline in the volume of illicit trade.
- Nowhere in the report is it mentioned that for the majority of countries (four out of seven) where the share of illicit consumption in total consumption of cigarettes increased between 2012 and 2013, there was no tax increase in 2013. Such result might have undermined the notion that tax increases drive increases in illicit trade, a key message of the report.

Finally, the report is full of errors and mistakes, which is rather surprising given the "commercial" quality and glossy graphical presentation of the results. For example, the report does not make any distinction between smoking incidence and smoking prevalence, even though these are two very different concepts: prevalence is the proportion of a population that smokes, while incidence measures how many people per year begin to smoke. It also confuses "sales" and "consumption", two fundamental concepts on which the calculations are based.

In short, as was true for the prior Asia-11 Report, the reliance on potentially biased data, combined with the lack of transparency about methods employed, results in a study whose estimates are of questionable value. We would caution any stakeholders against relying on this report when assessing the trade in illicit cigarettes in their country or in the region.

Apparently the authors of the report are in agreement about this conclusion since they themselves expressly caution against reliance on their estimates by saying, "Should any party choose to rely on the report, they do so at their own risk. ITIC and OE will not accept any responsibility or liability in respect of the report."

This disclaimer speaks volumes about how much reliance should be placed on the findings of the Asia-14 report.

1 BACKGROUND

The "Asia-14 Illicit Tobacco Indicator 2013" (Asia-14) is an update of a previous report by the International Tax and Investment Center (ITIC) and Oxford Economics (OE), published in 2013 under the title "Asia-11 Illicit Tobacco Indicator 2012" (Asia-11). The new report claims to take advantage of newly available data sources and extends its coverage beyond the original 11 countries[1] to include countries not in the Asia-11 report, namely Cambodia, Laos, and Myanmar, so that it covers all 10 ASEAN member nations plus Australia, Hong Kong, Pakistan, and Taiwan.

The report's institutional authors, ITIC and OE, come from the business community, and both Asia-11 and Asia-14 follow the format of a business report rather than that of a peer-reviewed, academic article. ITIC describes itself as, "an independent, non-profit research and education foundation that serves as a clearinghouse for information on best practices in taxation and investment policy" and purports to be "a neutral forum for discussion and resolution of problems in tax and investment policy."[2] OE, based in the UK, describes itself as, "a key adviser to corporate, financial and government decision-makers and thought leaders."[3] ITIC's corporate sponsors include Philip Morris International (PMI), British American Tobacco (BAT), Imperial Tobacco Limited (ITL), and Japan Tobacco International (JTI), among many others from a variety of sectors, including law, oil and gas, manufacturing, accounting, investment banking, consumer goods, beverages, and others. Four global tobacco executives—from Philip Morris International, Imperial Tobacco Limited, JT International, and British American Tobacco—serve on its Board of Directors.

The individual authors of the report are Daniel A. Witt, President of ITIC, Adrian Cooper, CEO of OE, and Scott Livermore, COO of Macroeconomics and Industry Services for OE. All three authors have a history of working for the tobacco industry.

ITIC and OE state that they "enjoy academic freedom and full editorial control" over the content of the report. They prepared it "in accordance with specific terms of reference agreed between Philip Morris Management S.A., an affiliate of Philip Morris International Inc. (PMI)" and ITIC (as indicated in the Executive Summary). Annex E, which purports to provide disclosure about the specifics of the terms of reference, claims, however, that the agreement also involved OE. It is not clear why OE is not mentioned as a party to the agreement in the Executive Summary. Financial support for the report was provided by PMI, but there is no information about how much PMI paid for it, the time of signing the agreement, the timeline for the delivery, nor any description of a review process. Throughout the report there are references to other participating tobacco companies, but no information is provided regarding the terms guiding such participation including financial contributions.

These links between the ITIC/OE and the tobacco industry are problematic, because research shows a systematic upward bias of the industry-funded estimates compared to academic studies.[4,5]

[1] The Asia-11 Report included Australia, Brunei, Hong Kong, Indonesia, Malaysia, Pakistan, the Philippines, Singapore, Taiwan, Thailand, and Vietnam.
[2] http://www.iticnet.org [accessed 11/01/14].
[3] http://www.oxfordeconomics.com/about-us [accessed 11/18/14].
[4] Chen J, McGhee S, Townsend J, Lam TH, Hedley A (2015). Did the tobacco industry inflate estimates of illicit cigarette consumption in Asia? An empirical analysis. Tobacco Control, 0:1–7. doi:10.1136/tobaccocontrol-2014-051937

Similarly to the previous report, Asia-14 estimates are generated using OE's Illicit Trade (IT) Flows Model. It follows the approach of Klynveld Peat Marwick Goerdeler (KPMG), a consulting firm that prepares Project Star reports on the 27 Member States of the European Union (EU) for Philip Morris International as part of the company's commitments under its cooperation agreement with the European Commission. The IT Flows model uses data on legal cigarette sales, data from consumer surveys, and data from discarded packs surveys and estimates total cigarette consumption using the following equation:

Total cigarette consumption = legal domestic consumption + legal non-domestic consumption + illicit domestic consumption + illicit non-domestic consumption

As was true for the prior edition, this report finds, echoing the position of the tobacco industry, that the illicit market in cigarettes represents a significant and increasing portion of the total market and that this increase deprives the region's governments of substantial tax revenues.

The key findings of the report include the following:

- In 2013, 10.9% of cigarettes consumed in Asia-14 were illicit.
- In 2013, the share of Illicit Consumption increased in 7 out of the 11 markets that were part of the 'Asia-11 Illicit Tobacco Indicator 2012' report.
- Domestic and Non-Domestic Illicit cigarettes both contributed to the rise in Illicit Consumption in Asia.
- Asia-14 government tax revenue losses from Illicit Cigarette Consumption totaled US$ 3.9 billion in 2013.

According to the ITIC websites "the Asia-14 report findings have been shared with government officials in the markets covered as well as Crime Stoppers International, TRANSCRIME and other organizations involved in monitoring and working to reduce the incidence of illicit trade in tobacco."

The report was first presented on 5 September 2014 by ITIC President Daniel Witt at the 8th annual Taiwan Anti-Illicit Trade Conference in Suao, Taiwan. On 9 September, to officially release the Asia-14 report, ITIC, Oxford Economics, and Hong Kong United Against Illicit Tobacco held a press conference in Hong Kong which was attended by over 25 journalists from all of the major television and radio stations and newspapers in Hong Kong. The report got the most coverage in the Philippines, Malaysia, and Hong Kong, and limited press coverage in Cambodia. ITIC President Daniel Witt has also presented the Asia-14 report at Interpol's 2014 International Law Enforcement IP Crime Conference held 23 - 25 September in Hanoi, Vietnam.

The following critique builds on the SEATCA critique, "Asia-11 Illicit Tobacco Indicator 2012: More Myth Than Fact,"[6] which analyzed the Asia-11 report. Many of the points raised in that publication are further analyzed in this critical review.

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[5] Stoklosa M, Ross H (2013). Contrasting Academic and Tobacco Industry Estimates of Illicit Cigarette Trade: Evidence from Warsaw, Poland. Tobacco Control. Tob Control 2014; 23:e30-e34, doi:10.1136/tobaccocontrol-2013-051099

[6] Southeast Asia Tobacco Control Alliance (2013). Asia-11 Illicit Tobacco Indicator 2012: More Myth Than Fact. Available from: http://seatca.org/asia-11-illicit-tobacco-indicator-2012/

2 GENERAL COMMENTS

The Asia-14 report suffers from an identity crisis. On one hand, it aspires to be taken seriously and to be regarded as on par with academic studies. On the other hand, it fails to adhere to the many conventions of writing, presentation of results, and review process that serve as the basis for the veracity, objectivity, and credibility that such academic studies enjoy. Academic studies are transparent about their methods and data, feature peer review, and disclose any conflicts of interest. Peer review by subject matter experts serves to ensure that the data sources are reliable and consistent, that the methods are correctly and consistently applied, and that the results are presented with sufficient details and interpreted in the light of existing evidence. Transparency of methods and data sources allows for verification and replication of results, eliminating errors and biases. Academic freedom ensures editorial independence. Disclosure of conflicts of interest allows the reader to give appropriate weight to the findings. The result of all these is high-quality publications. In contrast, reports commissioned and paid for by business interests and written by authors and organizations using inaccessible proprietary data can never have the same probative value. This report falls into the latter category, as this critique will illustrate.

Taken as a whole, the report suffers from a lack of consistency. Different sources and methods are used across countries, leading to results that are not comparable to one another, yet presented for comparison, without acknowledgement of their distinctions. This issue is further discussed in Section 3 below, but a cursory examination of Annex D: Overview of Data Sources, for example, shows that Primary Sources and Calculation methods do indeed differ across countries.

As was true for the previous Asia-11 report, the methods in the Asia-14 report are not clearly described, some data sources are questionable, the presentation of the findings is selective, and there are also numerous inconsistencies and mistakes.

The Foreword to the Asia-14 report makes reference to an improved methodology since the publication of Asia-11. Based on the level of details provided in Asia-11 and Asia-14 reports, we have not identified any improvement in the methodology except that 3 additional countries were added to the mix. This could lead to better estimates of duty-paid cigarettes leaving a country (called “outflows”) and reduce the number of packs whose origin is unknown (called “unspecified market variant”). Despite this possible refinement, the majority of illicit cigarettes originating outside a country (labeled “Non-Domestic Illicit”) consists of “unspecified market variant”, a fact that is mentioned only once when the summary results are presented.

In the attachment to the letter to the Southeast Asia Tobacco Control Alliance (SEATCA) written on September 17, 2014, ITIC and OE representatives say, in response to criticism about the lack of methodological details, “We have also decided to proactively provide more details in the annexes of our Asia-14 study report issued on September 11, 2014.” Even though the number of pages in Annexes increased from 42 pages in the Asia-11 report to 72 pages in the Asia-14 report, and their examination revealed methodological weaknesses that could not have been previously identified, the provided details still do not permit full assessment of the report’s scientific merit.

Another glaring weakness of the Asia-14 report is the reluctance of its authors to stand behind their findings. As noted above, ITIC purports to disseminate best practices in taxation, and OE claims to serve

as an adviser to businesses. They have included a disclaimer that on one hand states, "ITIC and OE assume all responsibility for the report's analysis, findings, and conclusions" and "the purpose of the report is to serve as a public policy resource…" On the other hand, it continues, "nevertheless, should any party choose to rely on the report, they do so at their own risk. ITIC and OE will not accept any responsibility or liability in respect of the report."

Apparently, public policymakers and business leaders who rely on ITIC and OE to provide guidance do so at their own peril. ITIC and OE assume all responsibility for their findings, and then deny all responsibility to anyone who relies on them. The disclaimer is something that would never be found in peer-reviewed academic articles, whose authors vouch for their findings with their names and reputations.

This could be a reason for such a high representation of *former* officials who contributed to the Foreword. Some of these contributors provided rather surprising remarks. For example, the director of Transcrime makes reference to how not releasing public data on illicit trade fuels the debate about the magnitude of the estimates. If there were public data on illicit trade, what would be the motivation of governments not to release the data and instead continue to commission studies to assess the scope of illicit trade? The director of Transcrime also believes that the Asia-14 report is the only source of estimates of the scope of illicit trade in Asia. This is not true, as is evident from the Asia-14 report itself, which cites alternative estimates of the scope of illicit trade from multiple countries.

One contributor to the Foreword, Mr. Jeff Hardy, claims that the report "sets a benchmark in fostering better knowledge of the illicit tobacco trade in Asia, especially given the significant volume of trade in counterfeit tobacco products" and that it helps us understand the impact of illicit tobacco trade on legitimate business investments. Since the percentage of counterfeit reported by ITIC/OE is only 0.3% and the topic of impact on legitimate business investments is not covered by the report at all, one wonders if Mr. Hardy actually read the report.

As was pointed out in the SEATCA critique of the Asia-11 report, no rationale is given for including or excluding countries from coverage in this report. The included countries are "a mixture of high-, middle-, and low-income countries, ranging in size from very small (e.g. Brunei and Singapore) to relatively large (Indonesia and the Philippines), and excluding many of the region's largest cigarette-consuming countries, such as China, Japan, and South Korea…"[7], all of which have relatively low percentages of illicit consumption. Pakistan, geographically an outlier, is also included in the group; is it because it is one of the three markets with reportedly the highest volume of illicit consumption (along with the Philippines and Vietnam)? The report claims that the reason for not including Japan is a lack of credible data (p. 20), but it is hard to believe that the authors were able to find credible data for countries like Myanmar, Lao PDR, and Cambodia, but not for Japan.

3 DETAILED COMMENTS

While the Asia-14 report may represent an improvement over the Asia-11 report, it still suffers from a variety of inadequacies, which broadly fall into four categories:

[7] "Asia-11 Illicit Tobacco Indicator 2012: More Myth Than Fact," South East Asia Tobacco Control Alliance (SEATCA). 2014, p. 5. Available from: http://seatca.org/asia-11-illicit-tobacco-indicator-2012/

- Methodological weakness and questionable data sources
- Lack of details
- Selective presentation of results
- Typographical errors, miscalculations, and similar errors

3.1 Methodological Weakness and Questionable Data Sources

The methods and data sources used to estimate the size of the illicit trade market vary substantially by country. For this reason, the estimates generated for different countries are not comparable. Any analysis related to that comparison is not valid without accounting for differences that could result from the application of different methods and from using inconsistent data sources. The different approaches/data sources across countries also lead to questionable regional estimates.

For example, the Empty Packs Survey (EPS), one of the report's primary data sources, was replaced in Taiwan by a Consumer Panel Survey. No reason was provided as to why a different data collection method was used in Taiwan.

The report's estimates of smoking prevalence come from multiple sources as well. The report claims to use smoking prevalence data from OECD, WHO, and national surveys, but this does not seem to be the case for all countries. For example, in Australia the source of prevalence data is an industry-funded KPMG 2013 report, while in Lao PDR it is the Tobacco Atlas (2012). The internationally recognized and authoritative source for smoking prevalence estimates is the World Health Organization (WHO)[8] and it reports prevalence estimates for all countries included in the report. Data for Taiwan and Hong Kong are not reported by WHO, but Hong Kong has official estimates of smoking prevalence based on household surveys[9] and Taiwan's prevalence has been reported in scientific journals[10] and in the official Taiwan Tobacco Control Annual Reports. Therefore, there is no need to use internal PMI data for prevalence or to conduct consumer surveys. If the authors of the report insist on using data that they collect or data provided by PMI, they should let the reader know how these statistics differ from the official or previously published estimates. This information is all the more important since details on how the data were collected are missing.

The prevalence estimate plays a key role in estimating the share of Non-Domestic Legal cigarettes in Non-Domestic cigarette consumption in foreign markets, which ultimately impacts the size of the illegal market in those foreign markets: the lower the prevalence, the lower the Non-Domestic Legal consumption in foreign markets, and the higher the Non-Domestic Illegal consumption in those foreign markets. To the extent that the prevalence estimates used by the report are lower than official estimates, the illicit cigarette consumption in all other countries will be overestimated thanks to the interconnectivity of the IT Flows model.

[8] WHO report on the global tobacco epidemic, 2013, WHO 2013.
[9] Thematic Household Survey Report - Report No. 53. Census and Statistics Department, Hong Kong, November 8, 2013. Available from: http://www.censtatd.gov.hk/fd.jsp?file=B11302532013XXXXB0100.pdf&product_id=B1130201&lang=1
[10] Hai-Yen Sung, Li-Chuan Chang, Yu-Wen Wen and Yi-Wen Tsai. The costs of smoking and secondhand smoke exposure in Taiwan: a prevalence-based annual cost approach. BMJ Open 2014;4:e005199 doi:10.1136/bmjopen-2014-005199

Another problem with comparing estimates across countries and over time is related to the fact that the amount of tax losses is expressed in US$ using variable exchange rates (p.16). This means that both types of comparison depend heavily on changes in exchange rates, both relative changes across countries and changes over time. The comparison is further hindered by the fact that in some countries the estimates of tax losses are based on a calendar year, but in other countries these estimates are based on a fiscal year (p 176 – 179). This allowed the authors to selectively choose tax rates that generated the maximum possible tax loss (see the case of Hong Kong and Singapore below).

In calculating tax losses, the report falsely assumes that total consumption would not change if there were no illicit trade. If illicit cigarettes are cheaper compared to legal cigarettes, eliminating illicit trade would increase the average price of cigarettes and reduce their consumption. This means that the governments would not be able to recover the amount of tax losses estimated by Asia-14 if there is no illicit cigarette consumption, unless they increase their tobacco tax rates also.

When estimating tax losses for 2013, the report applies a larger variety of different tax rates across countries (p. 176 - 177): a 2013 weighted average excise rate, 2012/13 weighted average excise rate, 2013/14 weighted average excise rate, excise tax rate on the most sold brand, etc. Therefore, the estimates across countries are not comparable, and the choice of rates seems to be driven by showing the maximum possible tax losses. For example, the report chose 2013/2014 instead of 2012/13 fiscal year for Hong Kong and Singapore, because these two countries increased tax rates in February 2014. This choice increased the revenue loss in Hong Kong and Singapore by about HK$ 31 million (US$ 4 million) and SGD 4.4 million (US$ 3.5 million), respectively, compared to relatively smaller revenue losses if fiscal year 2012/13 were chosen.

Using the excise tax rate on the most sold brand will most likely overestimate the tax loss since those who consume illicit products are more price-sensitive and, if the illicit products were not available, would either quit, reduce consumption or use cheaper cigarette brands with taxes that would be lower compared to the most sold brand.

Different tax rate calculations are also used for the same country to generate 2012 and 2013 revenue loss estimates. For example, the 2012 calculation for Indonesia used excise rates per tier, but the 2013 estimates were generated using weighted average excise rate. This makes the estimates of tax losses non-comparable over time.

The report's primary source of data, the EPS, feeds into the Illicit Trade (IT) Flows model developed for this report to estimate illicit consumption, as stated in the Glossary of Terms. Despite the lack of details about how the EPS was conducted, it is possible to identify serious problems with the representativeness of the data. The EPS does not cover rural areas, so the samples are not representative of entire countries. This is of particular concern in countries where a large share of the population lives in rural areas. The report even states that the EPS covers only 14% of the population in Cambodia, 15.5% of the population in Indonesia, 17% of the population in the Philippines, 16.7% of the population in Thailand, and 15.5% of the population in Vietnam, while the information on representativeness is missing for some countries (Lao PDR, Malaysia, Myanmar). In Lao PDR and Myanmar, for example, 66% and 67% of the population, respectively, lives in rural areas according to World Bank 2011 data. This means that estimates in at least half of the countries are based on unrepresentative samples of the population. If the consumption of illicit cigarettes is concentrated in

urban areas, as in Vietnam[11] for example, the EPS will systematically overestimate the size of the illicit market.

The IT Flows model itself has serious shortcomings. The outflow of duty-paid cigarettes to other countries has been systematically underestimated, since the majority of packs from EPS are of "unspecified market variant" (i.e. packs that do not bear specific market labeling and their intended retail market is unknown) and the model is capable of capturing only outflows to the other 13 countries covered by the report. The estimates of the inflow of legal cigarettes from other countries ("Non-Domestic Legal" cigarettes) is also biased downward, since it is based only on the top three "inbound markets" (i.e. the source countries of legally imported cigarettes). Both of these estimates lower the final estimate of total legal consumption in a country and increase the percentage of the total market that consists of illicit cigarettes.

In calculating "Non-Domestic Legal", the model assumes that the demographic composition of international tourists is similar to that of the origin country as a whole. This is not a very realistic assumption, as one would expect that families with small children and/or very old people travel less. The applied OE Tourism Model, "the only global econometric model of world travel with over 50,000 indicators," should be able to generate more refined estimates. In addition, the number of inbound tourists is adjusted to account only for tourists aged 15 years and older. There is no reason why such adjustment shouldn't have been applied to outbound tourists as well.

To estimate the number of illicit cigarettes originating outside a country ("Non-Domestic Illicit Consumption"), the model claims on page 150 that Non-Domestic packs found via EPS must subtract legal Duty-Free and Duty-Paid cigarettes from other markets. Yet on page 156 the model only subtracts legal Duty-Free cigarettes, which means that it fails to subtract legal Duty-Paid Non-Domestic cigarettes and overestimates the size of the illegal market. To add to the confusion, the Glossary of Terms defines Contraband as illicit packs that bear specific market labeling or Duty-Free labeling. If the report followed this definition, the size of the illicit market was overestimated by including (not subtracting) Duty-Free cigarettes. According to the Glossary of Terms, counterfeit cigarettes are all considered Non-Domestic Illicit. This is an erroneous assumption since counterfeit cigarettes can be produced locally. This assumption leads to overestimation of the size of "Non-Domestic Illicit Consumption" at the expense of "Domestic Illicit Consumption".

The report claims that total Counterfeit volumes may be underestimated. This is the result of the report's design, which allowed only the PMI brands to be analyzed for authenticity across all markets while selectively choosing some additional markets (Australia, Hong Kong, Malaysia, Singapore, and Taiwan) to be analyzed by other participating companies. However, the report fails to clarify that this underestimation would not change the total estimated volume of illicit trade, because the model places any unidentified counterfeit cigarettes in the "unspecified market variant" category and still counts them as illicit consumption. Therefore, the fact that the volume of counterfeit cigarettes is underestimated does not mean that the total illicit consumption is underestimated.

In Annex C, the report attempts to boost confidence in its estimates by testing them against alternative methods or by reporting estimates of illicit trade generated by other entities. For example, the estimates of the domestic cigarette market based on the IT Flows Model are claimed to be cross-verified

[11] Nguyen TM, Dao ST, et al (2014). Portrait of Illicit Cigarette Trade in Vietnam (unpublished report).

using a "bottom-up" approach. This approach uses prevalence, average consumption, and adult population to estimate the total consumption of cigarettes in a country. However, such an approach has many weaknesses such as consumer underreporting, recall bias, rounding bias, etc., which contaminate the estimates. The report points to only one of these weaknesses, but makes no effort to correct for this method's shortcomings. This is a serious issue since, in the case of Brunei, the report relies only on this "bottom-up" approach to estimate total consumption, i.e. the size of the domestic cigarette market.

The report's main approach is supplemented by other methods such as Passer-by Surveys, Pack Swaps, and Extrapolation from Seizures Data. Almost all of the listed supplemental studies are methodologically extremely weak, with the exception of the Econometric Estimates method, and that method is not described correctly. The Asia-14 authors believe that this method first uses data from a place where illegal consumption does not exist and then uses the model's coefficients to predict the consumption in places with illegal consumption. In econometric studies, the demand for cigarettes is usually measured by official tax-paid sales, which is estimated as a function of a set of variables affecting demand, including variables measuring incentives for engaging in illicit cigarette trade. None of these studies use data from places where illegal consumption does not exist. This lack of understanding of the econometric analysis that has been applied to generate Asia-14 estimates further reduces the credibility of the estimates.

Some alternative estimates presented in the report came from the commercial organization Euromonitor. Euromonitor provides this disclaimer in their reports: "Euromonitor International is a tobacco market research and analyst firm largely for the tobacco industry. While Euromonitor provides essential information on trade statistics and tobacco industry operations worldwide, their analyses regarding legislation, litigation, illicit trade volumes, and smoking prevalence should not be considered credible as the sole source for this type of information." It is not clear why a reader of the Asia-14 report (or Asia-11 report) should rely on data provided with such a disclaimer.

The report often relies on questionable data sources. Substantial amounts of data come from the tobacco industry and affiliated organizations or were prepared for the tobacco industry. Even though the report claims to use official data, i.e. from government or international organizations, a closer examination reveals that these sources are grossly underutilized.

For example, it is not clear why the report uses OECD prevalence data if WHO reports prevalence for all WHO member states covered by this report and government-recognized or published data for Hong Kong and Taiwan are available[12,13.] Not using official prevalence figures results in some surprising and erroneous statistics: according to the report, China and the USA have almost the same smoking prevalence, and smoking prevalence in Thailand is higher than in China. According to the official WHO figures[14] and data on US smoking prevalence provided by the Centers for Disease Control (CDC)[15], the

[12] Thematic Household Survey Report - Report No. 53. Census and Statistics Department, Hong Kong, November 8, 2013. Available from:
http://www.censtatd.gov.hk/fd.jsp?file=B11302532013XXXXB0100.pdf&product_id=B1130201&lang=1

[13] Hai-Yen Sung, Li-Chuan Chang, Yu-Wen Wen and Yi-Wen Tsai. The costs of smoking and secondhand smoke exposure in Taiwan: a prevalence-based annual cost approach. BMJ Open 2014;4:e005199 doi:10.1136/bmjopen-2014-005199

[14] WHO report on the global tobacco epidemic, 2013. WHO 2013

[15] Centers for Disease Control and Prevention. Current Cigarette Smoking Among Adults—United States, 2005-2012... Morbidity and Mortality Weekly Report 2014; 63(02):29–34 [accessed 2014 Feb 14].

adult smoking prevalence in the USA and in Thailand are 27% and 21% lower, respectively, compared to China.

Annex A states in one of its figures (p. 147) that the primary source of Legal Domestic Sales are In-Market Sales (IMS) data; however, the text below the figure negates that by saying that publicly available estimates of Legal Domestic Sales are used as a default, and IMS is only used in some countries where a widely accepted Legal Domestic Sales figure does not exist. On the next page (p. 148, Annex A), the report reveals that nine out of 14 countries used IMS data (primarily based on PMI estimates), two countries used AC Nielsen estimates, and only 2 countries (Australia and Hong Kong) used official sales data.

On page 150, Annex A claims that the primary source of data for estimating Non-Domestic Legal consumption is EPS. However, EPS data are not mentioned anywhere when the approach is described on the same page, which leaves a reader to wonder whether EPS data was used or not, and if so, how.

Finally, it is not clear why the report was able to cover both manufactured cigarettes and chop-chop (unbranded loose tobacco) in Australia, but it could not cover loose tobacco products in other countries, even where they represent a substantial share of the tobacco market (e.g. roll-your-own cigarettes in Thailand).

3.2 Lack of details

The methodology is not adequately described. As was true for the Asia-11 report, the Asia-14 results lean heavily on the IT Flows model, which relies primarily on data from the Empty Pack Surveys (EPS). However, critical information about the model and the surveys is not provided.

The most uncertainty stems from the Empty Pack Surveys (EPS). First of all, it is not clear who conducted these surveys. According to information provided on page 19, independent research companies conducted these surveys, but information provided on page 21 negates that information by attributing the data collection to PMI and other unspecified tobacco manufacturers. Then, Annex A informs that tobacco companies commission these surveys from various research companies. Therefore, it is not clear what role tobacco companies play in the EPS.

Second, the sampling method of the Empty Pack Surveys can only be guessed from information scattered throughout the report. The sampled locations are only vaguely described, while no information is provided as to how the specific locations for data collection were selected within the given geographical areas and whether the same locations were used more than once if the data was collected in multiple waves. Since the timing of the data collection can play an important role, information about the time of day and the part of the week when packs were collected, as well as any synchronization with garbage collection, should have been provided.

Without this information it is not possible to judge whether the sampled locations and timings were representative of all probable packs consumed in the given geographical location, or whether they systematically oversampled tourists and commuters.

Third, Annex A reports country-specific sizes of the EPS samples, but it does not clarify if those sample sizes are the results of multiple surveys or just one wave of data collection. Nowhere in the report is it

explained how the sample sizes were decided and why some countries collected data in multiple waves while others didn't.

Fourth, a reader knows very little about the criteria used in determining a pack's origin and placing it in one of the three categories (unspecified variant, counterfeit, or contraband), and he/she is told nothing about the training of people identifying the packs and how they were instructed to handle cases of uncertainty. It is doubtful that all packs could have been clearly assigned to one of the three categories, yet no information is provided as to what percentage of the packs were not identifiable, and whether or not the collected packs are available for re-inspection.

Since the methodology of EPS in some countries (e.g. Singapore) provided more details than in others, the sufficient information about the EPS method must exist, but it has not been disclosed uniformly across countries.

Often, the data from EPS are accompanied and/or supplemented by "surveys" and "expert opinion". Regarding the surveys, no details are provided except that the data were collected in 2013, and even that is not certain given that the terms of reference state that the data will be both from 2013 and some part of 2014. The data quality and the results generated from those data depend on the questions asked in the surveys, but the study doesn't provide a single questionnaire used to collect the data. There is no information about how the retail survey/audit was used to estimate illicit domestic consumption or illicit domestic production. Expert opinion as a method can be grossly biased, but no details are available as to who the experts were, how they were selected, how the information they provided was processed, and whether and how much they were paid.

In addition to the lack of clarity about the EPS, many other details are also lacking. Annex C briefly describes (pp. 181-183) several alternative methods and data sources, including their disadvantages, used to estimate the scope of illicit trade; however, there is no information as to how these shortcomings might have affected the validity of the estimates. The results for these "other studies" are not provided with the exception of the Empty Pack Surveys (it is unclear why it was included with "other studies" if it is the primary method) and the "bottom-up" approach (results provided for selected countries only) in the Annex C section called "Other estimates".

Apart from the EPS, other critical data needed for the IT Flows model is country-specific smoking prevalence. Unfortunately, the definition of this variable is not sufficiently clear. The Glossary of Terms defines smoking prevalence as "the percentage of smokers in the total adult population", but no information is provided as to how the adult population is defined. Is it similar in each of the 14 countries? How is "smoking" defined? Is it smoking only commercially manufactured cigarettes? Incorrect estimates of smoking prevalence can bias the study's estimates.

The IT Flows model uses an estimate of legal Non-Domestic consumption that is generated with the help of the OE Tourism Model. This model is only vaguely described and readers have to speculate as to how the model's "over 50,000 indicators" were used to estimate the number of tourists, and why it is relevant that the model forecasts 10 years into the future if the estimates in the report are for 2013.

Even though the report provides information on exchange rate assumptions, it fails to clarify whether these are exchange rate averages for the whole year or are based on a specific date.

In addition, the source of the price data for the regional overview (p. 26) is not disclosed, and one can only speculate as to how OE determined the most-sold brand (p. 27).

Finally, despite being based on numerous assumptions, the estimates are not accompanied by a sensitivity analysis that would test a range of possible assumptions, and none of the estimates are provided with confidence intervals or a margin of error, as would be found in an academic article.

3.3 Selective presentation of results

The report selectively highlights some results (emphasizing illicit trade) but often fails to report important contrary findings found in the same data.

For example, Annex C attempts to compare in graph form estimates of illicit cigarette market shares obtained using alternative methods or provided by other entities. This graphic presentation is very selective, because whenever one of the methods (the "bottom-up" approach) generates an estimate of no illicit trade (e.g. in Australia, Cambodia, Philippines, Singapore, Thailand, and Vietnam), it is not included in the figures. The graphs only present estimates greater than zero.

A similar selective approach to the results' presentation is also seen in the part of the report devoted to evaluating the trend in illicit cigarette consumption by comparing the 2012 and 2013 estimates. The report fails to point out that even according to its own estimates, 6 out of 11 countries that are being compared over time saw a decline in the volume of illicit cigarette consumption (p. 29). A headline saying that "the majority of countries experienced a decline in the volume of illicit trade" would probably not align well with the overall impression the report hopes to make.

Significantly, noting how the industry often claims that tax increases drive illicit trade, nowhere in the report is it mentioned that for the majority of countries (four out of seven) where the share of illicit consumption in total consumption of cigarettes allegedly increased between 2012 and 2013, there was no tax increase in 2013 (p. 10).

Countries that according to the report experienced the most significant increase in tax loss in absolute terms due to illicit trade (the Philippines, Australia, Indonesia, Taiwan, and Vietnam) also experienced an increase in tobacco tax revenues, which was larger (in absolute terms) than the increase in the estimated tax loss (p. 30). Again, the report failed to report this important finding.

The estimates of Non-Domestic Illicit in the Executive Summary did not show what percentage of these illegal cigarettes are contraband (genuine brands from other countries found to be illegally consumed in the domestic market), counterfeits, and unspecified market variant (the country of origin cannot be identified). Perhaps the report did not want to highlight the fact that the largest share of Non-Domestic Illicit consists of unspecified market variant, because it would reduce the reliability of the IT Flows model.

Even though the report points to a large, 146% increase in the volume of counterfeit cigarettes, the share of counterfeit cigarettes in the estimated illicit consumption only grew from 1.1% to 2.8%. The report perhaps did not want to draw attention to the fact that the counterfeit cigarettes still represent a negligible share of illicit consumption, while the genuine products manufactured primarily by the transnational tobacco companies occupy the overwhelming share of the illicit cigarette market.

3.4 Definitions, typographical errors, miscalculations, and similar errors

The following paragraphs list some of the numerous errors found in the report.

The report does not make any distinction between smoking incidence and smoking prevalence, even though these are two very different concepts: prevalence is the proportion of a population that smokes, while incidence measures how many people per year begin to smoke.

The definition of Contraband in the Glossary of Terms is also incorrect. There is no reason why contraband needs to be re-sold in "a higher-priced market" to qualify as an illicit product. Such a definition would implicitly exclude, for example, pre-taxed Malaysian brands sold illegally in Thailand, because Thailand is a lower-priced market compared to Malaysia. Yet the seller would be making a profit if the pre-tax cigarettes are cheaper than the price such cigarettes would command in Thailand.

On page 11 the report states that 6.6% of Illicit Consumption is Non-Domestic, but it should state that 6.6% of Total Consumption is Non-Domestic Illicit. A similar mistake (6.2% of Illicit Consumption is Non-Domestic) is repeated on page 12.

The text on page 13 says that Non-Domestic Legal stayed unchanged between 2012 and 2013, but the table below it very clearly states that this type of consumption declined by 0.7%.

The heading at the top of the third blue box on page 146 is incorrect – it reads, "Add Non-Domestic Legal (NDL) to Legal Domestic Sales to derive total legal consumption" where it should say "Add Non-Domestic Legal (NDL) to Legal Domestic Consumption to derive total legal consumption".

Finally, none of the tables and figures are numbered, which makes it extremely difficult to navigate through the report. For example, on page 32 there are two figures with the same title. Also, figures in the tables are presented in a very confusing way. Often, it is not clear what the base for calculating the percentage is, since the only heading on a table column is "%". What is even more confusing is the fact that such tables have "Total Consumption" in the last row as 100%, but the lines do not add up to 100%. Some rows require subtraction, others addition of adjacent figures to sum properly. The slightly different colors used in the table are supposed to help, but they are hardly distinguishable. Some tables show percentage change, but since they have multiple columns, it is not clear which numbers are compared (e.g. page 13).

And finally, not all abbreviations are explained (e.g. IDS and FOB).

4 Country Analyses

This section demonstrates specific weaknesses of the report from a country-level perspective. We have selected two countries, Australia and Hong Kong, for a detailed country-level analysis while highlighting only a few country-level specific issues for other countries.

4.1 AUSTRALIA

The report's estimates for Australia in 2013 are very similar in magnitude to those provided by international consulting group KMPG LLP in its 2013 report.[16] The KPMG LLP 2013 report is one of more than ten reports commissioned by the tobacco industry over the past seven years estimating very high levels of use of illicit tobacco in Australia.

The similarity of the Asia-14 and the KPMG LLP 2013 results are not a surprise, since both studies rely on the same EPS for their estimates of the illicit cigarettes consumption, and the estimate of illicit unbranded tobacco (chop-chop) consumption presented in the Asia-14 report was taken directly from the KPMG LLP 2013 report. Results of the EPS are adjusted to take into account an estimate of the number of packs discarded by international visitors/citizens returning from overseas trips, while the estimates of illicit unbranded tobacco consumption is based on an internet survey of smokers. [17],[18]

The validity of the estimates of the size of the illicit market in Australia in both the Asia-11 and Asia-14 reports and in all three KPMG LLP reports thus depends crucially on:

1. the representativeness of those two surveys (the internet survey of smokers and the EPS), and
2. the adequacy of adjustments for legitimate non-domestic purchases.

4.1.1 VALIDITY OF INDUSTRY SURVEYS AND ADJUSTMENTS

INTERNET SURVEYS OF SMOKERS

The Asia-14 report states that the survey of unbranded (illicit) tobacco (also known as "chop-chop") was conducted by KPMG (p. 157), but page 184 contradicts this statement saying that the survey was done by Roy Morgan Research.

The Asia-14 report estimates that unbranded tobacco constitutes over 40% of the total amount of illicit tobacco consumed in Australia—approximately 5.3% of total consumption (p. 41). This estimate is based on prevalence and the amounts used as reported during an internet survey. This survey relies on smokers opting into the survey rather than randomly selecting the participants. This method will result in biased estimates if the participation in the survey is skewed towards those more interested in the topic and thus more likely to engage in unbranded tobacco consumption.[19] In addition, it is difficult to ascertain from telephone surveys whether particular cigarettes purchased by smokers are contraband or not.

[16] KPMG LLP. Illicit tobacco in Australia: 2013 full-year report. Sydney 2014. Available from: http://www.bata.com.au/group/sites/BAT_7WYKG8.nsf/vwPagesWebLive/DO9FC38M?opendocument&SKN=1.
[17] KPMG LLP. Illicit tobacco in Australia: 2013 full-year report. Sydney 2014. Available from: http://www.bata.com.au/group/sites/BAT_7WYKG8.nsf/vwPagesWebLive/DO9FC38M?opendocument&SKN=1.
[18] KPMG LLP. Illicit tobacco in Australia: 2013 half year report. Sydney 2013. Available from: http://www.bata.com.au/group/sites/BAT_7WYKG8.nsf/vwPagesWebLive/DO9879X3?opendocument&SKN=1
[19] Quit Victoria. Critique of "*Illicit tobacco in Australia: full year report,* 2014 by KPMG LLP." Melbourne, Australia: Cancer Council Victoria, 2014. Available from: http://www.cancervic.org.au/plainfacts/browse.asp?ContainerID=illicittobacco.

Independent government-funded surveys estimate many *fewer* smokers who report using unbranded tobacco as well as the *amounts* they report using[20] and find that this type of tobacco represents between 1–2% of total tobacco consumption per year.[21] It is unclear why the Asia-14 report classifies chop-chop as non-domestic illicit tobacco (p.13) if it is clearly a domestic product.

DISCARDED PACK SURVEYS (EPS)

The estimates of illicit cigarette consumption are based on surveys in towns and major cities, while no packs are collected in rural areas, where approximately 25% of the Australian population resides. It is quite plausible that rates of use of illicit tobacco would be substantially lower in rural areas many hundreds of miles away from likely illicit distribution channels.

For the cities and towns, no information is provided on the exact locations of collections or on the exact methodology of collection. Without this information, it is not possible to judge even the representativeness of the urban areas.

ADJUSTMENTS FOR LEGITIMATE NON-DOMESTIC PURCHASES

Estimates of the amount of non-domestic legal purchases included in the Asia-14 report are based solely on the duty-free allowances for overseas visitors (page 152). These are calculated based on smoking rates in the countries of origin of each visitor as well as applicable duty-free allowances. This calculation ignores the fact that non-smokers may bring in cigarettes as gifts for family members. It also ignores the fact that people visiting or returning to Australia can bring in cigarettes beyond the duty-free allowance and simply declare these and pay customs duties.

In its annual report released in October 2014,[22] the Australian Customs and Border Protection Service included data on interceptions of cigarettes through the mail service in Australia. It reported that 44% of tobacco arriving via international mail was legal duty-paid. Yet the Asia-14 report and the KPMG LLP 2013 report fail to account for these legal non-domestic cigarettes.

For these reasons and given the likely unrepresentativeness of the discarded pack surveys, Asia-14 estimates of the prevalence of contraband tobacco are likely to be inflated.

4.1.2 ALTERNATIVE DATA ON ILLICIT TOBACCO IN AUSTRALIA

The Asia-14 report includes and comments on the strengths and weaknesses of other available data sources on illicit tobacco (Annex A and Annex C), and it also includes a number of alternative estimates of the size of the market (page 184). However, not only does the report fail to point out that three out of the five estimates (including the "bottom-up" approach) show that the share of illicit trade in the market is less than 4% (in contrast to the OE and KPMG estimates that are over 13%), it also omits

[20] Scollo M, Zacher M, Durkin S, and Wakefield M. Early evidence about the predicted unintended consequences of standardised 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(8). Available from: http://bmjopen.bmj.com/content/4/8/e005873.abstract

[21] Quit Victoria. Illicit trade of tobacco in Australia: a report prepared by Deloitte for British American Tobacco, Philip Morris Ltd and Imperial Tobacco Australia Limited: a critique prepared April 2012. Melbourne, Australia: Cancer Council Victoria, 2012. Available from: http://www.cancervic.org.au/plainfacts/browse.asp?ContainerID=illicittobacco.

[22] AC&BP annual reports, 2007-08 to 2013-14 Australian Customs and Border Protection Service. Annual Report 2013-14. Canberra: ACBPS, 2014. Available from: http://www.customs.gov.au/site/page4283.asp

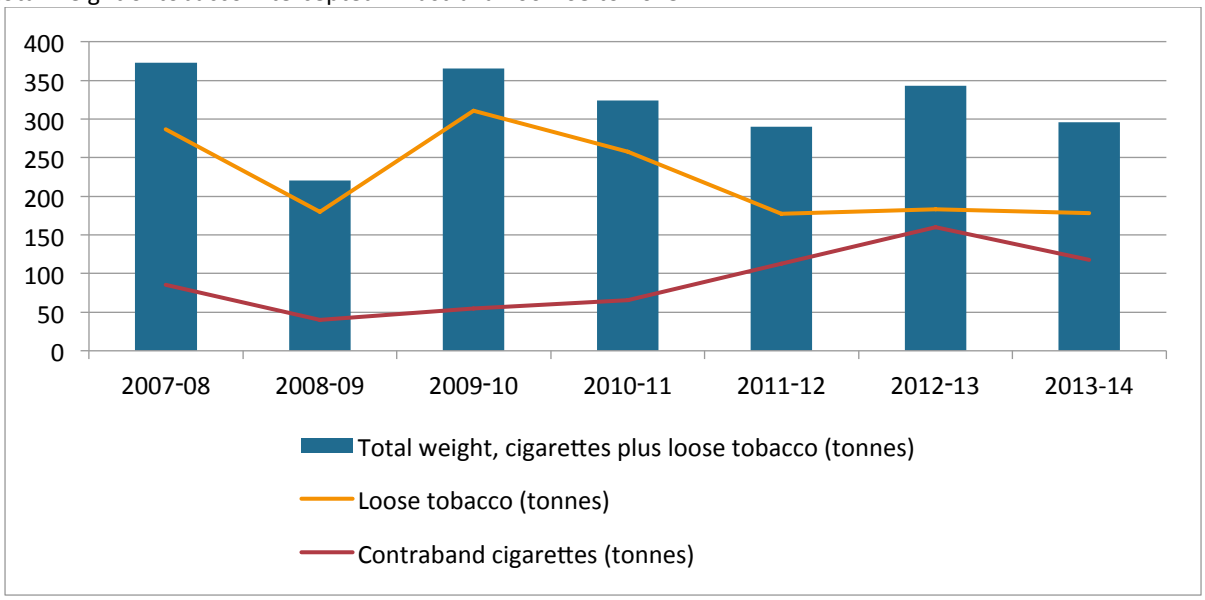
additional sources of data on illicit tobacco (summarized below) that were available prior to the Asia-14 report publication in September 2014. It is also unclear why the smoking prevalence was taken from KPMG report if official prevalence data exist.

Interceptions of sea cargo and international mail

The Asia-14 report states that the Australian Customs and Border Protection Service seized 3.4% more illicit tobacco and 41.8% more illicit cigarettes in 2012–13 than in 2011–12 (p. 40). While accurate this ignores the fact that 2011–12 was a low year for interceptions—see **Figure 1** and **Table 1**. In addition, seizures can vary significantly from year to year due to factors unrelated to the extent of illicit trade. For example, the seizures are particularly affected by enforcement efforts, which increased in Australia in 2012–13 given the industry claims that plain packaging would cause illicit trade to rise.

Data on sea cargo interceptions by the Australian Customs and Border Protection Service over the past five years indicate an increase in seizures of contraband cigarettes commencing in 2010–11 when excise and customs duty in Australia increased by an unprecedented 25%,[23] but the total amount of tobacco seized over each of the past seven years—the number of tones of contraband cigarettes plus loose tobacco combined—has remained surprisingly constant despite the increased number of detections and the substantial increase in prices of tobacco products in Australia over that time.[24]

Figure 1. Amounts of loose tobacco and contraband cigarettes intercepted in sea cargo bound for Australia, and total weight of tobacco intercepted—Australia 2007-08 to 2013-14



Note: An additional 42 million sticks of undeclared cigarettes were intercepted in mail in 2013-14. Figures of undeclared cigarettes intercepted in mail for previous years not reported. Source: Australian Customs and Border Protection Services annual reports. Available from: http://www.customs.gov.au/site/page4283.asp

[23] Scollo M. Chapter 13. The pricing and taxation of tobacco products in Australia. Tobacco in Australia: Facts and Issues, Melbourne, Australia: Cancer Council Victoria, 2013. Available from: http://www.webcitation.org/6QsaCaM3R

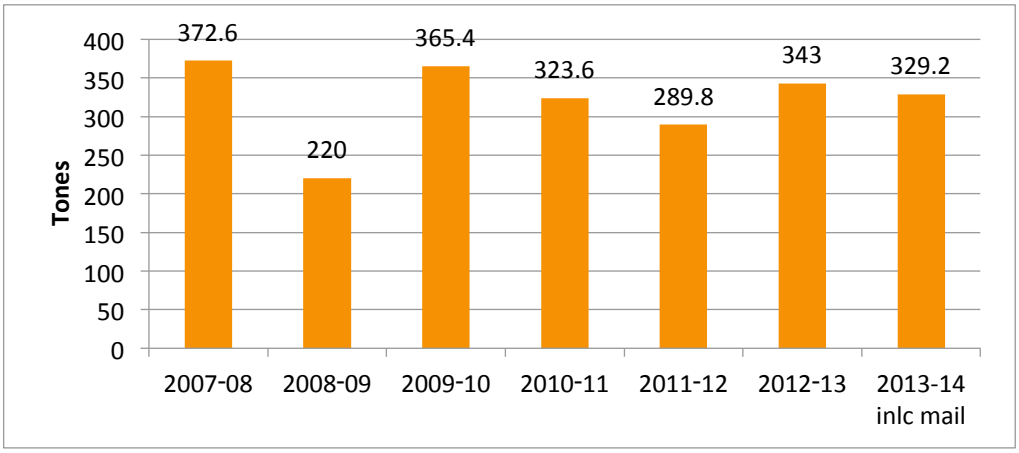
[24] Australian Customs and Border Protection Service. Annual report 2011–12. Canberra: Australian Government, 2012. Available from: http://www.customs.gov.au/site/page4283.asp.

Table 1. Amounts of loose tobacco and contraband cigarettes intercepted in sea cargo bound for Australia, and total weight of tobacco intercepted—Australia 2007-08 to 2013-14

Year	No. of detections	Tobacco (tones)	Cigarettes (millions of sticks)	Duty evaded (AUD million)	Equivalent tobacco weight (tones)
2007-08	58	287	107	114	373
2008-09	33	180	50	70	220
2009-10	42	311	68	120	365
2010-11	55	258	82	135	324
2011-12	45	177	141	125	289
2012-13	76	183	200	151	343
2013-14	81	178	147	139	296

The overall amount of tobacco intercepted in sea cargo in 2013-14 was lower than in 2012-13—see **Figure 1** and **Table 1.** Indeed, even including the cigarettes seized from international mail, data for which were included in the 2013–14 report but not in previous reports, the total amount of tobacco reported seized was lower in 2013–14 than in three of the previous six years (**Figure 2**).

Figure 2. Total weight of tobacco—cigarettes plus loose tobacco—reported seized, including mail interceptions in 2013-14 only



Source: AC&BP annual reports, 2007-08 to 2013-14 Australian Customs and Border Protection Service. Annual Report 2013-14. Canberra: ACBPS, 2014. Available from: http://www.customs.gov.au/site/page4283.asp

ALTERNATIVE SOURCES OF ESTIMATES NOT PRESENTED IN ASIA-14 REPORT

Other available data provide relatively modest estimates of the extent of use of illicit tobacco in Australia.

1. **National Drug Strategy Household Survey–reported use of unbranded illicit tobacco**

Results from the National Drug Strategy Household Survey in 2013[25] suggest a significant decline since 2007 in the percentage of smokers who are aware of unbranded chop-chop tobacco, who have ever smoked it, and who currently use it (Table 2).

Table 2. Use of unbranded tobacco, among smokers aged 14 years or older, 2007 to 2013

	Persons		
	2007	**2010**	**2013**
As a proportion of smokers			
Aware of unbranded tobacco	48.0	46.3	33.9#
Smoked unbranded tobacco in their lifetime	27.0	24.0	16.5#
Currently smoke it	6.1	4.9	3.6#
No longer use it	20.8	19.0	12.9#

# indicates a statistically significant decline from 2007 to 2013.

2. **Survey of Victorian smokers–reported use of unbranded illicit tobacco and use of cigarettes with indicators of illicit status**

A study published in August 2014 in BMJ Open[26] analyzed cross-sectional data from the state of Victoria smokers interviewed before, during, and one year after the introduction of plain packaging. The proportion of smokers reporting current use of unbranded illicit tobacco (Table 3) was 2.3% in 2011, 2.2% in 2012 and 1.9% in 2013 (p=.46).

Table 3. Use of unbranded illicit tobacco by year – unadjusted percentages and 95% Confidence Intervals (95% CI)

	2011		**2012**		**2013**	
Unbranded illicit tobacco [a]	**%**	**95% CI**	**%**	**95% CI**	**%**	**95% CI**
Past 12-month use	4.4	2.4 – 6.3	4.9	2.4 – 7.4	4.0	2.0 – 6.0
Current [b] use	2.3	0.8 – 3.8	2.2	0.3 – 4.1	1.9	0.6 – 3.1

[a] Includes all current smokers (smokers who smoke daily, at least weekly or less than weekly (2011: n=754; 2012: n=590; 2013: n=601)

[b] Current use is use daily, weekly or less than weekly

[25] Australian Institute of Health and Welfare. Highlights from the 2013 survey: Tobacco Smoking. Canberra: AIHW, 2014. Last update: 27 July; Viewed AIHW cat. no. PHE 145. Available from: http://www.aihw.gov.au/alcohol-and-other-drugs/ndshs/

[26] Scollo M, Zacher M, Durkin S, and Wakefield M. Early evidence about the predicted unintended consequences of standardised 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(8). Available from: http://bmjopen.bmj.com/content/4/8/e005873.abstract

Two criteria strongly suggestive of illicit status of purchased cigarettes are non-compliance with Australia's packaging requirements and/or being purchased from informal sources such as friends, market stalls, or people selling from the back of vans. A survey in the state of Victoria[27] revealed that in 2013, 2.6% of cigarette smokers reported having purchased one or more packets of cigarettes in non-compliant packaging in the past three months. About 1.7% had purchased one or more packets from an informal seller in the past year. Most people reporting any such purchases indicated that only a very small number of such packs had been purchased over the previous quarter/year. These estimates are contradictory to the Asia-14 report estimates.

4.1.3 Conclusion

Data derived from sources independent of the tobacco industry suggests relatively low and stable levels of illicit tobacco in Australia.

4.2 Hong Kong

The Asia-14 report estimate claims that 33.6% of cigarettes consumed in Hong Kong in 2013 were illicit. This is a slight reduction compared to the estimate of 35.9% published in the 2012 Asia-11 report.

As with the Asia-11 report, ITIC/OE made substantial efforts to publicize the release of the Asia-14 report in Hong Kong. The Hong Kong Council on Smoking and Health (COSH) was not aware of any study being conducted in Hong Kong until ITIC/OE held its press conference on Sept 9, 2014. The report's results were reported in almost all major local media (mainly Chinese newspapers) the day following the report release with striking headlines such as "1/3 smokers in Hong Kong smoked illicit cigarettes" and "The illicit consumption in Hong Kong ranked 3rd in all the 14 markets". Most of them cited Daniel Witt, the president of ITIC, who stated that "Key drivers of illicit tobacco in the [*sic*] Hong Kong include the excessive tax increases in 2009 and 2011".[28] When Hong Kong COSH advocated for a tax increase in 2013, the opponents cited the Asia-11 results to oppose the tax increase.

Even though it is not possible to assess all the problems with the two ITIC/OE reports due to insufficient details regarding their methods and data, the information provided leads to the conclusion that both Asia-11[29] and Asia-14 estimates are the product of a defective methodology using questionable data sources.

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[27] Scollo M, Zacher M, Durkin S, and Wakefield M. Early evidence about the predicted unintended consequences of standardised 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(8). Available from: http://bmjopen.bmj.com/content/4/8/e005873.abstract

[28] For The Second Consecutive Year, 1 In 3 Cigarettes Consumed In Hong Kong Are Illegal. Press Release by the International Trade and Investment Center, Oxford Economics, and Hong Kong United Against Illicit Tobacco. Available from: http://www.iticnet.org/images/Press%20release%20(English).pdf [accessed 23 February 2014]

[29] Chen J, McGhee S, Townsend J, Lam TH, Hedley A (2015). Did the tobacco industry inflate estimates of illicit cigarette consumption in Asia? An empirical analysis. Tobacco Control, 0:1–7. doi:10.1136/tobaccocontrol-2014-051937

4.2.1 PROBLEMS WITH THE ESTIMATES, DATA AND METHODS

As is true for other countries covered in the report, legal duty-free consumption is underestimated by accounting for only the top 3 inbound markets while ignoring the large number of visitors from other countries in 2013 such as Japan (1 057 033 visitors) and Korea (1 083 543 visitors), for example. In addition, Hong Kong inbound residents are not included in the calculation, which falsely classifies some legal packs as illegal. Both of these methodological failures result in overestimating the size of the cigarette illicit market.

The biggest concern is the Empty Packs Survey (EPS), upon which the Hong Kong estimate is dependent. Despite repeated queries on the method of EPS raised by Clear The Air Hong Kong to OE and ITIC and a promise by OE manager Scott Livermore to provide that information, the following details of the EPS methodology have not been released:

- Methods of identifying that an empty pack was duty-paid, illicit, or duty-free. This type of information is usually not available on the packs sold in Hong Kong. Misclassification of legal packs as illicit products would result in overestimating the illicit share of total cigarette consumption.
- Reasons for selecting the 2nd and 4th quarters of 2013 for data collection (Page 158, Annex A). It is unclear whether selecting instead the low tourist season of the 3rd quarter would generate a different result, but given the important role tourists play in Hong Kong's estimate, this issue should have been addressed.
- The sampling method in each district, specifically, the method of selecting locations within a district where the empty packs were picked up and rules regarding sampling a particular location multiple times. The sampling method has profound implications for generating unbiased results.
- The specific timing of data collection according to the time of day and the part of the week. The timing could influence if these packs were discarded by commuters, late night partygoers or by weekend/holiday visitors.
- Calculation of sampling weights. In addition to weighting the data according to the population size, it is not clear whether the weights were also adjusted for commuting patterns and/or disproportional number of tourists temporarily residing in certain districts. The failure to account for the presence of tourists and commuters will generate an upward bias in the estimate of the size of the illicit cigarette market.

In addition to the lack of details on the EPS, there are no details about the 2013 consumer survey that was used to generate an alternative estimate of illicit cigarette consumption in Hong Kong.

The report is also confusing at times. For example the graph on page 29 as well as the information on page 63 show no change in the volume of illicit cigarette consumption; however, the text on page 29

explicitly lists Hong Kong among countries where the volume in illicit cigarette declined from 2012 to 2013. On page 66 the report states that "The bulk of the Non-Domestic share in Hong Kong remains Duty-Free products, the incidence of which far outweighs estimates of Non-Domestic Legal inflows." Yet, the report is clear about the Duty-Free products being also included in the Non-Domestic Legal inflows (p. 34).

4.2.2 Other estimates of illicit consumption in Hong Kong

Using scientifically valid data and a transparent methodology, a group of academics used a "top-down" approach to estimate the size of illicit cigarette consumption in Hong Kong. [30] Unlike the ITIC/OE reports, this study accounted for Hong Kong inbound residents and various groups of tourists based on the length of their stay in Hong Kong. It also conducted a sensitivity analysis to test the robustness of its results to various assumptions. The results showed that between 8.5% and 14.2% of total cigarette consumption in Hong Kong in 2012 was illicit. This means that the Asia-11 report inflated the estimates by 133–337%.

A population-based telephone survey conducted by Hong Kong COSH and School of Public Health, University of Hong Kong in 2013 among randomly sampled current smokers (n=800) aged 15-65 revealed that only 8.8% claimed that they had often bought lower cost cigarettes in the past 6 months. Among those who had bought the low-cost cigarettes, 28.5% believed that they were smuggled from other places. Daily consumption of smokers who often bought low-cost cigarettes was 16.3 sticks compared to 14.1 of the average daily consumption. If the smokers who often bought low-cost cigarettes only smoked low-cost cigarettes and all of the low-cost cigarettes were smuggled, then the proportion of illicit consumption from this survey would be 10.2% (8.8%*16.3/14.1). If only 28.5% of these low cost cigarettes were smuggled, illicit cigarettes would represent only 2.9% of total consumption. These estimates are substantially lower compared to the ITIC/OE estimates in the Asia-11 (35.9%) and Asia-14 (33.6%) reports.

4.3 Brunei

As late as 27 August 2014 Oxford Economics contacted the Ministry of Health in Brunei and requested data on the volume of legal duty-paid cigarettes and other tobacco products, as well as the value of excise duty paid in local currency for 2012 and 2013. This request reveals that seven business days before the report was officially presented on September 5, 2014, OE was still looking for the basic data required for calculating their estimates.

[30] Chen J, McGhee S, Townsend J, Lam TH, Hedley A (2015). Did the tobacco industry inflate estimates of illicit cigarette consumption in Asia? An empirical analysis. Tobacco Control, 0:1–7. doi:10.1136/tobaccocontrol-2014-051937

It was perhaps this rather late attempt to collect essential data that caused the estimates for Brunei to rely on the methodologically weak "bottom-up" approach to estimate the size of the domestic cigarette market (p.48). This estimate is even more questionable in the case of Brunei since the report claims there are no national data on the average daily cigarette consumption and "borrowed" this statistic from neighboring markets by calculating an average (p.185). No information is provided on the method of calculation. A transparent study would have disclosed which of the neighboring markets had been considered and specified whether a simple or weighted average had been used.

Even though the EPS was done in Brunei in the 2nd quarter of 2013, it is not clear why this was necessary if, in the end, the report considers all cigarettes consumed in Brunei to be illicit since May 2013 following PMI's departure from the country. Similarly, while the report recognizes (p. 153) that "passengers may still bring in products and pay the appropriate duty at the border," it makes a broad assumption that these volumes are negligible "in the absence of available data to suggest otherwise."

It is also not clear why the conversion of loose tobacco to cigarettes applied in Brunei (0.949 grams of loose tobacco per cigarette) is different compared to Australia (0.8 grams per cigarette) and Thailand (0.75 grams per cigarette).

Brunei did not have any tax increase in 2013, therefore the higher share of illicit consumption in total cigarette consumption in 2013 compared to 2012 could not be blamed on a tax increase. It was most likely a result of lower cigarettes consumption, both legal and illicit (p. 49).

4.4 Indonesia

The report states (p. 188) that the data source for the smoking prevalence is WHO, but the data source for the average daily consumption is a consumer survey data 2013. No details regarding this survey are provided on page 188. It is necessary to go back to page 70 and guess that the 2013 survey cited on page 188 could be a part of the Global Consumer Trends Surveys conducted in 2013 on behalf of PMI. The report provides no details about the Global Consumer Trends Surveys such as the sample size and sampling frame. Without such basic information, it is impossible to judge the quality of the data generated by this survey.

Even though a reader learns that Indonesia experienced a significant increase in tax loss (in absolute terms) from 2012 to 2013 due to illicit trade while simultaneously increasing tobacco tax revenue, the report does not point out that the tax revenue increase (from IDR 90.5 trillion to 103.6 trillion) was much larger than the alleged increase in the estimated tax loss (from IDR 0.1 trillion to 0.6 trillion). Additionally, the Asia-14 report presents the increase of tax revenue loss in a misleading way, stating that there was a 583.6% increase in tax revenue losses as against a 14.4% increase in tax revenues collected.

4.5 Malaysia

The Asia-14 report presents four different estimates of the share of illicit cigarette consumption in Malaysia using different methods and different data sources (p.190). They range from 16.5% to 54.1%

with the estimate of 35.6% presented in the Asia-14 report. Such a wide range of estimates calls into question the reliability of such estimates.

The International Tobacco Control (ITC) Policy Evaluation Project that collects data via cross-sectional surveys using multistage stratified cluster sampling method estimates that the share of illicit cigarettes in Malaysia was 16.5% of total consumption based on data collected from May 2011 to March 2012.[31] This ITC estimate is almost identical with the lowest estimate (estimated by an academic) cited and less than half of the estimate presented in the Asia-14 report.

The estimate presented in the Asia-14 report is based on the EPS, which is conducted in Malaysia by AC Nielsen on behalf of Royal Malaysian Customs with BAT, JTI, and PMI as participating companies. The methodology of this survey has been criticized both by academics and the public health community familiar with the data collection. The main criticism points to collecting packs primarily in areas where the likelihood of smokers consuming illicit cigarette is higher relative to other localities. For example, the public litter bins selected for data collection are located in illicit cigarettes hotspots such as stadiums and markets, or in rural areas known for large representation of immigrant workers such as palm oil estates where many poor Indonesian migrant workers reside.

4.6 PHILIPPINES

The Asia-14 report states that on 1 January 2013 the excise tax increased by 341.2% (from 2.72 to 12 pesos) for the majority of cigarettes, and this contributed to a 59.4% rise in the pack price of the most sold brand (p. 28). Even though this price increase was significant in relative terms, the report (p. 107) also shows that the pack price of the most sold brand increased from approx. 16 pesos in 2012 to only 25 pesos (less than USD 0.60) in 2013. This means that despite the price increase, cigarettes in the Philippines remain very affordable, especially when cigarettes are sold individually rather than by pack.

Still, the report claims that the 2013 tax increase was the main driver of the purported increase in illicit consumption in 2013, which it estimated at 18.1% of total consumption. This estimate is lower than in seven other Asia-14 countries, but the report emphasizes that the Philippines experienced the largest volume increase in Illicit Consumption (an increase of 198%) among the Asia-14 countries. While the report notes that there was a 3.0% reduction in Total (legal and illicit) Consumption in 2013 compared to 2012 and acknowledges that the "super low price" segment's share of Legal Domestic Sales more than doubled to 39.4% in 2013, and that the share of all other segments ("premium price", "medium price", and "low price") declined (p. 106), it claims that the decline in Legal Domestic Sales was wholly offset by a rise in Illicit Consumption (p. 108).

Allegedly an estimated 89.8% of Illicit Consumption and 16.3% of Total Consumption in 2013 was attributable to Domestic Illicit Consumption (p. 112), which was estimated to have grown by 181.2% or 11.0 billion cigarettes (p. 12). This is consistent with the assertions of Philip Morris Fortune Tobacco Corporation (PMFTC) that its main competitor, Mighty Corporation, had under-declared its production volumes to evade taxes, which allowed Mighty to outprice PMFTC brands and eat into PMFTC's

[31] Liber AC, Ross H, Omar M, Chaloupka FJ. The Impact of the Malaysian Minimum Cigarette Price Law: Findings from the ITC Malaysia Survey. Tob Control doi:10.1136/tobaccocontrol-2014-052028. Available at: http://tobaccocontrol.bmj.com/content/early/2015/03/25/tobaccocontrol-2014-052028.full

monopolistic market share.[32]

In addition to making claims of massive domestic illicit trade, the Asia-14 report continues its scaremongering by claiming that the Philippines was the main market for consumption of Counterfeit cigarettes, with counterfeit volumes rising sharply by 800%. A careful reader will discover, however, that despite this "huge" increase, the share of counterfeit cigarettes in total consumption is only 1.8%.

While the report highlights its estimates of alleged tax losses from illicit trade, it fails to point to the significantly higher tax revenues after the 2013 tax increase (p. 111); for tobacco excise alone (not including VAT), the government collected PHP 70.4 billion in 2013, which is higher by PHP 37.5 billion or 113.7% compared to 2012. Excise revenue gains were thus 454% higher than the report's estimated excise tax losses (PHP 12.7 billion) in 2013. This revenue gain was achieved despite the industry's customary practice of frontloading/forestalling at the end of 2012 (in anticipation of the January 2013 tax increase), which contributed to lower 2013 excise revenues, something the Asia-14 report fails to acknowledge.

Fortunately, in addition to having increased excise collections, the 2013 tax increase has also reduced tobacco consumption. A March 2014 survey[33] shows that overall smoking prevalence in the Philippines decreased from 28.3 percent to 26 percent from December 2012 to March 2014, with the largest declines among the very poor (from 38.0 percent to 25.0 percent) and among younger adults aged 18 to 24 years (from 35.0 percent to 18.0 percent).

4.7 TAIWAN

The Asia-14 report estimates that 8.7% of all cigarette consumption in Taiwan is illegal and also presents three other estimates, ranging from 3.5% to 13.5%, using alternative methods and data sources (p.195). A survey conducted by the Taiwan Administration in 2011 found that only 4% of Taiwanese smokers admitted having purchased contraband tobacco products in the past year.[34] This indicates that the lower bound estimate is probably closer to reality and that the Asia-14 report overestimated the share of the illicit market by more than 100%.

The Asia-14 report's estimate is based on an incorrect report of the legal domestic sales of 35.5 billion cigarettes in 2013, because the 2013 official data show that the total cigarette sales was 38.4 billion. If the correct estimate were used, the share of illicit cigarettes in total consumption would be 7% lower (8.1% instead of 8.7%).

In addition, the EPS, one of the primary data sources for almost all countries presented in the report, was replaced by a Consumer Panel Survey in Taiwan. No reason was provided as to why a different data collection method was used in Taiwan.

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[32] Cuevas-Miel, L. (2014, February 13). YOSI WARS: Philip Morris HQ Tells Investors Mighty Corp Is Dodging Taxes. *Interaksyon*. Retrieved from http://www.interaksyon.com/business/80684/yosi-wars--philip-morris-hq-tells-investors-mighty-corp-is-dodging-taxes

[33] Social Weather Stations (SWS). Survey on Usage, Attitudes and Behavior of Filipinos Towards Tobacco, March 2014.

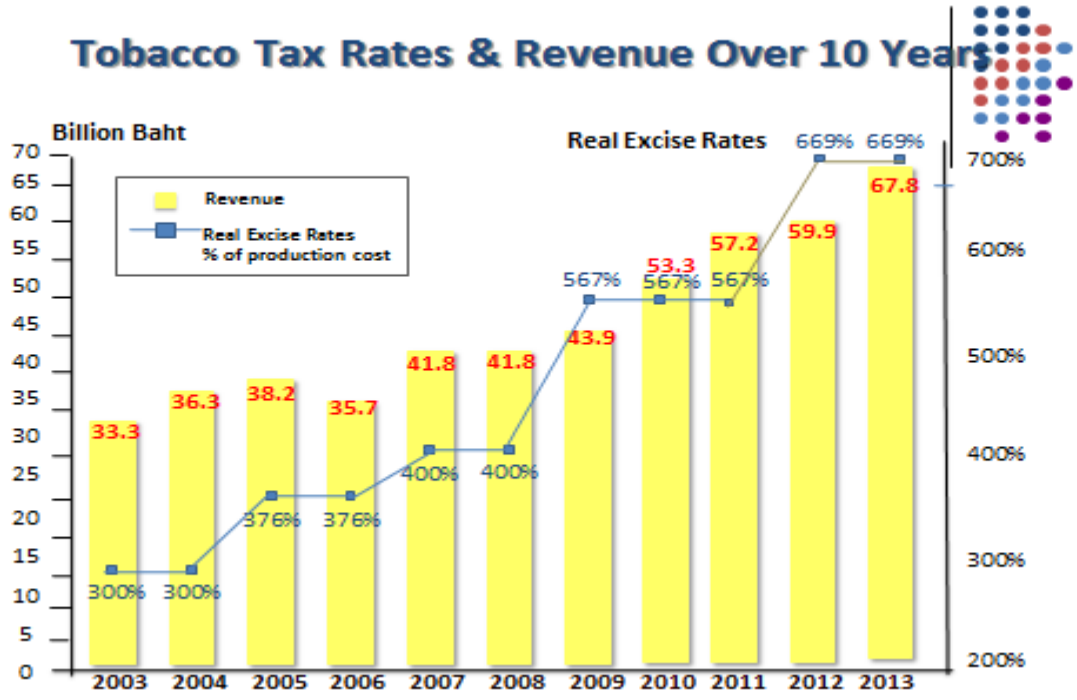
[34] 2013 Taiwan Tobacco Control Annual Report. Health Promotion Administration. Taiwan. 2013

Taiwan did not have any tax increase in 2013, therefore the higher share of illicit consumption in total cigarette consumption in 2013 compared to 2012 cannot be blamed on a tax increase.

Even though a reader learns that Taiwan experienced a significant increase in tax revenue losses (in absolute terms) from 2012 to 2013 due to illicit trade while simultaneously increasing tobacco tax revenue, the report does not point out that the net gain for the tax revenue authority in 2013 was still US$ 16.8 million even after accounting for the estimated revenue loss.

4.8 THAILAND

Thailand does not fit the report's rhetoric about the link between higher taxes and higher illicit market penetration. The report demonstrates that despite the tax increase in 2012, the market share of illicit cigarettes decreased from 2.9% in 2012 to 2.3% in 2013 and the estimated revenue loss declined from THB 2.4 billion in the fiscal year 2011/2012 to THB 1.7 billion in the fiscal year 2012/2013. At the same time, Thailand increased its tobacco tax revenue. Moreover, thanks to its policy of regular tobacco tax increases, Thailand was able to increase its excise tax revenue from THB 33.3 billion in 2003 to THB 67.8 billion in 2013[35] while having one of the lowest estimate of illicit tobacco trade.



Source: Ministry of Finance, Thailand, 2014

Even though the authors of the report believe that Thailand has high tobacco taxes that reached 87% of ex-factory selling price for manufactured cigarettes in August 2012, the illicit cigarette trade in Thailand is very low. In addition, the impact of the recent tax increase on tobacco products market prices was negligible and the prices of the most popular local and international cigarette brands even declined -

[35] Ministry of Finance, Thailand, 2014

from USD 2.16 in 2012 to USD 2.06 in 2014 for local brands, and from USD 2.66 in 2012 to USD 2.06 in 2014.[36,37] This means that the 2012 tobacco tax increase was not large enough to impact cigarette prices as it was absorbed by the tobacco companies. This is a signal that Thailand needs much higher tax rate in order to impact cigarette retail prices. Tobacco tax policy as public health measure works only if prices go up as it helps smokers to quit and prevents young people from smoking initiation.

4.9 Vietnam

Both the Asia-11 and Asia-14 reports were heavily publicized in the local media and used by the industry to lobby against higher tobacco taxes during the 2013-2014 excise tax law amendment process.

The Asia-14 report estimates that illicit consumption in Vietnam represented 20.7% of total domestic consumption in 2013. This estimate is remarkably close to the estimate of 21.6% provided by the Vietnam Tobacco Association (VTA) that is also highlighted in the report. The report does not provide any information about the methodology employed by VTA to generate their estimate.

The EPS, the primary source of data to estimate the size of the illicit cigarette market in Vietnam, was conducted in the 15 largest cities covering 15.5% of the total population. Since the consumption of illicit cigarettes is substantially larger in urban versus rural areas,[38] the Asia-14 estimate for Vietnam suffers from an upward bias.

A recent empirical analysis in Vietnam using publicly available data showed that illicit consumption in Vietnam ranged from 0.7% - 6%[39] of total domestic consumption, an estimate substantially lower compared to the Asia-14 report's estimate.

The report claims (p.30) that Vietnam experienced an increase in tax losses due to illicit cigarettes between 2012 and 2013. However, the estimated increase in the tax loss was only about 3.1% (about US$ 9 million) while the total cigarette tax revenue increased by 15.4% (about US$ 110 million) during the same time. Since there was no tobacco tax increase in Vietnam from 2008 to 2014 and Vietnam applies ad valorem tax, where the amount of tax collection is a function of the producers' price, the tax revenue increase was entirely driven by tobacco industry price increases. Therefore, the increase in tax losses due to illicit cigarettes cannot be blamed on a tax increase. This situation also puts into question the tobacco industry rhetoric about prices/taxes driving the illicit trade and the industry effort to prevent illicit trade by opposing tax increases. Obviously, when it comes to industry-driven price increases, the industry is less eager to make the association.

[36] SEATCA. (2013). ASEAN Tax Tobacco Tax Report Card: Regional Comparison and Trends.
[37] SEATCA. (2015). ASEAN Tax Tobacco Tax Report Card: Regional Comparison and Trends.
[38] Nguyen MT, Dao ST, et al (2014). Portrait of Illicit Cigarette Trade in Vietnam (unpublished report).
[39] Nguyen MT, Denniston R, Nguyen HT, et al. The empirical analysis of cigarette tax avoidance and illicit trade in Vietnam, 1998-2010. *PLoS One*. 2014;9:e87272.

5 CONCLUSIONS

The Asia-14 report lacks sufficient details both on its methods and on the data used to generate the estimates. This prevents a fuller review and critical assessment of the methodology and data used by ITIC/OE to assess their validity. The lack of details makes it impossible to replicate the results.

This critique points to some shortcomings that could be identified given the level of detail provided in the report. These faults are more than sufficient to cast doubt on all estimates presented in the study.

The report acknowledges in words but fails to factor in the considerable uncertainty surrounding the estimated size of the illicit tobacco market in all countries. Yet the results have been presented to governments of the participating countries with a high level of confidence.

ACKNOWLEDGEMENTS

We would like to thank Prof. Frank Chaloupka for reviewing this critique and for providing useful comments. We very much appreciate the input provided by Kylie Lindorff from Cancer Council Victoria, by Dr. Chen Jing, Professor T.H. Lam and Sir Robert Kotewall from Hong Kong, and by the SEATCA team and country coordinators.

Southeast Asia Tobacco Control Alliance

Press Release

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Failed: Tobacco Industry Funded Research on Illicit Trade of Tobacco Products in Asia

Manila, 30 May 2015: The Southeast Asia Tobacco Control Alliance (SEATCA) has stamped "***Failed***" on a tobacco industry funded research on illicit trade of tobacco products in 14 Asian countries.

Last year, Philip Morris International funded a second research on illicit trade of tobacco products in Asia, called "Asia-14 Illicit Tobacco Indicator 2013" which was carried out jointly by a Washington based group, International Tax and Investment Center (ITIC) and a UK group, Oxford Economics (OE). It is no surprise that the findings of this research, like its predecessor (Asia-11 Illicit Tobacco Indicator 2012), are pro-tobacco industry.

In conjunction with World No Tobacco Day, SEATCA has released "*A Critique of the ITIC/OE Asia-14 Illicit Tobacco Indicator 2013*", saying the research fails in four areas: methods and data issues, lack of sufficient detail to permit assessment and replication, selective presentation of results, and plain mistakes and errors.

According to the main reviewer of the research, Prof. Hana Ross, Principal Research Officer of the Economics of Tobacco Control Project at the University of Cape Town, "The Asia-14 report fails to provide scientifically sound and unbiased information to policy makers and other tobacco market stakeholders. The reason for this is simple. The figures and statistics it reports are products of either incorrect or unverified/unverifiable estimation methods applied to often questionable data from multiple sources that do not blend."

According to Dr. Ross, the quality of the original data collection is questionable due to the lack of representativeness and possibly intended bias. Many secondary data come from sources with an obvious conflict of interest.

The findings are selectively presented, highlighting examples of increasing illicit consumption while neglecting to point out the declines or lack of change in some countries.

More seriously, the report is full of errors and mistakes, which is surprising given the "commercial" quality of the results. For example, the report does not make any distinction between smoking incidence and smoking prevalence, even though these are two very different concepts. It also confuses "sales" and "consumption", two fundamental concepts on which the calculations are based.

While illicit tobacco trade is a problem that requires government attention, it is often blown out of proportion and out of context by the tobacco industry in order to discourage governments from increasing tobacco taxes and implementing other regulatory measures.

Dr. Ulysses Dorotheo, FCTC Program Director of SEATCA said, "Governments should reject partnerships and non-binding agreements with the tobacco industry to solve illicit trade. Instead, governments should secure the supply chain in accordance with measures contained in the FCTC Protocol to Eliminate Illicit Trade in Tobacco Products, which was adopted in 2012 by the 180 Parties to the WHO Framework Convention on Tobacco Control (FCTC). The Protocol also enables governments to collaborate with each other rather than be misled and lied-to by the tobacco industry that is complicit in illicit trade of tobacco."

Failed: A Critique of the ITIC/OE Asia-14 Illicit Tobacco Indicator 2013 (full text), see: http://seatca.org/dmdocuments/Asia%2014%20Critique_Final_20May2015.pdf

For more information on World No Tobacco Day 2015 and the Protocol to Eliminate Illicit Trade in Tobacco Products, see: http://www.who.int/campaigns/no-tobacco-day/2015/en/

http://who.int/fctc/mediacentre/iticreminder/en/

WHO FRAMEWORK CONVENTION ON TOBACCO CONTROL

CSF/NV/14/25

Sixth session of the Conference of the Parties to the WHO FCTC: issues related to Article 5.3 and the guidelines for its implementation

The Convention Secretariat presents its compliments to the Permanent Missions in Geneva of the Parties to the WHO Framework Convention on Tobacco Control (WHO FCTC) and has the honour to refer to the sixth session of the Conference of the Parties to the WHO FCTC, which will be held from 13 to 18 October 2014 in Moscow, Russian Federation.

As part of its agenda, the Conference of the Parties (COP) will consider many topics related to economics and trade: the report and draft guidelines[1] on Article 6 (*Price and tax measures to reduce the demand for tobacco*), submitted by the open-ended drafting group established by the COP at its fifth session;[2] the status of the Protocol to Eliminate Illicit Trade in Tobacco Products;[3] and trade and investment issues relevant to implementation of the WHO FCTC.[4]

It has been brought to the attention of the Convention Secretariat that the International Tax and Investment Center (ITIC),[5] in cooperation with the Eurasian Economic Commission, is organizing a briefing on tobacco excise taxation in Moscow on 12 October 2014, one day before the opening of the COP, and inviting tax officials from Parties and WHO Member States that are observers to the COP to participate. The Convention Secretariat would like to bring to your attention that ITIC has a number of tobacco companies as part of its board of directors and has produced many publications on several areas related to taxes and prices, investment and illicit trade in tobacco products.

In light of Article 5.3 of the Convention and the guidelines for its implementation adopted by the COP, the Convention Secretariat would like to inform the Parties and accredited observers to the Convention that this event is in no manner supported by the Convention Secretariat and cannot be considered as being in any way linked to the COP. The Ministry of Healthcare of the Russian Federation has also reassured the Secretariat that ITIC's event is in no manner supported by the Government of

[1] See document FCTC/COP/6/7, available at http://apps.who.int/gb/fctc/PDF/cop6/FCTC_COP6_7-en.pdf
[2] See http://who.int/fctc/guidelines/groups/art_6/en/
[3] See document FCTC/COP/6/6, available at http://apps.who.int/gb/fctc/PDF/cop6/FCTC_COP6_6-en.pdf
[4] See document FCTC/COP/6/20, available at http://apps.who.int/gb/fctc/PDF/cop6/FCTC_COP6_20-en.pdf
[5] See http://www.iticnet.org

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WHO FRAMEWORK CONVENTION ON TOBACCO CONTROL

the Russian Federation. Furthermore, to the best of Secretariat's information, the event is also not supported by any Party or accredited observer to the WHO FCTC.

The Convention Secretariat would also like to take this opportunity to remind Parties of recommendations 4.9 and 8.3 of the guidelines for implementation of Article 5.3 of the WHO FCTC related to the composition of delegations to meetings of the COP and its subsidiary bodies. Furthermore, in line with Articles 4.2 and 4.4 (*Guiding principles*) and 5.1 (*General obligations*) of the WHO FCTC, the Secretariat would like to highlight the pertinence of involving different sectors of the government as part of their delegations, such as customs, finances, regulatory and law enforcement authorities among others.

The Convention Secretariat is available to respond to any queries related to the information contained in this note verbale and avails itself of this opportunity to renew to the Parties to the WHO FCTC the assurance of its highest consideration.

GENEVA, 19 September 2014

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OPEN ACCESS

Did the tobacco industry inflate estimates of illicit cigarette consumption in Asia? An empirical analysis

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ABSTRACT

Objective Estimates of illicit cigarette consumption are limited and the data obtained from studies funded by the tobacco industry have a tendency to inflate them. This study aimed to validate an industry-funded estimate of 35.9% for Hong Kong using a framework taken from an industry-funded report, but with more transparent data sources.

Methods Illicit cigarette consumption was estimated as the difference between total cigarette consumption and the sum of legal domestic sales and legal personal imports (duty-free consumption). Reliable data from government reports and scientifically valid routine sources were used to estimate the total cigarette consumption by Hong Kong smokers and legal domestic sales in Hong Kong. Consumption by visitors and legal duty-free consumption by Hong Kong passengers were estimated under three scenarios for the assumptions to examine the uncertainty around the estimate. A two-way sensitivity analysis was conducted using different levels of possible undeclared smoking and under-reporting of self-reported daily consumption.

Results Illicit cigarette consumption was estimated to be about 8.2–15.4% of the total cigarette consumption in Hong Kong in 2012 with a midpoint estimate of 11.9%, as compared with the industry-funded estimate of 35.9% of cigarette consumption. The industry-funded estimate was inflated by 133–337% of the probable true value. Only with significant levels of under-reporting of daily cigarette consumption and undeclared smoking could we approximate the value reported in the industry-funded study.

Conclusions The industry-funded estimate inflates the likely levels of illicit cigarette consumption.

INTRODUCTION

Article 6 of the WHO Framework Convention on Tobacco Control (FCTC) recommends the use of taxation and pricing policies on tobacco products to decrease tobacco use.[1] Increasing tax that results in an increase in cigarette prices is considered to be an effective policy to reduce tobacco consumption, induce smokers to quit and, in particular, reduce the initiation of smoking among young people[2] without reducing the revenue of the government.[3] The argument that illicit trade will increase as a result of price rise is often raised by tobacco companies, sometimes successfully, to oppose tobacco tax increases.[4] The tobacco companies themselves, on the other hand, are the major beneficiaries of illicit trade and have been found to facilitate smuggling so that cigarettes penetrate youth markets.[4]

Data on illicit cigarette consumption are limited and not available in many countries.[5] The available data, often provided by industry-funded studies, have an incentive to inflate the extent of illicit cigarette consumption to oppose tobacco tax increases. Joossens *et al*[6] showed that estimates from Project Star, which was commissioned by Philip Morris International (PMI) and compiled by Klynveld Peat Marwick Goerdeler (KPMG), were higher than the estimates based on a study among a sample of representative smokers in 11 of 18 European countries. Stoklosa and Ross[7] showed that the industry estimate in Poland (22.9%) was higher than their estimates based on survey data (14.6%) or based on representative-discarded pack data (15.6%). van Walbeek[8] compared the estimates presented by the Tobacco Institute of Southern Africa (30%), a body representing the interests of large cigarette companies, with estimates based on rigorous econometric methods (6.1%) and showed again that the industry-funded data were not reliable.

Another more recent example is the report, "Asia-Illicit Tobacco Indicator 2012".[9] This study was funded by PMI and compiled by Oxford Economics (OE) and the International Tax and Investment Center (ITIC). The ITIC itself is funded by major transnational tobacco companies. In the report, illicit cigarette consumption in 11 Asian markets was estimated and claims were made that in 2012, illicit consumption comprised 35.9% of total cigarette consumption in Hong Kong. This estimate lacked rigorous validation, and the methods by which it had been obtained were not clearly described. The Southeast Asia Tobacco Control Alliance raised many questions about the sources of data, analytic methods and conclusions of this report.[10] Nonetheless, the OE estimates for Hong Kong have been used to oppose tax increases.

In Hong Kong, stopping the illicit trade of tobacco, especially cigarette smuggling, has always been a priority of the Customs and Excise Department (CED). The drop in the number of seized cigarettes in the past decade, from 153 million sticks in 2003 to 39 million sticks in 2012, indicates that more stringent enforcement by the CED along with better cooperation with counterparts in bordering countries, primarily Mainland China and other local enforcement agencies, has deterred smuggling activities.[11] In the meantime, in February 2009 and February 2011, the Hong Kong Government increased tobacco tax by 50% and 41.5%, respectively. Tobacco tax revenue increased from HK$2.8 billion in 2007 to HK$5.0 billion in 2012,[11] while the prevalence of smoking declined from 11.8% in 2007 to 10.7% in 2012.[12 13] The number of seized cigarettes in 2009 (29 million sticks) and 2011 (57 million sticks) did not increase as compared to the previous years of 2008

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(81.6 million sticks) and 2010 (57 million sticks).[11] However, when tobacco control and public health professionals in Hong Kong pressed the government to increase tobacco tax by 100% in 2013 and when the Bill to increase tax on tobacco was introduced in the Legislative Council in 2014, the OE estimate of 35.9% of cigarette consumption being illicit, which had been presented to the mass media in Hong Kong in 2013, was repeatedly used by opponents of tobacco taxation to lobby the government not to increase tobacco tax. Finally, in 2014, the Hong Kong Government increased the tax by only 11.7%.

Therefore, the current study aimed to estimate illicit cigarette consumption in Hong Kong in 2012 and to validate the estimate published by OE. To do this, we used a comparable estimation framework, including consumption by Hong Kong residents and visitors, but our data came from more reliable and transparent sources.

METHODS

Estimation framework

Approach adopted by ITIC and OE

The report by ITIC and OE (OE Report) describes their estimation framework as:

Total cigarette consumption = legal domestic consumption
+ legal non-domestic consumption
+ illicit domestic consumption
+ illicit non-domestic consumption[9]

The OE Report used a bottom-up approach to estimate total cigarette consumption. The report estimated the legal domestic consumption from the legal domestic sales data from the Hong Kong CED minus the outflows of duty-paid cigarettes to other countries based on the 'empty pack surveys' (EPS) in other countries, legal non-domestic consumption from EPS plus 'OE estimates', and illicit non-domestic consumption based on EPS plus 'OE estimates' (Annexe A, Page 94).[9] The total consumption was then the sum total of the above three components and the EPS plus OE estimates (Annexe A, page 94).[9]

OE estimates for Hong Kong were mostly based on the EPS for which previous studies have raised serious concerns[7 10 14 15] and no details were disclosed anywhere as to how the survey had been carried out. There are many questions about this approach in the case of Hong Kong, the answers to which could greatly affect the results of the survey and interpretation of those data. For example: (1) How did they identify any empty pack that was duty-paid, smuggled or duty-free, since this information is usually not available on the pack in Hong Kong? (2) Could the sampled sites and timings yield a representative sample of all packs discarded in Hong Kong? (3) What was the final sample size with regard to the number of packs picked up from different bins and locations at different times? For example, how many packs were picked up on weekdays or weekends or holidays (such as 'Golden Week' holidays)? How replicable were the data? (4) How can we interpret these data in terms of consumers (local residents or visitors) who had smoked the cigarettes from the empty packs? The answers to these questions are the minimum information we would need to determine the validity and reliability of the survey methods used; and hence, the likely accuracy and representativeness of the results presented.

In our estimate, we used the same overall framework described above, but included only data from known sources and methods that are reproducible. We used a top-down approach where we first estimated the total cigarette consumption and then, legal domestic and non-domestic consumption. The difference between the total consumption and the legal domestic and non-domestic consumption were the illicit cigarette consumption. Our methods are described below.

Estimation of illicit cigarette consumption

Hong Kong, as an international metropolis, attracts tourists and business personnel from all over the world. In 2012, visitor-arrivals amounted to 48.6 million.[16] Using the same framework as in the OE Report, we summarised and labelled the different types and sources of cigarette consumption in Hong Kong (table 1).

We estimated illicit cigarette consumption by Hong Kong smokers and visiting smokers, using the following formulae:

$$\begin{aligned}&\text{Illicit consumption by Hong Kong smokers } (I_h)\\&= \text{annual cigarette consumptionby Hong Kong smokers } (A_h)\\&\quad - \text{annual legal consumption byHong Kong smokers } (B_h)\\&\quad - \text{annual legal personal importsby Hong Kong smokers } (C_h)\end{aligned} \tag{1}$$

$$\begin{aligned}&\text{Illicit consumption by visitors } (I_v)\\&= \text{total cigarette consumptionby smoking visitors } (A_v)\\&\quad - \text{total legal consumption by visiting smokers } (B_v)\\&\quad - \text{total legal personal imports by smoking visitors } (C_v)\end{aligned} \tag{2}$$

We calculated the total annual cigarette consumption (legal plus illicit) by summing the annual cigarette consumption by Hong Kong smokers (A_h) and by visiting smokers (A_v). The illicit consumption was estimated as this total minus the legal domestic consumption (B_h), legal personal imports (C_h), legal non-domestic consumption (B_v) and legal personal imports by visitors (C_v). The illicit consumption could be summarised thus:

$$I = I_h + I_v = (A_h + A_v) - (B_h + B_v) - (C_h + C_v). \tag{3}$$

Our data sources are detailed below.

Parameters and data sources

Annual cigarette consumption by Hong Kong smokers (A_h)

This was estimated from the Hong Kong Thematic Household Survey 2012 (THS No. 53).[13] THS is a population-based household survey conducted regularly by the Census and Statistics Department. THS No. 53 provided the smoking prevalence by age group and sex, and the average daily consumption of current smokers in each group in 2012. A_h was calculated by multiplying the average daily consumption of each smoker by age group and the number of smokers in each group, and then grossing up to a year (366 days in 2012). The estimated A_h was 3227 million sticks, which included legal and illicit

Table 1 Composition of cigarette consumption in Hong Kong, 2012

	Origins of smokers	
Type of consumption	**Local smokers**	**Visiting smokers**
Legal consumption	B_h	B_v
Legal personal imports	C_h	C_v
Illicit consumption	I_h	I_v
Total consumption	A_h	A_v

Table 2 Estimated number of smokers among visitors in Hong Kong, 2012

Country of residence	Number of overnight visitors[17]	Proportion of people aged 15+[23]	Smoking prevalence of those aged 15+	Number of visiting smokers
Mainland China	15 110 372			
Male (40.0%[24])	6 044 149	82.0%	52.9%[19]*	2 621 831
Female (60.0%[24])	9 066 223	82.0%	2.4%[19]*	178 423
Other places	8 659 823			
Male (44.0%[24])	3 810 322	73.6%	36.0%[18]†	1 009 583
Female (56.0%[24])	4 849 501	73.6%	8.0%[18]†	285 539
Total number of smokers among visitors				4 095 376

*Smoking prevalence in 2010.
†Prevalence of smoking any tobacco product among adults aged ≥15 years in 2009.

consumption. Consumption by occasional smokers (prevalence was 1% in 2012) was not counted in this calculation because the smoking intensity by occasional smokers had not been captured in THS No. 53 and their contribution to the estimated annual cigarette consumption was not likely to be significant.

Annual cigarette consumption by visiting smokers (A_v)

This was estimated from the product of the number of overnight visitors,[17] the smoking prevalence in the visitors' original countries,[18 19] the average length of stay in Hong Kong of overnight visitors[16] and the average daily consumption of visiting smokers.[20–22] Among the 48.6 million visitors in 2012, 23.7 million stayed overnight and the other 24.8 million were 1-day visitors.[17] The 1-day visitors were assumed to bring cigarettes within the duty-free allowance (19 sticks) for a day visit, given the fact that smokers usually carry cigarettes with them when they are going out. So consumption by 1-day visiting smokers was removed from this calculation. An estimated 4.1 million overnight visiting smokers arrived in Hong Kong in 2012 (table 2). We estimated A_v from these 4.1 million overnight visiting smokers under several scenarios, which have been described in Alternative Scenarios.

Annual legal consumption by Hong Kong smokers and visiting smokers (B_h+B_v)

This is equal to the annual legal domestic sales of cigarettes in Hong Kong estimated by dividing the total cigarette tax revenue by the tax rate per stick. In 2012, the tax revenue was HK$5024 million.[11] According to THS No. 53, 99.4% of current smokers consumed cigarettes and only 0.8% consumed other forms of tobacco.[13] We assumed that 99% (HK$4974 million) of the tobacco tax revenue was from cigarettes. Hong Kong had a single specific excise tax rate of HK$1706 for 1000 cigarettes (equivalent to HK$34 per pack of 20), so the annual legal domestic sales were 2925 million sticks (HK $4974 million×20 sticks/HK$34) in 2012. These legal duty-paid sales of cigarettes would be consumed by Hong Kong or visiting smokers (B_h+B_v).

Legal personal imports for Hong Kong smokers and visiting smokers (C_h+C_v)

These were estimated based on the number of incoming smokers to Hong Kong using data on the number of incoming passengers into Hong Kong and the smoking prevalence of Hong Kong residents aged 15 or above, and the number of incoming visitors, their countries of origin and smoking prevalence in their home countries for those aged 15 or above. Several assumptions were made regarding the total number of duty-free cigarettes brought by the incoming smokers and these are described below.

Alternative scenarios for estimating A_v and C_h+C_v

There is uncertainty around the average daily consumption of visiting smokers since passengers may temporarily change their smoking habits during a trip, and also around the amount of legal personal imports (duty-free consumption) by Hong Kong smokers and visiting smokers, since they may or may not bring cigarettes with them. Thus, three scenarios were examined to show how the different possible magnitudes of these parameters would influence illicit cigarette consumption estimates (I) (table 3).

Midpoint estimate

Among the overnight visitors, 15.1 million (63.6%) were from Mainland China and the rest were mainly from other Asian countries (22.1%), Europe (6.7%), the Americas (5.2%) and Australia (2.4%).[17] The average daily consumption reported by smokers in China was 17 sticks,[20] in the US 16 sticks,[21] in Australia 14 sticks and in the UK 12 sticks.[22] The mean (15 sticks) reported daily consumption was used in the calculation for this scenario, assuming that visitors would not change their smoking habits during a trip. During a typical 4-day visit (average length of stay of overnight visitors was 3.5 nights[16]) to Hong Kong, one visiting smoker would smoke 60 cigarettes.

The total cigarette consumption of smoking visitors (A_v) was estimated to be 245.7 million sticks (4.1 million visiting smokers×15 sticks per day×4 days). There were 133.9 million passengers who arrived in Hong Kong in 2012 including Hong

Table 3 Scenarios for the estimation of illicit cigarette consumption in Hong Kong

Scenarios	Average daily consumption by visiting smokers	Number of smokers (million) among Hong Kong passengers who bring duty-free cigarettes (%)	Number of visiting smokers (million) who bring duty-free cigarettes (%)
Upper bound	17	0 (0)	2.05 (50)
Midpoint bound	15	4.04 (50)	3.07 (75)
Lower bound	13	8.09 (100)	4.1 (100)

Kong passengers and visitors.[25] The total visitor arrivals was 48.6 million so there were 85.3 million (133.9–48.6) incoming Hong Kong passengers. Scaling by smoking prevalence (10.7% in those aged 15 or above) and the proportion of people aged 15 or above (88.6%[26]), there were 8.09 million Hong Kong smokers among the incoming passengers. In this scenario, 75% of visiting smokers and 50% of Hong Kong smokers, among the incoming passengers, were assumed to bring cigarettes with them when entering Hong Kong. Thus, the legal personal import (duty-free consumption) (C_h+C_v) was estimated to be 135.2 million sticks (50%×8.09 million incoming HK smokers×19 sticks per smoker+75%×4.1 million visiting smokers×19 sticks per smoker).

Upper bound estimate

The average daily consumption by Chinese smokers (which was the highest reported) was used in this scenario. A_v was estimated to be 278.5 million sticks (4.1 million visiting smokers×17 sticks per day×4 days). Conservatively, it was assumed that none of the smokers among the incoming Hong Kong passengers and 50% of all visiting smokers would bring duty-free cigarettes (19 sticks) when entering Hong Kong. Thus, in this scenario, C_h+C_v was 38.9 million sticks (4.1 million visiting smokers×50%×19 sticks per smoker).

Lower bound estimate

The average daily consumption by Hong Kong smokers (13 sticks[13]) was used in this scenario. Since Hong Kong has comprehensive smoking bans in almost all public places, it was assumed that visiting smokers during the trip in Hong Kong would reduce their daily consumption to the level of Hong Kong smokers. A_v was estimated to be 212.9 million sticks (4.1 million visiting smokers×13 sticks per day×4 days). It was assumed that all smokers among Hong Kong incoming passengers and all visiting smokers would bring cigarettes with them. C_h+C_v was estimated to be 231.5 million sticks (8.09 million incoming HK smokers×19+4.1 million visiting smokers×19).

Sensitivity analysis

The estimation of total cigarette consumption was based on self-reported smoking status and self-reported daily consumption by smokers. Some previous studies claimed that smokers may under-report their daily consumption.[27–29] We have no estimate of what this proportion might be in Hong Kong but we tested the impact on the results of under-reporting of consumption by 10%, 15% and 20%. It is also claimed that some smokers might not admit to smoking at all. However, Yeager and Krosnick carefully assessed the reasons for apparent differences between self-reported and biochemically-validated prevalence and concluded that there was little evidence of deliberate misreporting of smoking habits.[30] They were investigating face-to-face self-reports but commented that this result may apply also to other methods of data collection such as telephone surveys. Therefore, as a conservative approach, we have tested their maximum estimate of up to 0.94% of smokers denying that they smoked. We used a two-way sensitivity analysis, testing how levels of under-reporting of consumption, that is, 10%, 15% and 20%, and values of undeclared smoking prevalence, that is, 0.3%, 0.6% and 0.94%, would influence our estimates.

RESULTS

Illicit cigarette consumption was estimated to be 411.8 million sticks in 2012 in Hong Kong, ranging from 282.7 to 540.8 million sticks (table 4). The estimated illicit cigarette consumption as a percentage of total consumption ranged from 8.2% to 15.4% with a midpoint estimate of 11.9%. This implies that the tobacco-industry-funded OE Report estimate of 35.9% inflated the illicit cigarette consumption in 2012 in Hong Kong, relative to our estimate, by 133% to 377% (35.9/15.4-1, 35.9/8.2-1). Sensitivity analysis showed that only with 20% under-reporting of daily consumption and 0.94% undeclared smoking prevalence (for which we would have to underestimate consumption by 976.2 million cigarettes per year), could our estimate approach that from the industry-funded report.

DISCUSSION

Our study, using a framework comparable to the one used in a recent industry-funded report but based on data in the public domain from verifiable sources, showed that illicit consumption in 2012 in Hong Kong ranged from 8.2% to 15.4% with a midpoint estimate of 11.9%. The estimate in the OE Report (35.9%), funded by Philip Morris, inflated the illicit cigarette consumption estimate by 203% (range 133–337%). Only if there had been a significant under-reporting of daily cigarette consumption and undeclared smoking prevalence, could our estimate approach the values reported in the industry-funded study.

Research on the global illicit cigarette trade has estimated that illicit cigarettes account for 11.6% of the total market: 16.8% in low-income and 9.8% in high-income countries.[5] Our estimate for Hong Kong (midpoint 11.9%) is comparable to this global estimate. Our findings are consistent with a growing body of other overseas academic studies, which report that industry-funded studies tend to exaggerate illicit consumption. Such exaggeration has been found in tobacco industry backed reports on the West European,[6] East European[7] and African markets[8] and now Asian markets as well. A recent empirical analysis in Vietnam used two methods: the difference between legal sales and domestic tobacco consumption from surveys, and the trade difference between Vietnam and trade partners; both were based on publicly available data and showed that illicit consumption in Vietnam ranged from 0.7% to 6%.[31] This was much lower than the estimate for Vietnam (19.4%[9]) in the same OE Report that we have described in this paper. The similarly-generated estimates for the other markets covered in the OE Report may also be substantially inflated. Scientific studies for other markets are needed to refute the dubious industry-funded estimates.

The tobacco industry has also manipulated the historical data to create an impression that illicit trade has been increasing dramatically. Blecher *et al*[32] identified inconsistencies between estimates of illicit trade for the same years released in successive editions of the Euromonitor reports for countries such as South Africa, Mexico and Bulgaria. Rowell *et al*[15], after closely examining the media coverage of illicit trade in the UK, showed that the claim of the tobacco industry on the rapidly increased illicit trade in the UK was inconsistent with historical trends and the industry data on illicit trade were unreliable.

Apart from exaggerating levels of illicit trade and manipulating the historical data to lobby against tobacco tax increases, the tobacco industry has been complicit in smuggling all over the world, a practice that has been exposed and sometimes brought to trial.[33] For example, in July 2008, in Canada, two tobacco companies pleaded guilty and admitted to having aided people to sell or keep tobacco products manufactured in Canada, but not packaged or stamped in conformity with the Excise Act, between 1989 and 1994.[34] In Vietnam, even after British American Tobacco (BAT) signed a licensing agreement with Vinataba, the

Table 4 Estimated illicit cigarette consumption (million sticks) in Hong Kong, 2012

	Upper	Midpoint	Lower
Total cigarette consumption	3505.5	3472.7	3439.9
Total legal consumption (sales)	2925.7	2925.7	2925.7
Total legal duty-free consumption	38.9	135.2	231.5
Estimated number of illicit cigarettes	540.8	411.8	282.7
Estimated illicit cigarettes as % of total consumption (%)	15.4	11.9	8.2
Inflation by tobacco industry-funded report (%)	132.7	202.8	336.9
0% undeclared smoker			
Illicit consumption as % of total consumption (10% under-reporting, %)	22.6	19.4	16.1
Illicit consumption as % of total consumption (15% under-reporting, %)	25.7	22.6	19.5
Illicit consumption as % of total consumption (20% under-reporting, %)	28.6	25.7	22.7
0.3% undeclared smoker			
Illicit consumption as % of total consumption (0% under-reporting, %)	17.5	14.0	10.4
Illicit consumption as % of total consumption (10% under-reporting, %)	24.5	21.3	18.1
Illicit consumption as % of total consumption (15% under-reporting, %)	27.5	24.5	21.5
Illicit consumption as % of total consumption (20% under-reporting, %)	30.3	27.5	24.6
0.6% undeclared smoker			
Illicit consumption as % of total consumption (0% under-reporting, %)	19.5	16.0	12.4
Illicit consumption as % of total consumption (10% under-reporting, %)	26.3	23.2	20.0
Illicit consumption as % of total consumption (15% under-reporting, %)	29.3	26.3	23.3
Illicit consumption as % of total consumption (20% under-reporting, %)	32.0	29.2	26.3
0.94% undeclared smoker			
Illicit consumption as % of total consumption (0% under-reporting, %)	21.6	18.2	14.7
Illicit consumption as % of total consumption (10% under-reporting, %)	28.2	25.2	22.0
Illicit consumption as % of total consumption (15% under-reporting, %)	31.2	28.2	25.2
Illicit consumption as % of total consumption (20% under-reporting, %)	33.8	31.0	28.2

Upper: visiting smokers will smoke 17 cigarettes a day during a typical 4-day stay in Hong Kong. Fifty per cent of visiting smokers and none of smokers among Hong Kong passengers will bring as many duty-free cigarettes as allowed (19 sticks).
Midpoint: visiting smokers will smoke 15 cigarettes a day during a typical 4-day stay in Hong Kong. Seventy-five per cent of visiting smokers and 50% of smokers among Hong Kong passengers will bring as many duty-free cigarettes as allowed (19 sticks).
Lower: visiting smokers will smoke 13 cigarettes a day during a typical 4-day stay in Hong Kong. All visiting smokers and all smokers among Hong Kong passengers will bring as many duty-free cigarettes as allowed (19 sticks).

state tobacco monopoly, to produce and sell its State Express (SE) 555 cigarettes locally, BAT continued to supply traders smuggling UK made SE 555 into the country, apparently well aware of the illicit trade.[35]

The available evidence shows that illicit trade in the form of smuggling between jurisdictions with different levels of tobacco duty is linked, not primarily to the levels of tax but to the extent of corruption and criminality in individual jurisdictions.[36] The solution to this would be to deal firmly with the illegal activities, corruption and criminality associated with them, and to raise tobacco tax to provide more revenue for disciplined services to combat illicit trade.

Our estimate was validated using survey data in Hong Kong. In a recent population-based telephone survey in Hong Kong, among all randomly sampled current smokers (n=800) aged 15–65, 8.8% claimed that they had often bought cigarettes far cheaper than the regular prices in the past 6 months.[37] Of those who had bought the low-cost cigarettes, 28.5% believed that the cigarettes had been smuggled from other places. The survey did not record the number of illicit cigarettes consumed. The daily consumption of smokers who often bought low-cost cigarettes was 16.3 sticks as compared to 14.1 of the average daily consumption from the above survey. If the smokers who often bought low-cost cigarettes only smoked low-cost cigarettes and if all of the low-cost cigarettes had been smuggled, then the proportion of illicit consumption from this survey would be 10.2% (8.8%×16.3/14.1), which is within the range of our current estimates of 8.2–15.4%.

Our estimate was based on different assumptions but we always used the more conservative ones. We assumed the visiting smokers smoked the same amount of cigarettes as they did in their home countries (average daily consumption of 13, 15 and 17 in lower, midpoint and upper bound estimates, respectively). Hong Kong has a very comprehensive smoke-free law where almost all public places are smoke-free. Visitors during a trip may involuntarily reduce their cigarette consumption. One study in Thailand showed that the average daily consumption of a visiting smoker was 7.8.[38] If we applied this value, the illicit consumption as the percentage of total consumption would be 5.9–11.6%. We assumed at least 50% of visiting smokers would bring cigarettes with them when entering Hong Kong. Almost 70% of the visiting smokers were from Mainland China in 2012. Smokers from Mainland China predominantly smoke China-made cigarettes of Chinese brands, which are quite different from those smoked by Hong Kong smokers. There are over 200 domestic cigarette brands in the Chinese market.[39] It seems unlikely that most of these smokers would purchase cigarettes in Hong Kong, not only because prices are much more expensive[40] but primarily because Chinese smokers are not used to the taste of foreign brands of cigarettes such as Marlboro and Mild Seven, which are widely sold in Hong Kong.

There are smokers who do not admit their smoking status (undeclared smokers) and under-report their cigarette consumptions for whatever reasons. One study in the UK used an uplift factor correcting for this bias to estimate the illicit market for tobacco.[41] It calculated the uplift factor in a year in which the

illicit market was estimated by other sources and believed to be small by comparing total consumption based on self-reported data with total consumption based on actual clearance and estimate of legal cigarettes brought from abroad. We are unable to do the same because such data were not available, but overseas studies showed that self-reports of smoking were accurate with minimal response bias, especially in nationally representative surveys in adult populations.[30 42 43]

This study is subject to several limitations that should be addressed in future work. The study provides a point estimate of illicit cigarette consumption in 2012 with a plausible range but cannot demonstrate that tax increases will not increase illicit cigarette consumption. For this, along with longitudinal survey data that can validly and directly monitor the changes of illicit consumption over time, we also need multiple methods to cross-validate different estimates, which should be considered in future work. Different methods of assessment may provide different estimates of illicit consumption.[44] The method used in our estimate (difference between total consumption and legal consumption) was a gap method that was used in studies in South Africa,[8] Vietnam[31] and the UK.[41] We cannot be certain whether our report overestimates or underestimates the true magnitude of illicit consumption. However, we have cross-validated our estimates using a different method and an entirely different data source. We also sought to use conservative assumptions as explained above in order to avoid underestimation. Our study provides a replicable model for estimating illicit cigarette consumption using scientifically valid data sources along with transparent and testable assumptions.

All the industry effort is to lobby decision-makers not to increase tax, undermine the effects of tobacco control policies and to eventually significantly benefit from it. The industry-funded estimate of 35.9% of consumption in Hong Kong being illicit, for example, was repeatedly used by opponents to argue against a tobacco tax increase in 2014 and the HK Government, instead of increasing the tax 100% as advocated by tobacco control professionals, finally only increased it 11.7%. By the time this paper was under revision, the ITIC and OE had already held two press conferences in Hong Kong to report their estimates of illicit cigarettes, which drew substantial attention from the public. Given the need for reliable data in order to inform local policies and to counter false arguments against the essential public health need to raise tobacco taxes, territories such as Hong Kong and the neighbouring regions need regular monitoring and continuous data collection on illicit consumption. Hong Kong should also ensure active co-operation from all its neighbours to reduce illicit trade while maintaining and increasing tobacco tax.

What this paper adds

- This is the first study to directly validate an industry-funded estimate of illicit cigarette consumption, using a comparable estimation framework employed by the industry but with reliable and transparent data sources.
- This estimate is based on the tobacco usage of residents and visitors who are smokers, to include all possible sources of illicit trade.
- Compared with our estimate, the industry-funded estimate of illicit cigarette consumption for Hong Kong had been inflated by at least 133%.

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Did the tobacco industry inflate estimates of illicit cigarette consumption in Asia? An empirical analysis

Jing Chen, Sarah M McGhee, Joy Townsend, Tai Hing Lam and Anthony J Hedley

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Tobacco industry peddling overestimates of illicit cigarettes to dampen tax increase

Online Response

http://tobaccocontrol.bmj.com/content/early/2015/01/05/tobaccocontrol-2014-051937.full/reply#tobaccocontrol_el_13564

Online Response letter

Sophapan Ratanachena, Tobacco Tax Program Manager
Son Dao and Hana Ross
Southeast Asia Tobacco Control Alliance

NOT PEER REVIEWED

We refer to the article, "Did the tobacco industry inflate estimates of illicit cigarette consumption in Asia? An empirical analysis" Chen J, et al. published in Tobacco Control on November 25, 2014 (Tob Control 2015;0:1-7) and concur with the important points raised in this article. While the article focuses on Hong Kong, other countries in South East Asia also faced a similar experience. The authors revealed that the tobacco industry-funded study on the illicit trade of cigarettes in Asia, "Asia-11 Illicit Tobacco Indicator 2012" by the International Tax and Investment Center (ITIC) and Oxford Economics (OE) inflated the extent of illicit consumption in Hong Kong by 133-337 percent. Similarly, other scholars have also questioned the methodology applied in this report. For example, Dr. Frank Chaloupka, Distinguished Professor of Economics at the University of Illinois at Chicago, criticized the reliability of the study's estimates in using an inconsistent approach and the lack of details about the empty pack surveys, the main source of data for the estimates. In June 2014, the South East Asia Tobacco Control Alliance (SEATCA) released a critique of the "Asia-11 Illicit Tobacco Indicator 2012" showing how its estimates are being used to rescind tobacco tax policies. As illustrated in Hong Kong's experience, the SEATCA critique revealed that the ITIC-OE report overestimated the total illegal consumption in other countries in South East Asia. In the case of Vietnam, it claimed that in 2012 about 103.3 billion cigarettes consumed in Vietnam were illegal, which amounted to 19.4% of total cigarette consumption. The estimate was based primarily on the data of a tobacco industry group, the Vietnam Tobacco Association (VTA), and the full details of the methodology were not disclosed. The report admitted that data were collected only in urban areas, but it failed to mention that 68.3% of the Vietnamese population live in rural areas. This means that the findings are not representative of the Vietnamese population and are very likely biased since illicit cigarettes consumption is concentrated in big cities and near borders.

Unfortunately, as in Hong Kong, the glossy ITIC-OE study took its toll on tobacco tax policy in Vietnam. The Government of Vietnam considered the results of the study and opted for a less than ambitious tobacco tax rate increase. When the Ministry of Finance proposed a rather moderate tobacco tax roadmap in March 2014 (an increase from 65% to 75% in July 2015 and to 85% in January 2018), they noted that their decision was influenced by the illicit cigarette issue. The scope of illicit cigarettes consumption and the associated government revenue loss continued to be highlighted both in the press and during the policy debates until November 2014, when the National Assembly adopted an even weaker excise tax law: an increase to 70% in Jan 2016, and to 75% in 2019. Since these taxes are based on ex-factory price, and the tobacco industry is in full control of that price, the full impact on cigarette retail prices and tax revenue is likely to be minuscule. The average real retail cigarettes prices are expected to increase by less than 1% per year in the period from 2015 to 2020 (5.8% in 6 years), which, given

the 5-6% annually per capita real income grows, is insufficient to prevent cigarette consumption from rising. In summary, the Asia-Illicit Tobacco Indicator 2012 report was as non- transparent in Hong Kong as it was in Vietnam and nine other countries covered by the report. It was used to undermine a pro-health tobacco tax policy supported both by public health advocates as well as the general public. We thank Tobacco Control for publishing the findings of Hong Kong colleagues, which successfully challenged the invalid evidence and arguments supported by the tobacco industry. We hope that other countries in Asia and elsewhere will follow Hong Kong's initiative and expose the tobacco industry's tactic to undermine pro-health tobacco tax policies that signatories to the WHO FCTC are committed to under Article 6 of the Convention.

Thank you

Sincerely, Son Dao , Hana Ross and Sophapan Ratanachena

Conflict of Interest:

None declared

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