Asia Illicit Tobacco Indicator 2017: Methodological Overview

Prepared by Oxford Economics
September 2018

OXFORD ECONOMICS

Disclaimer

The Asia Illicit Tobacco Indicator 2017 (the "Report") on the illicit tobacco trade in selected Asian markets (including Australia and New Zealand) has been prepared by Oxford Economics (OE). OE enjoyed academic freedom and full editorial control of the Report. We are grateful for the inputs and data received from public sector and industry stakeholders.

OE prepared the Report in accordance with specific terms of reference agreed between Philip Morris International Management SA, an affiliate of Philip Morris International (PM), and OE. Financial support for the Report was provided by PM. OE assume all responsibility for the Report analysis, findings, and conclusion. The terms of reference under which OE were engaged by Philip Morris International Management SA are detailed at the end of this Report.

Contents

Methodology for estimating illicit trade 4–35
Methodology for estimating Tax Loss 36–42
Methodological comparison with other estimates 43–46
Glossary of terms 47–48
Report terms of reference 49–51

Methodology for estimating illicit trade

Methodology: Overview

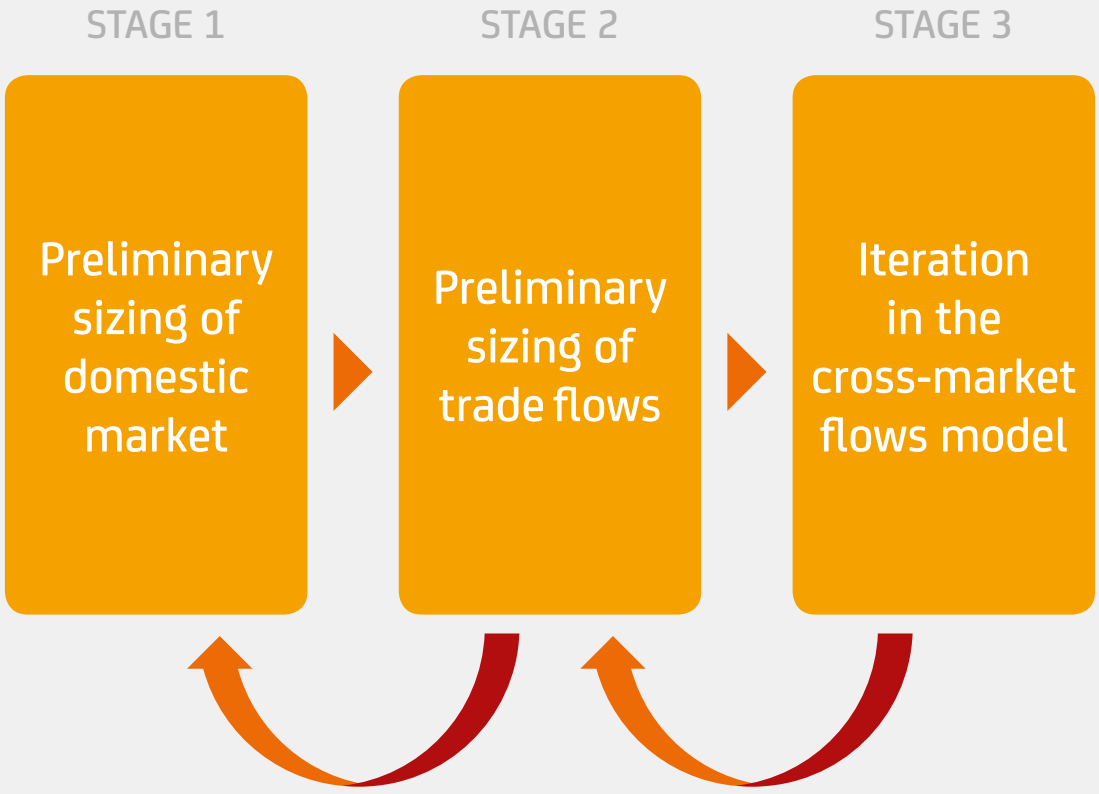
- **Oxford Economics have developed a methodology for quantifying Illicit Consumption of cigarettes and the associated Tax Loss in a selected group of Asian markets.**[1] Our approach combines multiple data sources and a custom-built analytical model of cigarette flows.

- Oxford Economics have developed an **Illicit Tobacco (IT) Flows Model** to estimate Illicit Consumption and trade flows between markets. Primarily based on market-specific Legal Domestic Sales and Empty Pack Survey source data, the IT Flows Model then "iterates" to ensure consistency between Inflows and Outflows both at the market and regional level, leading to a refinement of estimates of the volume of non-domestic flows by market.

- The methodology initially builds an estimate of Total Consumption of cigarettes from data on Legal Domestic Sales in each market. This incorporates estimates of Outflows of domestic duty-paid cigarettes, Inflows of Non-Domestic Legal cigarettes and estimates of Illicit Consumption **(Stage One)**.

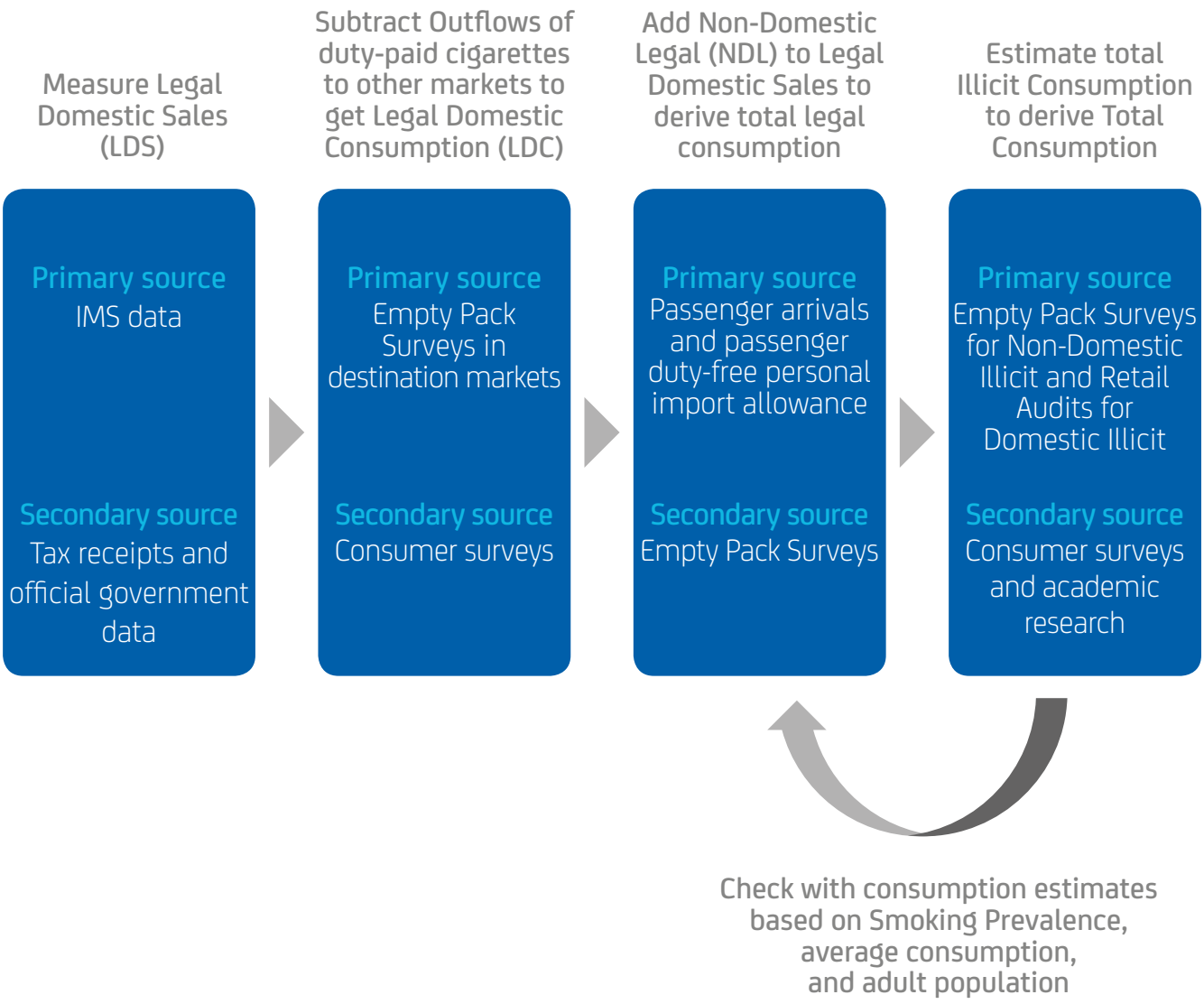
- It then maps trade flows for each market **(Stage Two)** and iterates with minor adjustments to ensure that there is consistency of estimates of different components of cigarette consumption in each market and consistency of modelled trade flows between markets **(Stage Three)**.

Three stages that underpin the IT Flows Model

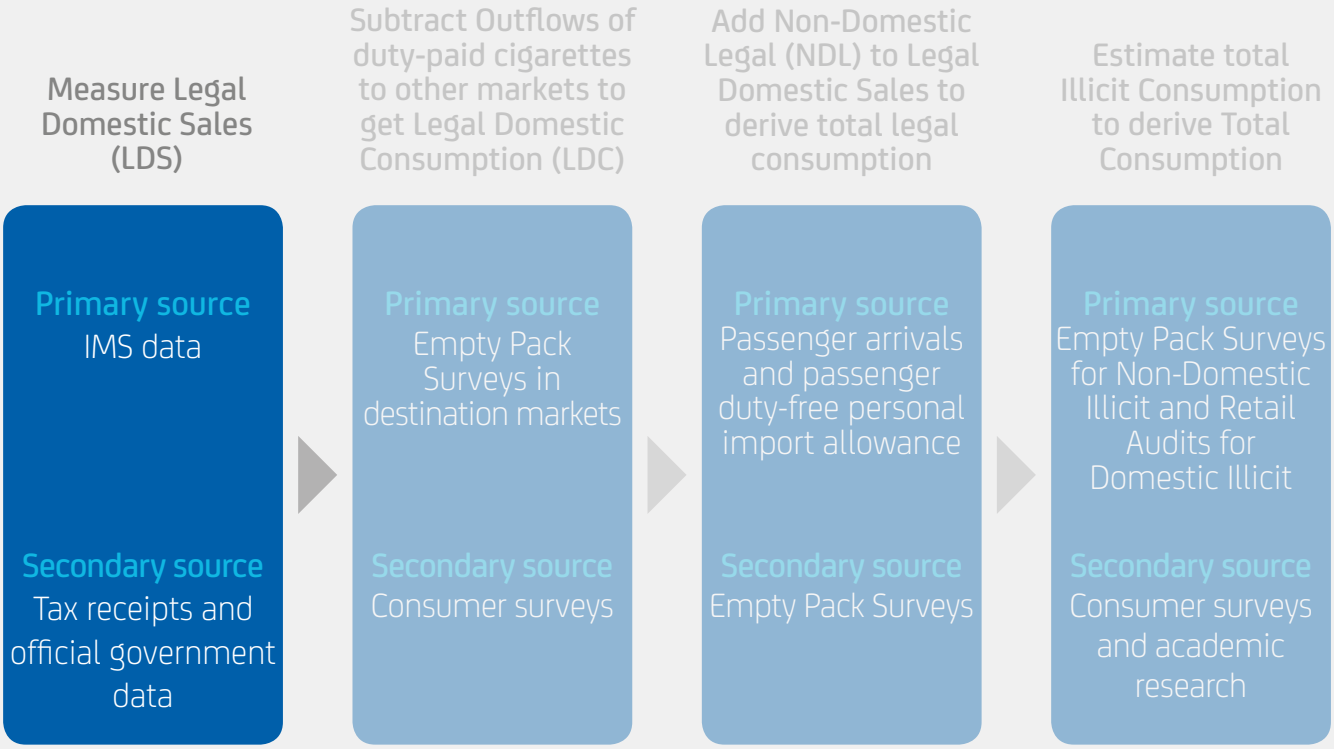


[1]The methodology has been developed to cover the market for manufactured cigarettes only, with the exception of Australia and New Zealand, which include estimates for the OTP market.

Methodology: Stage 1 – Preliminary sizing of domestic market



Methodology:
Stage 1 – Legal Domestic Sales

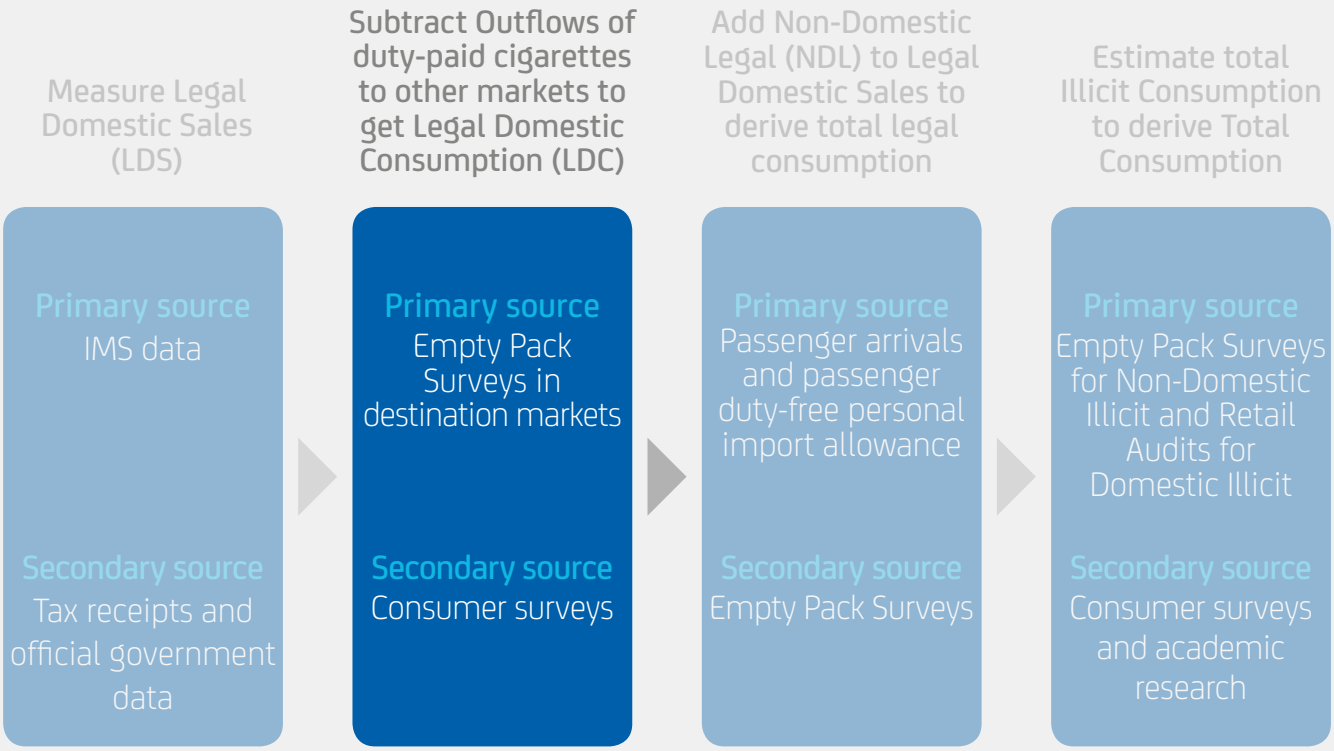


- **The starting point underpinning the modelling process is an estimate for Legal Domestic Sales for each market.**
- Estimates for each market were based on a variety of sources depending on the availability of data.
- For a number of markets, the government publishes official statistics on Legal Domestic Sales that are widely accepted by all relevant stakeholders and market participants. Where available, these estimates of Legal Domestic Sales have been incorporated within the modelling process.
- In the remaining markets where a widely accepted Legal Domestic Sales figure does not exist, estimates are composed using Legal Domestic Sales for PM (IMS) based on actual shipments (reflecting sales to the market as opposed to production volumes which may differ depending on inventory management) and estimates for non-PM brands based on industry exchange, retail audit data, or other in-market intelligence.

Methodology:
Stage 1 – Legal Domestic Sales

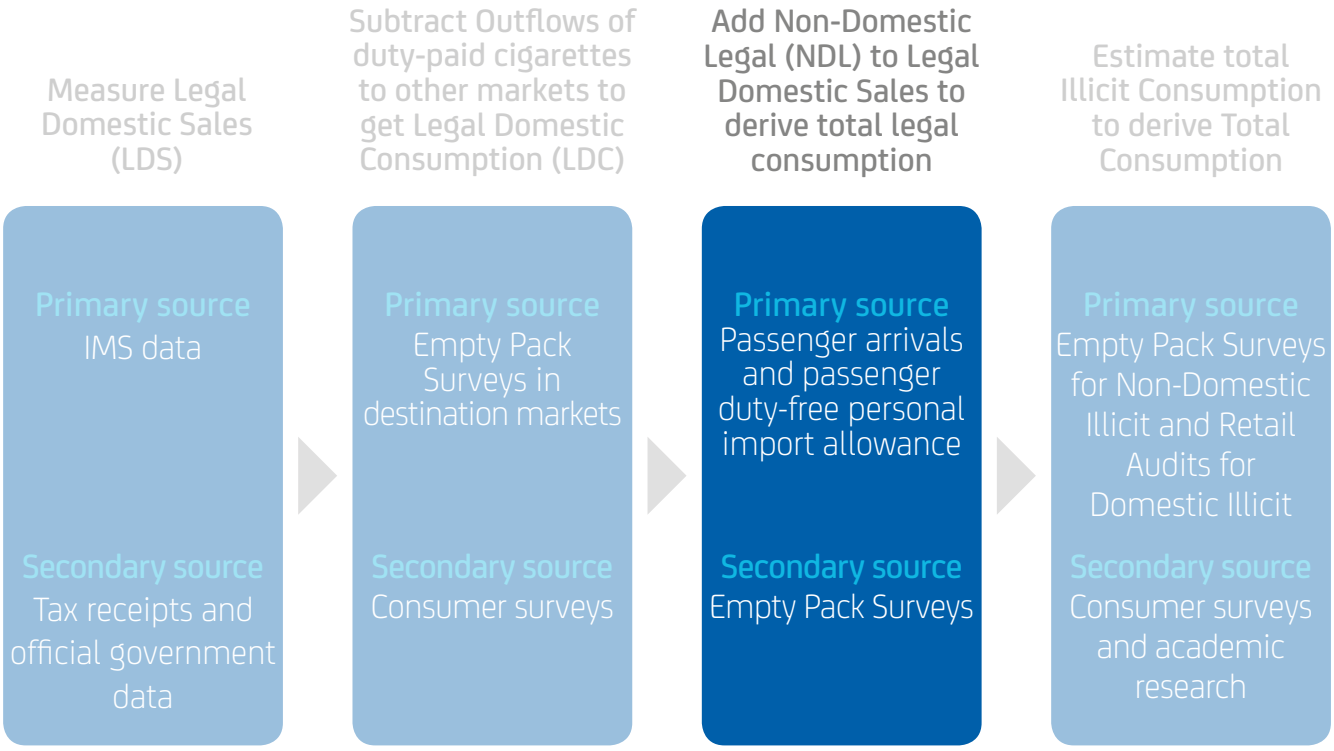
Market	Methodology for estimating LDS
Australia	Actual volumes of tobacco clearances recorded by the Australian Taxation Office and the Department of Home Affairs were used, adjusted to account for tobacco products destroyed following the introduction of plain packaging legislation in 2012 (sourced from the Australian Treasury Department).
Cambodia	Total industry volume based on PM and distributor estimates for 2016, grown forward using data on the retail volume of cigarettes from Euromonitor International Passport 2018.
Hong Kong	Sales of duty-paid tobacco, sourced from the Hong Kong Customs & Excise Department.
Indonesia	Actual shipments for PM brands and PM estimates for other manufacturers based on Nielsen Retail Audit, adjusted to reflect the proportion of Domestic Illicit Consumption that includes under-declaration, used, and Counterfeit Excise Tax stamps, sourced from Satriawan et al., Economics and Business Research and Development Agency (EBReDA), Universitas Gadjah Mada, Yogyakarta, Indonesia. Unpublished Report, 2018.
Laos	Total industry volume based on PM and distributor estimates for 2016, grown forward using data on the retail volume of cigarettes from Euromonitor International Passport 2018.
Macao	Actual shipments for PM brands and PM estimates for other manufacturers based on Nielsen Retail Audit.
Malaysia	Distributor-to-trade volume based on Confederation of Malaysian Tobacco Manufacturers (CMTM) for top 3 companies (PM, BAT, and JTI), and PM estimates on other manufacturers based on Nielsen Retail Audit.
Myanmar	Total industry volume based on PM estimates for 2016, grown forward using data on the retail volume of cigarettes from Euromonitor International Passport 2018.
New Zealand	Annual tobacco returns filed by manufacturers and importers with the New Zealand Ministry of Health.
Pakistan	Actual shipments for PM and BAT brands based on industry exchange (PM volume is based on tax-paid shipments and BAT volume is based on factory clearance).
Philippines	Industry volume based on Bureau of Internal Revenue Statement of manufactures' ex-factory withdrawals, adjusted for actual shipments for PM. While withdrawals reflect the volume of cigarettes manufactured and therefore duty-paid, shipments reflect actual volumes sent to distributors and retailers for retail, and is therefore is a better measure of sales.
Singapore	Sales of duty-paid tobacco, sourced from Singapore Customs.
South Korea	Total industry volume based on distributors sales to retailers, provided by Hankook Research.
Taiwan	Actual shipments for PM brands and PM estimates for other companies based on Nielsen Retail Audit.
Thailand	Actual shipments for PM brands and PM estimates for other manufacturers.
Vietnam	Total industry based on Vietnam Tobacco Association and key company breakdown based on PM estimates, adjusted to reflect loading production driven by the Excise Tax increase implemented in January 2016.

Methodology:
Stage 1 – Legal Domestic Consumption



- In order to estimate Legal Domestic Consumption, Legal Domestic Sales data is adjusted to account for Outflows of legal sales to other markets.
- Rather than capture "registered" exports, which will be classified within Legal Domestic Sales data in the destination market, this Report is attempting to capture "unregistered" exports i.e., cigarettes carried across boarders either legally, via the passenger duty-free personal import allowance, or illegally.
- **Outflows of duty-paid cigarettes are estimated based on identified Inflows by origin market in the other markets covered in this analysis.**
- This Report only considers Outflows to other markets and therefore it is recognised that the figures presented may underestimate total Outflows from each market. Furthermore, only packs that are identified as coming from a specific market through pack markings are attributed as a Market Variant. Cigarettes where the market of intended retail is unknown, such as packs produced for export with generic pack markings, or cigarettes of Unspecified Market Variant, are not considered as part of this analysis.
- In practice, a number of cigarette packs collected as part of the Empty Pack Surveys do not bear specific market labelling or Duty-Free labelling. They are considered as Non-Domestic of Unspecified Market Variant.
- For the reasons outlined above, **the estimated volume of Outflows of legal sales to other markets is likely to under-represent the true volume of Outflows**.

Methodology:
Stage 1 – Non-Domestic Legal



- **A non-domestic pack found in a given market is not necessarily an illicit pack.** For example, such a pack may be there legally as a result of purchases of Duty-Free products by travellers from airport Duty-Free shops or duty-paid products brought by tourists from their market of origin. In such cases, for a given market, an estimate needs to be made of the theoretical maximum volume of Inflows of legal Duty-Free and duty-paid cigarettes from other markets, and this can then be netted off from the estimated volumes of non-domestic cigarettes found.

- The approach used in this Report is to estimate the theoretical maximum volume of legal Duty-Free and duty-paid cigarettes from other markets using passenger data, Smoking Prevalence in tourists' market of origin, and the passenger duty-free personal import allowance limit. **Estimates are based on the total number of inbound visitors in 2017, disaggregated by origin market, as well as the total number of outbound resident departures** (assuming residents who embark on a trip return within the same calendar year). Data for tourist numbers were taken from official government statistics (subject to availability) or the Oxford Economics Tourism Model,[1] Smoking Prevalence data were sourced from the WHO or national statistics, and population data were taken from the UN.

- This approach yields an upper-bound estimate for Non-Domestic Legal Inflows of Duty-Free cigarettes from other markets. However, inbound visitors can bring into a market volumes of cigarettes in excess of the prescribed passenger duty-free personal import allowance, choosing to declare the excess with customs and pay the appropriate duty at the border. Such volumes are likely to be low, however due to a lack of available data, they are not covered in this analysis.

[1]The Oxford Economics Tourism Model is the only global econometric model of world travel and covers over 50,000 indicators of travel, demographics, and economics that are forecast 10 years into the future. In the instance where official statistics are not publically available for calendar year 2017, it was necessary to use the forecasts implied by the Oxford Economics Tourism Model.

Methodology:
Stage 1 – Non-Domestic Legal

- By calculating an estimate for Non-Domestic Legal Inflows of Duty-Free cigarettes from other markets, the methodology uses a conservative approach to estimating the volume of Non-Domestic Legal consumption that probably yields an upper bound estimate of the actual volume. In practice, not all passengers will take advantage of the passenger duty-free personal import allowance limit, while for some markets additional concessions may apply (e.g., for military personnel, or when exchanging gift items). In most markets, however, the volume of Non-Domestic Legal Inflows from other markets represents a relatively small proportion of Total Consumption and so these factors will have a minimal distortionary effect.
- In some special cases, all non-domestic packs are assumed to be illicit – for example in Singapore, where personal imports of cigarettes without payment of duty are not permitted. In this instance, while it is recognised that passengers may still bring in products and pay the appropriate duty at the border, these volumes are assumed to be negligible in the absence of available data to suggest otherwise.

The steps involved in estimating the volume of Non-Domestic Legal Inflows from other markets are as follows:

- **Step 1: Calculating adult tourist numbers** – data are collected for 2017 on total inbound foreign visitor arrivals (including overnight and same day visitors), disaggregated by the main origin markets with a residual "rest of the world" category defined as total foreign visitor arrivals minus the sum of foreign visitors from the main origin markets. Where available, some official government statistics data allow for a more granular analysis of inbound foreign visitor arrivals by origin market (in 12 markets, data was obtained for 30+ origin markets). In each market, the analysis incorporates the most detailed breakdown available in order to produce a robust estimate of the volume of Non-Domestic Legal Inflows from other markets. For the purpose of this Report, the number of adult tourists is estimated in each case by scaling the total number of tourists by the share of the population in each market which is aged 15 years or above, sourced from the UN. Implicit within this assumption, and in the absence of alternative and consistent data on the demographic composition of international tourists, is that the demographic composition of international tourists broadly reflects that of the origin market as a whole. Given that it can be reasonably assumed that both families with small children and the very old travel less often, by scaling the total number of tourists by origin market demographic characteristics, our calculations will likely under-estimate both the number of adult tourists and the Smoking Prevalence (Smoking Prevalence generally declines as people get older).
- As well as estimating Inflows from inbound foreign visitor arrivals, it is also necessary to include Duty-Free volumes arriving from outbound resident departures as they return home. For the purpose of this Report, data is sourced on the number of outbound resident departures, based on the implicit assumption that all tourists embark on a return trip within the period under analysis. Again, the number of adult tourists is estimated in each case by scaling the total number of tourists by the share of the population in each market which is aged 15 years or above, sourced from the UN.
- **Step 2: Scaling for Smoking Prevalence** – for each market providing adult tourists (both inbound and outbound), Smoking Prevalence data is collected and used to estimate the number of adult visitors who are smokers. This again assumes that the composition of visitors in terms of Smoking Prevalence is the same as in the wider population.
- **Step 3: Applying the passenger duty-free personal import allowance** – for each market (including those returning residents), the estimated number of adult smoking tourists is multiplied by the passenger duty-free personal import allowance limit (e.g., 200 cigarettes in South Korea) to estimate the volume of Non-Domestic Legal Inflows from other markets associated with each market providing tourists in 2017.
- **Step 4: Aggregation** – the individual market estimates from Step 3 above are aggregated into a total estimated volume of Non-Domestic Legal Inflows of cigarettes.

Methodology:
Stage 1 – Non-Domestic Legal

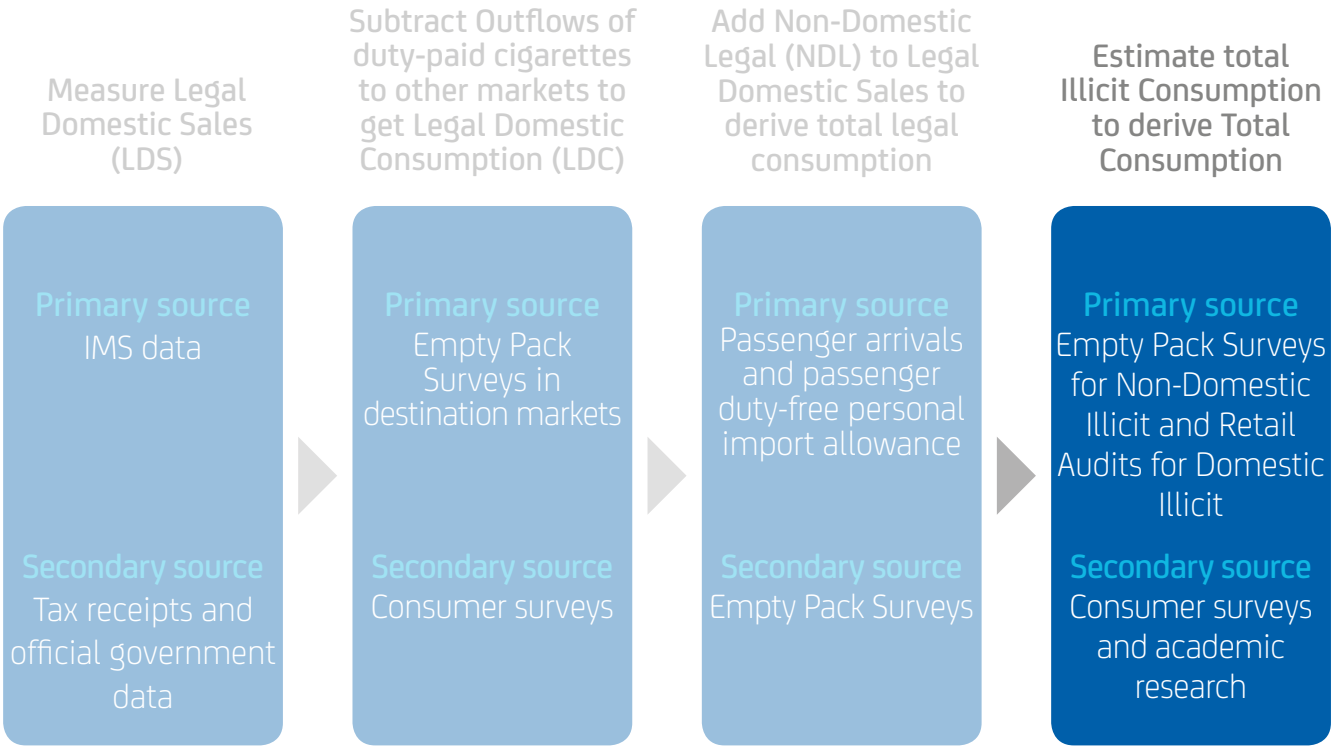
Market	Inbound visitor arrivals 2017 (mn)	Source	Outbound resident departures 2017 (mn)	Source	Duty-free personal import allowance (cigarettes)
Australia	8.8	Australian Bureau of Statistics	10.5	Australian Bureau of Statistics	Jan-June 50 July-Dec 25
Cambodia	5.6	Cambodia Ministry of Tourism	1.5	Cambodia Ministry of Tourism	400
Hong Kong	58.5	Immigration Department	91.3	Immigration Department	19
Indonesia	14.0	UNWTO and OE Tourism Model	9.0	UNWTO and OE Tourism Model	200
Laos	3.1	UNWTO and OE Tourism Model	2.0	UNWTO and OE Tourism Model	200
Macao	32.6	Macao Statistics and Census Service	1.4	Macao Statistics and Census Service	19
Malaysia[1]	N/A	N/A	N/A	N/A	200
Myanmar	1.5	Myanmar Statistical Information Service	0.8	UNWTO and OE Tourism Model	400
New Zealand	3.7	Statistics New Zealand	2.9	Statistics New Zealand	50
Pakistan	1.2	UNWTO and OE Tourism Model	2.3	UNWTO and OE Tourism Model	200
Philippines	6.6	Philippines Department of Tourism	5.4	UNWTO and OE Tourism Model	400
Singapore	N/A	N/A	N/A	N/A	0
South Korea	13.3	Korea Tourism Organisation	26.5	Korea Tourism Organisation	200
Taiwan	10.7	Tourism Bureau, MOTC Republic of China (Taiwan)	15.7	Tourism Bureau, MOTC Republic of China (Taiwan)	200
Thailand	35.4	Department of Tourism	7.8	UNWTO and OE Tourism Model	200
Vietnam	12.9	Vietnam Ministry of Culture, Sports & Tourism	2.7	UNWTO and OE Tourism Model	Jan-June 400 July-Dec 200

[1]The Empty Pack Survey in Malaysia identifies the genuine volume of cigarettes meant for the Malaysian duty-free market due to the presence of a "pink banderol" security mark.

Methodology:
Stage 1 – Non-Domestic Legal

Market	Adult Smoking Prevalence (% daily smokers, 15 years old and above, unless otherwise stated)	Source
Australia	12.2 (aged 14-100)	WHO FCTC 2018 (National Drug Strategy Household Survey, 2016)
Cambodia	16.5 (aged 15-99)	WHO FCTC 2018 (Report on National Adult Tobacco Survey of Cambodia, 2014)
Hong Kong	10.0	Census and Statistics Department, Thematic Household survey No. 64, 2017 (Party to WHO FCTC Convention but no reporting requirement)
Indonesia	31.9	WHO Report on the Global Tobacco Epidemic, 2017 (Not a signatory of WHO FCTC)
Laos	25.8	WHO FCTC 2018 (National Adult Tobacco Survey, 2015)
Macao	16.6	The Health Bureau Department of Chronic Disease Control and Health Promotion, 2016 (Party to WHO FCTC convention but no reporting requirement)
Malaysia	20.5 (aged 15-75)	WHO FCTC 2018 (National Health Morbidity Survey, 2015)
Myanmar	20.7 (aged 25-64)	WHO FCTC 2018 (WHO NCD STEPS Survey, 2014)
New Zealand	13.8 (aged 15-100)	WHO FCTC 2018 (Annual Update of Key Results 2016/17: New Zealand Health Survey, 2017)
Pakistan	11.5	WHO FCTC 2018 (Global Adult Tobacco Survey, 2014)
Philippines	18.7 (aged 15-100)	WHO FCTC 2016 (Global Adult Tobacco Survey Philippines, 2015)
Singapore	13.3 (aged 18-69)	WHO FCTC 2018 (National Health Surveillance Survey, 2013)
South Korea	19.3 (aged 19+)	WHO FCTC 2018 (Korea National Health & Nutrition Examination Survey, 2016, published by Ministry of Health and Welfare in 2017)
Taiwan	17.1 (aged 18+)	Taiwan Tobacco Control Annual Report, 2016, Health Promotion Board (Not a signatory of WHO FCTC)
Thailand	18.2 (aged 15-100)	WHO FCTC 2018 (The Smoking and Drinking Behaviour Survey, 2014)
Vietnam	19.2 (aged 15-100)	WHO FCTC 2018 (Global Adult Tobacco Survey, 2015)

Methodology:
Stage 1 – Illicit Consumption



- **The primary sources for estimating Illicit Consumption were Empty Pack Surveys.** Commissioned by the participating tobacco manufacturers, Empty Pack Surveys are conducted by independent research companies in each individual market (e.g., Ipsos, Nielsen, MS Intelligence, and Global Vox Populi).

- The approach involves the collection of a large sample of discarded cigarette packs from streets and public bins in randomly selected locations in each market. These cigarettes packs are then analysed by experts in order to identify if they are of domestic or non-domestic origin (based on the individual characteristics of each pack, e.g., the presence of tax stamps, graphic health warnings etc.).

- Empty Pack Surveys therefore provide an estimate of the non-domestic share in Total Consumption of cigarettes for each individual market. Volume estimates for non-domestic flows (legal and illicit) can be generated by applying the shares data to Legal Domestic Consumption. From this, an estimate of Non-Domestic Illicit Consumption can be derived by subtracting the volume of Non-Domestic Legal Inflows from other markets.

- In relying on the collection of physical evidence, Empty Pack Surveys are not vulnerable to potential consumer bias that often accompanies interview-based sampling methods (see the methodological review of other studies).

Methodology:
Stage 1 – Illicit Consumption

Survey design

- Participating manufacturers commission independent research companies to conduct Empty Pack Surveys.
- The participating manufacturer(s) and research agency will agree upon the sampling plan including the sample size and choice of population centres – for each market. The sampling plan will vary by market according to factors including the overall size and population density of the market, and the participating manufacturer(s) share of the legal market.
- Once agreed, the sampling plan will be executed by the research agency. The number of packs required for collection in each population center is designed to be proportional to its population size, in order to ensure the sample is statistically representative of the market.
- Collection dates are chosen to avoid public holidays or special events that may bias the results. The purpose of the research is not known by collectors prior to undertaking the field work.

Field work

- The chosen population centres are divided into five sectors (North, South, East, West, and Centre). The research agency will randomly select neighbourhoods in each sector to survey. Locations such as sports stadium, large cultural events, and train stations, which could be considered unrepresentative of the population, are excluded.
- The number of neighbourhoods selected in each population centre depends on the quota of empty packs required from that population centre. The same number of empty packs are collected in each neighbourhood, subject to a minimum of 30.
- In each neighbourhood, the research agency selects a starting point from which the collectors follow a fixed route to ensure all areas within a 250m radius are surveyed.
- Collectors are instructed to collect as many discarded cigarette packs from streets and public bins as possible, covering all manufacturers and all brands without bias. Homes and workplaces are not covered. Supervisors are present during the field work to ensure collectors follow the requirements as instructed.
- If collectors are unable to reach the quota in a particular neighbourhood, then the radius from the starting point is extended to 500m and collectors will revisit the neighbourhood as many times as necessary until the quota is fulfilled.

Pack analysis

- Empty packs are shipped to a central data entry location, where they are bagged, cleaned, and the details of each pack recorded. Data collected on each pack include the manufacturer and brand, as well as the intended market of final retail sale (i.e., domestic or non-domestic, including Duty Free variants). Individual pack characteristics are used to determine the intended market of final retail sale of each pack, e.g., the presence of tax stamps, graphic health warnings, or other market specific pack characteristics.
- Packs with no discernible markings allowing appropriate identification are labelled as Unspecified Market Variant.
- Product experts at the participating manufacturer(s) review their own packs in order to identify the presence of Counterfeit products, e.g., according to inks, paper, or other specific pack characteristics.
- The final results are provided in excel format to Oxford Economics for further analysis.

Methodology:
Stage 1 – Illicit Consumption

- In each market, Empty Pack Survey results are analysed to identify any outliers considered inconsistent with specific market intelligence or consumer behaviour, such as a larger presence of high-priced market variant cigarettes in a particular market. In such instances, the results are adjusted and the remainder of the survey is reweighted accordingly.
- For some markets, other sources were also used to estimate Illicit Consumption. This was necessary in cases where the Empty Pack Surveys were considered insufficiently representative or where they would be unlikely to fully capture a key element of Illicit Consumption such as Domestic Illicit or illicit loose tobacco volumes (RYO). In these markets, Empty Pack Survey estimates were combined with other estimates to produce a "hybrid" estimate of Illicit Consumption.
- Alternative sources used for estimates of Illicit Consumption included:
    - **Retail audits:** Pakistan and the Philippines (for estimation of Domestic Illicit).
    - **Academic research:** Indonesia (for estimation of Domestic Illicit).
    - **Other surveys:** Australia and New Zealand for the estimation of RYO loose tobacco consumption, and Taiwan where the topography (with 70% of the land-mass covered by mountainous terrain) makes it difficult to undertake an Empty Pack Survey that can be considered representative of the market.
    - **We also sought to corroborate our estimates of Illicit Consumption where possible** by reference to other estimates including "bottom up" estimates of consumption and other academic studies.
- Market variant cigarettes identified in the Empty Pack Surveys of other markets are used to estimate the Outflows of Legal Domestic Sales (see Stage 2).
- For some markets, there is insufficient data available to estimate the full scale of Illicit Consumption. In Thailand, the Report excludes the large RYO segment of the market (estimated at around 40% of Total Consumption).

Methodology:
Stage 1 – Empty Pack Surveys

Market	Date conducted	Research company	Sample size (packs)	Non-Domestic Incidence	Research methodology
Australia	2017 Q2, Q4	MSIntelligence Participating companies PM, BAT, and Imperial Tobacco	12,000 / 12,000	8.8% / 8.6%	16 largest cities were selected for both surveys covering 75.2% of the total population.
Cambodia	2017 Q2	Global Vox populi Participating company PM	1,801	6.8%	7 largest cities were selected covering 14.1% of the total population.
Hong Kong	2017 Q2, Q4	MSIntelligence Participating companies PM, BAT, JT, Nanyang Brothers, and Ever Fortune Tobacco for Q2 report and PM for Q4 report	5,000 / 5,000	35.8% / 35.9%	18 districts in 3 regions were selected for both surveys.
Indonesia	2017 Q4	MSIntelligence Participating company PM	10,000	0.4%	45 largest cities were selected covering 18.0% of the total population.
Laos	2017 Q2	Global vox populi Participating company PM	1,000	13.3%	4 largest cities were selected covering 13.0% of the total population.
Macao	2017 Q2, Q4	MSIntelligence Participating company PM	1,000 / 1,000	69.9% / 71.9%	20 areas in 6 districts were selected for both surveys.
Malaysia	2017 Q2, Q3, Q4	Nielsen on behalf of Royal Malaysian Customs	51,000 / 51,000 / 51,000	Average Illicit Incidence at 55.6%	14 states were selected for each survey covering 99.4% of the total population. Validation of security features carried out by Lembah Sari (government appointed sole vendor for security markings).

Methodology:
Stage 1 – Empty Pack Surveys

Market	Date conducted	Research company	Sample size (packs)	Non-Domestic Incidence	Research methodology
Myanmar	2017 Q4	Global Vox Populi Participating company PM	3,000	1.4%	10 largest cities were selected covering 15.3% of the total population.
New Zealand	2017 Q2, Q4	MSIntelligence Participating companies PM, BAT, and Imperial Tobacco	2,000 / 2,000	25.3% / 10.5%	5 largest cities were selected covering 56.4% of the total population.
Pakistan	2017 Q4	Foresight Research Participating company PM	15,973	11.0%	36 cities (urban) and 60 villages (rural) were selected for both surveys covering 97.6% of the population.
Philippines	2017 Q3	MSIntelligence Participating company PM	10,200	6.8%	57 cities in 55 provinces were selected covering 85% of the total population. Methodology was modified in 2017 to include single-cigarette sales by purchasing open cigarette packs on sale in randomly selected sari-sari stores, with market variant and pack sizes chosen according to loose quotas based on Nielsen Retail Audit.
Singapore	2017 H1, H2	TNS Participating companies PM, BAT, and JTI	14,103 / 14,239	15% / 12%	32 locations in 5 districts were selected for both surveys.
South Korea	2017 Q1	Global Vox Populi Participating company PM	2,000	3.8%	2 largest cities were selected covering 26.1% of the total population.
Thailand	2017 Q4	Nielsen Participating company PM	10,000	6.6%	36 largest cities were selected covering 64.3% of the total population.
Vietnam	2017 Q4	Global Vox Populi Participating company PM	10,000/ 10,000	31.6%	21 largest cities were selected for both surveys covering 16.3% of the total population. The EPS conducted in Vietnam probably over-estimates Non-Domestic Incidence as the coverage fails to capture the pattern of Inflows outside the major cities, which are likely to be much less sizable. For the purposes of this Report, and to provide a more complete representation of the market, we therefore scale down the Non-Domestic Incidence level from the EPS using supporting evidence provided by the Vietnam Tobacco Association.

Methodology:
Stage 1 – Consumer Surveys

Market	Date conducted	Research company	Sample size	Non-Domestic Incidence	Research methodology
New Zealand	2017 Q4	Colmar Brunton Participating companies BAT, Imperial Tobacco Limited, and PM	2,000 respondents	N/A	Colmar Brunton conduced 2,000 interviews with tobacco users aged 19 years and over. 664 interviews were conducted via computer assisted telephone and 1,336 via online interviews. Respondents were asked a range of questions covering awareness and usage of illicit tobacco. Final results were weighted to be representative of product usage (manufactured cigarettes and RYO), regional disparity, and age/ gender.
Taiwan	2017 Q2, Q4	TNS Participating companies BAT, Imperial Tobacco Limited, JTI, PM, and TTL	10,918 / 5,247 packs collected from a panel of 1,000 smokers	5.0% / 11.5%	Empty cigarette packs were collected from a smoker panel with each smoker asked to collect all the cigarette packs they smoked and finished over the subsequent 7 days. Samples were collected from 19 cities in 4 regions. Samples weighted based on the smoker area distribution from government data.

Methodology:
Stage 1 – Retail Audits

Market	Research company	Sample size (stores)	Research methodology
Philippines	Nielsen	5,969	Continuous, independent measurement of sales to consumers based on a statistically representative sample of retail outlets. Includes supermarkets, grocery/convenience stores, sari-sari stores, market stores, and bakeries. Outlets are visited on a monthly basis, with surveyors recording actual receipts of the last 30 days as well as inventory stocks. Sales volume is calculated as follows: Sales Volume = Beginning Inventory + Purchases – Ending Inventory
Pakistan	Nielsen	5,927	Continuous, independent measurement of sales to consumers based on a statistically representative sample of retail outlets. Includes supermarkets, general stores, kiryana stores, pan shops, corner shops/hawkers/kiosks and HORECA/eating places. Outlets are visited on a weekly basis, with surveyors recording the retailers purchases and inventory stocks. Sales volume is calculated as follows: Sales Volume = Beginning Inventory + Purchases – Ending Inventory

Methodology:
Empty Pack Survey Results

Australia City/Region	Number of Packs						ND Incidence (%)					
	2012	2013	2014	2015	2016	2017	2012	2013	2014	2015	2016	2017
Adelaide	800	1,600	1,600	1,600	1,600	1,600	2.1	9.9	6.3	8.6	7.4	8.6
Brisbane	1,200	2,400	2,400	2,400	2,400	2,400	1.3	13.2	9.6	6.4	6.6	8.4
Cairns	300	600	600	600	600	600	6.2	12.6	6.0	10.7	6.9	10.9
Canberra-Queanbeyan	300	600	600	600	600	600	0.8	5.5	3.6	4.7	6.8	9.6
Darwin	300	600	600	600	600	600	3.7	12.5	0.9	7.7	3.9	9.2
Geelong	300	600	600	600	600	600	2.7	2.2	4.4	7.8	4.4	9.5
Gold Coast-Tweed	400	800	800	800	800	800	1.4	9.1	5.4	10.2	6.5	10.6
Hobart	300	600	600	600	600	600	0.2	9.6	3.1	7.2	4.6	9.4
Melbourne	2,500	5,000	5,000	5,000	5,000	5,000	4.7	5.9	8.2	8.8	6.3	9.0
Newcastle	400	800	800	800	800	800	0.8	4.5	4.6	9.5	5.4	7.9
Perth	1,000	2,000	2,000	2,000	2,000	2,000	2.2	6.5	9.0	8.7	8.5	8.5
Sunshine Coast	300	600	600	600	600	600	0.5	5.7	5.5	5.8	7.7	8.5
Sydney	3,000	6,000	6,000	6,000	6,000	6,000	8.9	14.5	11.7	8.8	8.4	8.2
Toowoomba	300	600	600	600	600	600	0.5	2.9	2.3	8.9	5.9	9.2
Townsville	300	600	600	600	600	600	3.1	16.6	1.3	6.4	10.3	10.3
Wollongong	300	600	600	600	600	600	1.4	8.3	4.6	7.9	5.1	10.1
Total	**12,000**	**24,000**	**24,000**	**24,000**	**24,000**	**24,000**	**4.3**	**9.8**	**8.5**	**8.3**	**7.2**	**8.7**

Brunei City/Region	Number of Packs						ND Incidence (%)					
	2012[1]	2013	2014	2015	2016	2017	2012[1]	2013	2014	2015	2016	2017
Bandar Seri Begawan	2,289	1,400	-	1,400	-	-	90.6	99.0	-	100.0	-	-
Kuala Belait	731	300	-	300	-	-	88.8	99.7	-	100.0	-	-
Seria	516	100	-	100	-	-	85.7	99.0	-	100.0	-	-
Tutong	464	200	-	200	-	-	92.2	99.5	-	100.0	-	-
Total	**4,000**	**2,000**	**-**	**2,000**	**-**	**-**	**89.8**	**99.1**	**-**	**100.0**	**-**	**-**

Cambodia City/Region	Number of Packs						ND Incidence (%)					
	2012	2013	2014	2015	2016	2017	2012	2013	2014	2015	2016	2017
Battambang	-	-	200	135	200	198	-	-	4.2	3.7	3.8	1.5
Phnom Penh	-	-	1,000	1,195	1,000	1,005	-	-	5.4	6.6	1.4	8.1
Poi Pet	-	-	100	86	100	100	-	-	6.6	2.9	0.0	7.0
Preah Sihanouk	-	-	100	86	100	100	-	-	5.5	14.8	0.9	3.1
Siem Reap	-	-	200	162	200	201	-	-	8.1	20.7	16.4	8.5
Sisophon	-	-	100	59	100	99	-	-	2.6	3.8	0.0	10.0
Takhmao	-	-	100	77	100	98	-	-	3.0	5.0	0.0	1.0
Total	**-**	**-**	**1,800**	**1,800**	**1,800**	**1,801**	**-**	**-**	**5.4**	**7.7**	**3.0**	**6.8**

[1]The Empty Pack Survey was undertaken in 2011 Q3.

Methodology: Stage 1 – Empty Pack Survey Results

Hong Kong City/Region	Number of Packs						ND Incidence (%)					
	2012	2013	2014	2015	2016	2017	2012	2013	2014	2015	2016	2017
Hong Kong Island - Central & Western	400	400	400	400	400	400	33.7	37.8	32.3	33.7	35.3	37.3
Hong Kong Island - Eastern	800	800	800	800	800	800	41.4	42.2	40.0	41.4	35.4	33.2
Hong Kong Island - Southern	400	400	400	400	400	400	34.0	39.5	29.7	34.0	36.5	33.0
Hong Kong Island - Wan Chai	300	300	300	300	300	300	32.7	38.6	39.4	32.7	36.0	38.0
Islands	300	300	300	300	300	300	39.0	42.3	40.4	39.0	27.3	40.0
Kowloon City	500	500	500	500	500	500	36.6	38.0	34.6	36.6	33.6	34.2
Kwai Tsing	700	700	700	700	700	700	36.0	42.0	33.8	36.0	37.8	40.2
Kwun Tong	900	900	900	900	900	900	33.9	42.8	36.9	33.9	32.2	30.6
North	400	400	400	400	400	400	36.8	50.5	31.0	36.8	34.0	41.8
Sai Kung	600	600	600	600	600	600	36.4	42.9	34.2	36.4	30.3	29.3
Sha Tin	900	900	900	900	900	900	37.7	39.7	38.5	37.7	35.8	35.4
Sham Shui Po	500	500	500	500	500	500	34.3	38.2	38.8	34.3	36.8	43.0
Tai Po	400	400	400	400	400	400	37.4	38.8	41.3	37.4	35.8	39.3
Tsuen Wan	400	400	400	400	400	400	37.7	41.8	37.8	37.7	32.5	41.3
Tuen Mun	700	700	700	700	700	700	39.3	43.1	33.6	39.3	33.4	36.9
Wong Tai Sin	600	600	600	600	600	600	36.0	39.8	38.0	36.0	34.2	29.5
Yau Tsim Mong	400	400	400	400	400	400	44.2	46.0	30.4	44.2	39.8	38.8
Yuen Long	800	800	800	800	800	800	38.7	41.1	39.9	38.7	36.1	35.5
Total	**10,000**	**10,000**	**10,000**	**10,000**	**10,000**	**10,000**	**37.1**	**41.4**	**36.4**	**37.2**	**34.7**	**35.9**

Methodology: Stage 1 – Empty Pack Survey Results

Indonesia City/Region	Number of Packs						ND Incidence (%)					
	2012[1]	2013	2014	2015	2016	2017	2012[1]	2013	2014	2015	2016	2017
Balikpapan	0	111	111	100	100	100	0.0	0.0	0.0	0.0	0.0	0.0
Banda aceh	-	-	-	150	150	120	-	-	-	0.0	0.0	0.0
Bandar Lampung	300	133	133	200	200	-	0.0	0.0	0.0	0.0	0.0	-
Bandung	1,000	290	290	700	700	480	0.0	0.0	0.0	0.0	0.0	0.0
Banjar	-	-	-	50	50	-	-	-	-	0.0	1.0	-
Banjarbaru	-	-	-	100	100	-	-	-	-	0.0	0.0	-
Banjarmasin	150	130	130	150	150	270	0.0	0.0	0.0	1.0	0.0	0.7
Batam	200	139	139	250	250	200	7.7	22.2	9.4	12.3	0.0	3.0
Baubau	-	-	-	50	50	-	-	-	-	0.0	0.0	-
Bekasi	1,000	283	283	500	500	240	0.0	0.0	0.0	0.0	0.0	0.0
Bengkulu	-	-	-	100	100	150	-	-	-	0.0	0.0	0.0
Bogor	300	115	115	250	250	390	0.5	0.0	0.0	0.0	0.0	0.0
Bontang	-	-	-	50	50	-	-	-	-	0.0	2.4	-
Bukittinggi	-	-	-	-	-	120	-	-	-	-	-	0.8
Cilegon	-	-	-	100	100	-	-	-	-	0.0	0.0	-
Cimahi	150	-	-	-	-	-	0.0	-	-	-	-	-
Cirebon	-	-	-	-	-	270	-	-	-	-	-	0.4
Denpasar	150	95	95	200	200	180	0.0	0.0	0.0	0.0	0.0	1.1
Depok	500	211	211	400	400	150	0.0	0.0	0.0	0.0	0.0	0.0
Gorontalo	-	-	-	100	100	-	-	-	-	0.0	0.0	-
Gunungsitoli	-	-	-	50	50	-	-	-	-	0.0	0.0	-
Jakarta	2,500	1,164	1,164	900	900	480	0.1	0.0	0.0	0.1	0.0	0.0
Jambi	-	-	-	150	150	180	-	-	-	0.0	0.8	0.6
Kediri	-	-	-	-	-	270						0.4
Kendari	-	-	-	100	100	-	-	-	-	0.9	0.0	-
Kotamobagu	-	-	-	50	50	-	-	-	-	0.0	0.0	-
Lhokseumawe	-	-	-	-	-	100	-	-	-	-	-	1.0
Madiun	-	-	-	-	-	210	-	-	-	-	-	0.0
Magelang	-	-	-	50	50	120	-	-	-	0.0	0.0	0.0
Makassar (Ujungpandang)	500	282	282	300	300	210	0.0	0.0	0.0	0.0	0.3	-
Malang	300	99	99	200	200	270	0.0	0.0	0.0	0.0	0.0	0.4
Manado	-	-	-	100	100	150	-	-	-	0.0	0.0	0.0
Mataram	-	-	-	-	-	180	-	-	-	-	-	0.0
Medan	1,000	319	319	500	500	330	0.1	0.0	0.0	0.0	0.0	0.0
Metro	-	-	-	50	50	390	-	-	-	0.0	0.0	-
Mojokerto	-	-	-	50	50	210	-	-	-	0.0	0.0	0.0
Padang	300	121	121	200	200	210	0.0	0.0	0.0	1.5	0.0	2.4
Padang Sidempuan	-	-	-	-	-	120	-	-	-	-	-	0.0
Pagaralam	-	-	-	50	50	-	-	-	-	0.0	0.0	-
Palangkaraya	-	-	-	100	100	-	-	-	-	1.0	0.0	-
Palembang	500	219	219	400	400	300	0.0	0.6	0.0	0.0	0.3	0.3
Palopo	-	-	-	50	50	-	-	-	-	0.0	0.0	-
Palu	-	-	-	150	150	120	-	-	-	0.0	0.0	0.0
Pangkalpinang	-	-	-	100	100	-	-	-	-	0.0	0.0	-
Pare-pare	-	-	-	-	-	210	-	-	-	-	-	0.0
Pekanbaru	300	134	134	200	200	150	0.0	0.9	0.0	1.2	0.7	3.3
Pematang Siantar	-	-	-	-	-	240	-	-	-	-	-	0.0
Pontianak	150	117	117	150	150	210	0.0	0.0	0.0	0.0	0.0	0.0
Probolinggo	-	-	-	-	-	240	-	-	-	-	-	0.0
Salatiga	-	-	-	-	-	120	-	-	-	-	-	0.8
Samarinda	150	145	145	200	200	120	0.0	0.0	0.0	0.0	0.0	0.0
Sawahlunto	-	-	-	50	50	-	-	-	-	5.3	0.0	-
Semarang	500	184	184	400	400	240	0.0	0.0	0.5	0.2	0.0	0.0
Serang	-	-	-	-	-	210	-	-	-	-	-	0.0

Continues on next page

[1]The Empty Pack Survey was undertaken in 2011 Q4.

Methodology: Stage 1 – Empty Pack Survey Results

Indonesia City/Region	Number of Packs						ND Incidence (%)					
	2012[1]	2013	2014	2015	2016	2017	2012[1]	2013	2014	2015	2016	2017
Singkawang	-	-	-	50	50	-	-	-	-	0.0	0.0	-
Subulussalam	-	-	-	50	50	-	-	-	-	0.0	0.0	-
Sukabumi	-	-	-	-	-	240	-	-	-	-	-	0.0
Sungai penuh	-	-	-	50	50	-	-	-	-	0.0	0.0	-
Surabaya	1,000	335	335	700	700	240	0.1	0.0	0.2	0.0	0.0	0.0
Surakarta	150	-	-	-	-	150	0.0	-	-	-	-	3.3
Tangerang	500	218	218	500	500	390	0.0	0.0	0.0	0.0	0.0	0.0
Tangerang Selatan	0	156	156	300	300	-	0.0	0.0	0.0	0.0	0.0	-
Tanjungpinang	-	-	-	100	100	-	-	-	-	17.3	24.2	-
Tarakan	-	-	-	100	100	-	-	-	-	0.0	0.0	-
Tasikmalaya	-	-	-	-	-	210	-	-	-	-	-	0.0
Tegal	-	-	-	-	-	300	-	-	-	-	-	0.0
Yogyakarta	-	-	-	150	150	210	-	-	-	0.0	0.0	0.0
Total	**11,600**	**5,000**	**5,000**	**10,000**	**10,000**	**10,000**	**0.2**	**0.7**	**0.3**	**0.2**	**0.1**	**0.4**

[1]The Empty Pack Survey was undertaken in 2011 Q4.

Methodology: Stage 1 – Empty Pack Survey Results

Laos City/Region	Number of Packs						ND Incidence (%)					
	2012	2013	2014	2015	2016	2017	2012	2013	2014	2015	2016	2017
Luang Prabang (Louangphrabang)	-	-	100	100	100	150	-	-	11.0	23.0	12.0	18.0
Pakse	-	-	200	200	200	150	-	-	18.0	33.5	9.0	4.0
Savannakhet	-	-	200	200	200	200	-	-	27.5	24.0	10.0	9.0
Vientiane	-	-	500	500	500	500	-	-	16.4	24.6	20.0	14.4
Total	**-**	**-**	**1,000**	**1,000**	**1,000**	**1,000**	**-**	**-**	**18.4**	**26.3**	**14.9**	**13.3**

Macao City/Region	Number of Packs						ND Incidence (%)					
	2012	2013	2014	2015	2016	2017	2012	2013	2014	2015	2016	2017
AreiaPreta	-	-	50	100	100	100	-	-	46.0	43.0	65.0	72.0
Coloane	-	-	50	100	100	100	-	-	41.4	55.0	71.0	68.8
Conselho	-	-	50	100	100	100	-	-	56.0	43.0	55.0	71.0
Ctr Vilada	-	-	50	100	100	100	-	-	40.0	45.0	65.0	58.0
Dynasty	-	-	50	100	100	100	-	-	50.0	39.0	69.0	77.0
FaiChiKei	-	-	50	100	100	100	-	-	56.0	42.0	55.0	63.0
Hipodromo	-	-	50	100	100	100	-	-	58.0	39.0	67.7	71.0
Ilha Verde	-	-	50	100	100	100	-	-	56.0	47.0	62.0	74.0
NAPE E	-	-	50	100	100	100	-	-	52.0	59.0	69.4	73.0
NAPE W	-	-	50	100	100	100	-	-	62.0	52.0	61.0	81.0
NovoVilada	-	-	50	100	100	100	-	-	50.0	49.0	66.9	71.0
Pac On	-	-	50	100	100	100	-	-	44.0	53.0	65.0	66.0
Parque	-	-	50	100	100	100	-	-	46.0	42.0	62.0	67.0
Patane	-	-	50	100	100	100	-	-	54.0	48.0	64.0	74.0
Portas Cerco	-	-	50	100	100	100	-	-	45.5	44.0	55.0	69.0
Porto Exteri	-	-	50	100	100	100	-	-	42.0	42.0	62.0	77.0
Praia Mand	-	-	50	100	100	100	-	-	58.0	44.0	68.0	81.0
Sai Van	-	-	50	100	100	100	-	-	66.0	39.0	54.0	69.0
Tamag	-	-	50	100	100	100	-	-	48.0	45.0	68.0	67.0
ZonaDaSe	-	-	50	100	100	100	-	-	56.0	52.0	66.0	69.0
Total	**-**	**-**	**1,000**	**2,000**	**2,000**	**2,000**	**-**	**-**	**51.4**	**46.1**	**63.1**	**70.9**

Methodology: Stage 1 – Empty Pack Survey Results

Malaysia City/Region	Number of Packs						ND Incidence (%)					
	2012	2013	2014	2015	2016	2017	2012	2013	2014	2016	2016	2017
Johor	9,000	9,000	9,000	14,250	14,250	14,250	29.4	26.8	19.5	20.5	41.1	42.4
Kedah	9,000	9,000	9,000	9,000	9,000	9,000	25.4	29.6	14.9	25.1	38.7	50.1
Kelantan	9,000	9,000	9,000	9,000	9,000	9,000	30.8	40.3	29.5	28.9	52.1	73.4
Melaka	9,000	9,000	9,000	9,000	9,000	9,000	33.9	34.0	37.8	30.7	54.5	53.0
Negeri Sembilan	9,000	9,000	9,000	9,000	9,000	9,000	38.7	34.3	37.3	29.1	50.9	50.8
Pahang	9,000	9,000	9,000	9,000	9,000	9,000	27.5	30.8	41.0	44.5	66.3	72.4
Perak	9,000	9,000	9,000	9,000	9,000	9,000	28.4	33.6	28.9	26.5	37.6	52.6
Perlis	9,000	9,000	9,000	9,000	9,000	9,000	37.3	32.4	13.0	2.7	19.8	36.1
Penang	9,000	9,000	9,000	9,000	9,000	9,000	23.6	33.6	36.3	36.3	49.9	34.6
Sabah	12,000	12,000	12,000	12,000	12,000	12,000	81.5	76.2	74.0	79.6	80.0	69.3
Sarawak	12,000	12,000	12,000	12,000	12,000	12,000	62.9	63.5	64.6	75.5	77.4	76.2
Selangor	9,000	9,000	9,000	24,000	24,000	24,000	34.7	37.9	36.9	35.1	48.6	51.3
Terengganu	9,000	9,000	9,000	9,000	9,000	9,000	37.0	37.6	26.0	41.3	65.2	77.2
WP Kuala Lumpur	9,000	9,000	9,000	9,750	9,750	9,750	21.6	22.3	21.1	28.5	41.0	46.3
Total	**132,000**	**132,000**	**132,000**	**153,000**	**153,000**	**153,000**	**34.5**	**35.7**	**33.7**	**36.9**	**52.3**	**55.6**

Myanmar City/Region	Number of Packs						ND Incidence (%)					
	2012	2013	2014	2015	2016	2017	2012	2013	2014	2015	2016	2017
Bago	-	-	-	100	100	100	-	-	-	0.0	2.0	2.0
Lashio	-	-	-	100	100	100	-	-	-	4.0	2.0	0.0
Mandalay	-	-	-	500	500	500	-	-	-	5.3	5.0	3.8
Mawlamyaing	-	-	-	100	100	100	-	-	-	3.0	0.0	1.0
Monywa	-	-	-	100	100	100	-	-	-	0.0	0.0	0.0
Myitkyina	-	-	-	100	100	100	-	-	-	4.0	0.0	0.0
Naypyitaw	-	-	-	200	200	200	-	-	-	0.0	0.0	0.0
Pathein	-	-	-	100	100	100	-	-	-	0.0	1.0	9.0
Rangoon	-	600	600	1,500	1,500	1,500	-	23.7	3.7	2.1	0.7	0.8
Taunggyi	-	-	-	200	200	200	-	-	-	0.0	0.0	0.5
Total	**-**	**600**	**600**	**3,000**	**3,000**	**3,000**	**-**	**23.7**	**3.7**	**2.4**	**1.3**	**1.4**

New Zealand City/Region	Number of Packs						ND Incidence (%)					
	2012	2013	2014	2015	2016	2017	2012	2013	2014	2015	2016	2017
Auckland	-	-	1,064	2,128	1,064	2,128	-	-	23.8	9.0	13.6	19.6
Christchurch	-	-	318	636	318	702	-	-	0.0	8.2	11.0	16.3
Hamilton	-	-	163	326	163	636	-	-	0.0	6.2	13.8	12.5
Napier	-	-	104	208	104	326	-	-	0.0	7.6	14.3	16.4
Wellington	-	-	351	702	351	208	-	-	3.5	9.7	13.3	17.2
Total	**-**	**-**	**2,000**	**4,000**	**2,000**	**4,000**	**-**	**-**	**13.2**	**8.7**	**13.2**	**17.5**

Methodology: Stage 1 – Empty Pack Survey Results

Pakistan City/Region	Number of Packs						ND Incidence (%)					
	2012[1]	2013	2014	2015	2016	2017	2012[1]	2013	2014	2015	2016	2017
Bahāwalpur	700	-	-	-	-	-	1.8	-	-	-	-	-
Central Punjab	-	-	3,279	3,279	6,558	3,279	-	-	1.8	5.4	8.2	7.6
Faisalabad	1,900	-	-	-	-	-	1.5	-	-	-	-	-
Gujrānwāla	1,000	-	-	-	-	-	1.9	-	-	-	-	-
Hyderābād	1,400	-	-	-	-	-	5.1	-	-	-	-	-
Islāmābād	700	-	-	-	-	-	7.6	-	-	-	-	-
Jhang Maghiāna	700	-	-	-	-	-	0.5	-	-	-	-	-
Karāchi	4,400	-	-	-	-	-	5.2	-	-	-	-	-
Lahore	3,400	-	-	-	-	-	4.8	-	-	-	-	-
Mardan	800	-	-	-	-	-	6.4	-	-	-	-	-
Multān	1,400	-	-	-	-	-	1.9	-	-	-	-	-
North Punjab & KPK	-	-	4,198	4,198	8,396	4,198	-	-	3.6	4.3	9.5	6.2
Peshāwar	1,200	-	-	-	-	-	7.7	-	-	-	-	-
Quetta	900	-	-	-	-	-	8.3	-	-	-	-	-
Rāwalpindi	1,400	-	-	-	-	-	6.0	-	-	-	-	-
Sargodha	700	-	-	-	-	-	2.8	-	-	-	-	-
Siālkot	700	-	-	-	-	-	2.8	-	-	-	-	-
Sindh	-	-	4,496	4,496	8,992	4,496	-	-	6.6	10.4	16.4	14.3
South Punjab & Balochistan	-	-	4,000	4,000	8,000	4,000	-	-	5.8	9.2	16.3	16.8
Sukkur	700	-	-	-	-	-	2.0	-	-	-	-	-
Total	**22,000**	**-**	**15,973**	**15,973**	**31,946**	**15,973**	**3.7**	**-**	**4.2**	**7.2**	**12.4**	**11.0**

[1]The Empty Pack Survey was undertaken in 2011 Q4.

Methodology: Stage 1 – Empty Pack Survey Results

Philippines City/Region	Number of Packs						ND Incidence (%)					
	2012[1]	2013	2014	2015	2016	2017	2012[1]	2013	2014	2015	2016	2017
Alabel	-	-	-	-	100	100	-	-	-	-	6.3	8.0
Antipolo	245	400	200	400	300	300	0.4	2.8	1.0	3.2	2.4	3.0
Bacolod	193	300	150	300	300	300	0.5	1.1	0.7	0.0	11.0	8.3
Bacoor	0	300	150	300	-	-	0.0	2.3	0.0	2.4	-	-
Baguio	-	-	-	-	100	100	-	-	-	-	1.0	36.0
Balanga City	-	-	-	-	100	100	-	-	-	-	5.2	6.0
Batangas	-	-	-	-	300	300	-	-	-	-	2.0	3.7
Bayombong	-	-	-	-	100	100	-	-	-	-	15.0	8.0
Bayugan	-	-	-	-	100	100	-	-	-	-	2.1	5.0
Bislig	-	-	-	-	100	100	-	-	-	-	7.9	2.0
Borongan City	-	-	-	-	100	100	-	-	-	-	2.1	6.0
Butuan City	-	-	-	-	100	100	-	-	-	-	6.3	4.0
Cabanatuan City	-	-	-	-	200	200	-	-	-	-	10.8	13.5
Cagayan De Oro	214	400	200	400	200	200	0.0	1.6	0.5	1.0	11.0	8.0
Calamba	-	-	-	-	300	300	-	-	-	-	0.7	7.7
Calapan	-	-	-	-	100	100	-	-	-	-	5.2	3.0
Calcoocan (Kalookan)	533	800	400	800	-	-	0.0	0.6	0.7	1.0	-	-
Catarman	-	-	-	-	100	100	-	-	-	-	12.4	7.0
Catbalogan	-	-	-	-	100	100	-	-	-	-	6.1	14.0
Cebu	309	600	300	600	400	400	0.0	1.1	0.0	0.9	8.6	5.0
Daet	-	-	-	-	100	100	-	-	-	-	4.0	6.0
Dagupan City	-	-	-	-	300	300	-	-	-	-	11.3	14.0
Dasmarinas	-	-	-	-	350	350	-	-	-	-	3.5	4.3
Dasmariñas {Dasmarinas}	215	400	200	400	-	-	1.4	2.3	1.6	0.8	-	-
Davao	304	800	400	800	300	300	0.0	1.2	0.0	2.3	1.7	1.0
Dipolog	-	-	-	-	150	150	-	-	-	-	23.7	2.7
General Santos	-	-	-	-	200	200	-	-	-	-	6.5	12.5
General Santos (Dadiangas)	0	200	100	200	-	-	0.0	4.3	0.0	0.0	-	-
Iligan	-	-	-	-	150	150	-	-	-	-	12.0	20.0
Ipil	-	-	-	-	100	100	-	-	-	-	11.4	9.0
Isulan	-	-	-	-	100	100	-	-	-	-	8.0	2.0
Kalibo	-	-	-	-	100	100	-	-	-	-	4.0	6.0
Kidapawan	-	-	-	-	200	200	-	-	-	-	7.9	1.0
Laoag City	-	-	-	-	100	100	-	-	-	-	3.2	8.0
Las Piñas {Las Pinas}	206	300	150	300	-	-	0.0	2.6	1.8	2.1	-	-
Legazpi City	-	-	-	-	200	200	-	-	-	-	0.0	2.5
Lucena	-	-	-	-	200	200	-	-	-	-	3.5	7.5
Maasin	-	-	-	-	100	100	-	-	-	-	20.0	35.0
Makati	197	300	150	300	100	150	0.0	1.9	0.8	1.1	3.1	0.7
Malaybalay	-	-	-	-	200	200	-	-	-	-	3.5	3.0
Manila	642	1,000	500	1,000	500	450	0.6	1.3	1.1	2.1	0.8	1.8
Masbate City	-	-	-	-	100	100	-	-	-	-	0.0	8.0
Mati	-	-	-	-	100	100	-	-	-	-	39.4	1.0
Muntinlupa	0	300	150	300	-	-	0.0	4.1	1.4	0.7	-	-
Nabunturan	-	-	-	-	100	100	-	-	-	-	21.2	1.0
Naga	-	-	-	-	200	200	-	-	-	-	10.8	2.0
Olongapo City	-	-	-	-	100	100	-	-	-	-	2.0	6.0
Oroquitea	-	-	-	-	100	100	-	-	-	-	35.8	15.0
Parañaque {Paranaque}	213	400	200	400	-	-	0.5	2.9	1.6	2.8	-	-
Pasig	237	400	200	400	-	-	0.0	0.9	0.5	2.1	-	-
Quezon City	1,035	1,600	800	1,600	400	600	0.4	2.4	1.0	1.6	1.8	5.5
Roxas City	-	-	-	-	100	100	-	-	-	-	4.0	14.0
Sablayan	-	-	-	-	100	100	-	-	-	-	28.0	7.0
San Fernando -La Union	-	-	-	-	100	100	-	-	-	-	28.0	9.0
San Fernando -Pampanga	-	-	-	-	300	300	-	-	-	-	8.3	10.3
San Jose De Buenavista	-	-	-	-	100	100	-	-	-	-	3.0	5.0
San Jose Del Monte	0	300	150	300	350	350	0.0	1.6	0.7	1.0	0.9	11.4
Santiago City	-	-	-	-	200	200	-	-	-	-	8.5	12.0
Sorsogon	-	-	-	-	100	100	-	-	-	-	0.0	2.0
Surigao City	-	-	-	-	100	100	-	-	-	-	4.1	2.0
Taguig	237	400	200	400	-	-	0.4	2.5	3.2	0.8	-	-
Tagum City	-	-	-	-	200	200	-	-	-	-	4.9	1.5
Tarlac City	-	-	-	-	200	200	-	-	-	-	6.3	9.0
Tuguegarao City	-	-	-	-	200	200	-	-	-	-	9.6	5.5
Valenzuela	220	400	200	400	-	-	0.0	1.5	1.6	2.8	-	-
Vigan City	-	-	-	-	100	100	-	-	-	-	14.1	2.0
Zamboanga	0	400	200	400	200	200	0.0	2.3	3.4	10.0	37.1	8.5
Total	**5,000**	**10,000**	**5,000**	**10,000**	**10,000**	**10,200**	**0.4**	**1.9**	**1.0**	**1.9**	**7.0**	**6.8**

[1]The Empty Pack Survey was undertaken in 2011 Q4.

Methodology: Stage 1 – Empty Pack Survey Results

Singapore City/Region	Number of Packs						ND Incidence (%)					
	2012	2013	2014	2015	2016	2017	2012	2013	2014	2015	2016	2017
Central	3,825	3,603	11,212	9,610	9,839	9,618	30.4	21.2	16.6	14.8	13.6	15.0
East	1,159	1,233	3,578	2,827	8,147	3,965	22.8	16.8	10.7	14.9	12.0	11.8
North	1,607	1,505	4,721	3,957	3,948	2,927	23.8	21.4	16.5	14.6	13.3	13.8
North East	2,716	2,560	8,015	5,370	N/A	6,654	24.0	14.8	12.8	13.2	9.7	15.0
West	3,152	2,951	9,356	6,501	6,688	5,178	23.1	22.0	15.7	14.5	10.7	11.8
Total	**12,460**	**11,851**	**24,483**	**28,265**	**28,622**	**28,622**	**25.5**	**19.6**	**14.6**	**14.4**	**12.0**	**13.8**

South Korea City/Region	Number of Packs						ND Incidence (%)					
	2012	2013	2014	2015	2016	2017	2012	2013	2014	2015	2016	2017
Busan	-	-	500	401	-	796	-	-	0.4	3.8	-	5.8
Seoul	-	-	1,000	1,150	-	1,204	-	-	0.5	3.4	-	3.1
Daegu	-	-	-	287	-	-	-	-	-	2.4	-	-
Daejeon	-	-	-	176	-	-	-	-	-	2.3	-	-
Gwangju	-	-	-	173	-	-	-	-	-	4.6	-	-
Incheon	-	-	-	313	-	-	-	-	-	3.2	-	-
Total	**-**	**-**	**1,500**	**2,500**	**-**	**2,000**	**-**	**-**	**0.5**	**3.3**	**-**	**3.8**

Taiwan City/Region	Number of Samples[1]						ND Incidence (%)					
	2012	2013	2014	2015	2016	2017	2012	2013	2014	2015	2016	2017
Changhua County	137	165	151	144	145	172	20.4	15.0	7.4	20.4	10.2	5.2
Chiayi City	35	23	21	80	80	18	9.1	11.4	11.9	9.1	0.0	17.0
Chiayi County	75	54	62	80	80	12	11.9	9.6	10.7	11.9	4.5	2.2
Hsinchu City	28	26	25	80	80	10	4.9	4.2	1.9	4.9	4.2	0.0
Hsinchu County	45	56	54	80	80	18	5.8	18.1	5.3	5.8	5.0	14.4
Hualien County	50	24	23	80	80	4	5.5	0.5	0.7	5.5	2.1	29.2
Kaohsiung City	193	308	305	427	427	250	10.5	10.4	15.3	10.5	5.4	8.3
Keelung City	92	63	98	80	80	104	7.9	6.7	4.7	7.9	5.6	5.7
Miaoli County	69	17	54	80	80	48	10.9	25.8	5.0	10.9	4.3	14.3
Nantou County	99	41	34	80	80	66	10.2	16.9	5.8	10.2	3.5	7.5
New Taipei City	205	236	255	197	240	252	10.1	6.7	5.1	10.1	6.7	6.8
Pingtung County	83	94	115	80	107	148	4.8	11.5	12.5	4.8	9.4	4.9
Taichung City	188	198	215	189	152	158	9.8	11.8	5.6	9.8	8.9	11.5
Tainan City	176	198	168	211	202	338	8.4	10.2	16.5	8.4	9.9	9.8
Taipei City	92	118	80	114	91	56	10.4	15.4	11.8	10.4	6.8	5.5
Taitung County	78	68	20	80	80	48	23.4	8.8	9.3	23.4	7.0	3.7
Taoyuan County	198	188	229	174	217	218	9.1	5.7	3.4	9.1	6.0	6.8
Yilan County	45	68	68	80	80	24	4.4	4.9	3.3	4.4	7.2	19.6
Yunlin County	112	55	23	80	83	56	11.9	10.9	13.7	11.9	6.6	13.9
Total	**2,000**	**2,000**	**2,000**	**2,416**	**2,464**	**2,000**	**10.1**	**10.3**	**8.4**	**6.5**	**6.8**	**8.3**

[1]Consumer Panel Survey.

Methodology: Stage 1 – Empty Pack Survey Results

Thailand City/Region	Number of Packs						ND Incidence (%)					
	2012	2013	2014	2015	2016	2017	2012	2013	2014	2015	2016	2017
Buri Ram	-	-	289	-	-	-	-	-	3.5	-	-	-
Chanthaburi	120	100	-	120	100	60	28.0	12.0	-	5.0	0.0	15.0
Chiang Mai	200	200	952	200	420	200	0.0	0.0	0.1	2.0	1.4	0.0
Chiang Rai	-	-	448	-	180	180	-	-	0.9	-	0.0	0.0
Chon Buri	200	200	556	200	370	300	8.5	2.5	0.2	1.5	1.1	5.7
Hat Yai	200	200	-	200	-	-	18.9	29.4	-	42.6	-	-
Kalasin	-	-	330	-	-	-	-	-	0.9	-	-	-
Kanjanaburi	-	-	-	-	100	150	-	-	-	-	1.0	0.0
Khlong Luang	120	100	-	120	-	-	0.7	0.0	-	0.0	-	-
Khon Kaen	200	200	541	200	520	400	0.0	1.3	0.7	0.0	0.6	0.8
Krathum baen	120	100	-	120	-	-	1.7	0.0	-	3.3	-	-
Krung Therp (Bangkok)	4,960	5,200	1,259	4,960	1,500	1,500	3.5	3.5	1.4	1.1	1.1	1.4
Lampang	200	200	367	200	200	200	0.0	0.0	0.0	0.5	1.0	0.5
Lopburi	-	-	-	-	195	200	-	-	-	-	0.0	2.5
Mookdaharn	-	-	-	-	70	100	-	-	-	-	7.1	16.0
Nakhon Pathom	200	200	163	200	245	290	0.0	0.5	0.6	1.5	0.8	1.4
Nakhon Ratchasima	300	300	502	300	700	500	1.0	4.7	2.2	0.7	7.7	6.2
Nakhon Sawan	120	100	-	120	260	260	0.8	0.0	-	0.0	0.0	2.7
Nakhon Si Thammarat	200	200	194	200	370	360	2.0	2.5	3.6	1.5	2.7	26.9
Nakornpanom	-	-	-	-	100	260	-	-	-	-	1.0	0.8
Nongkhai	-	-	-	-	250	250	-	-	-	-	1.2	2.4
Nonthaburi	300	300	383	300	325	350	4.7	3.0	0.8	1.0	0.3	1.1
Pak kret	200	200	-	200	-	-	1.5	1.5	-	0.5	-	-
Pathum Thani	-	-	363	-	325	350	-	-	0.0	-	0.0	0.9
Pattaya	120	100	-	120	-	-	27.2	6.0	-	1.7	-	-
Pattalung	-	-	-	-	125	200	-	-	-	-	18.3	46.0
Phitsanulok	120	100	-	120	240	360	1.5	2.0	-	0.0	4.2	1.1
Phra Nakhon Si Ayutthaya	120	100	175	120	220	100	0.0	3.0	0.6	0.8	1.4	1.0
Phra Pradaeng	200	200	-	200	-	-	28.3	2.5	-	3.0	-	-
Phuket	-	-	262	-	135	90	-	-	1.1	-	0.0	1.1
Prajuabkirikhan	-	-	-	-	130	130	-	-	-	-	2.3	0.0
Ranong	-	-	-	-	60	100	-	-	-	-	16.7	15.0
Ratchaburi	120	100	152	120	205	220	0.8	1.0	0.7	3.3	1.0	0.0
Rayong	120	100	214	120	-	-	15.0	6.0	0.5	2.5	-	-
Roi Et	-	-	281	-	-	-	-	-	0.7	-	-	-
Sa Kaeo					100	200	-	-	-	-	4.0	5.5
Sakon Nakhon	-	-	243	-	-	-	-	-	1.2	-	-	-
Samut Prakan	300	400	520	300	450	400	4.3	1.5	2.2	3.3	1.6	1.7
Samut Sakhon	-	-	230	-	220	250	-	-	1.3	-	0.5	2.0
Si Racha	200	200	-	200	-	-	1.0	1.0	-	0.9	-	-
Satul	-	-	-	-	70	70	-	-	-	-	11.4	76.6
Songkhla	120	100	586	120	380	320	8.6	13.6	0.9	18.3	13.6	66.9
Supanburi	-	-	-	-	215	200					2.3	1.0
Surat Thani	200	200	302	200	260	260	0.0	0.5	0.0	0.0	1.2	0.8
Surin	-	-	-	-	170	300	-	-	-	-	6.5	5.0
Tak	-	-	-	-	100	200	-	-	-	-	5.0	0.5
Thanya Buri	200	200	-	200	-	-	3.0	2.5	-	0.0	-	-
Ubon Ratchathani	120	100	317	120	260	260	1.7	3.0	3.8	1.7	1.9	4.2
Udon Thani	300	300	371	300	430	430	1.0	4.7	0.0	0.3	0.5	0.0
Total	**9,880**	**10,000**	**10,000**	**9,880**	**10,000**	**10,000**	**4.3**	**3.6**	**1.0**	**2.1**	**2.9**	**6.6**

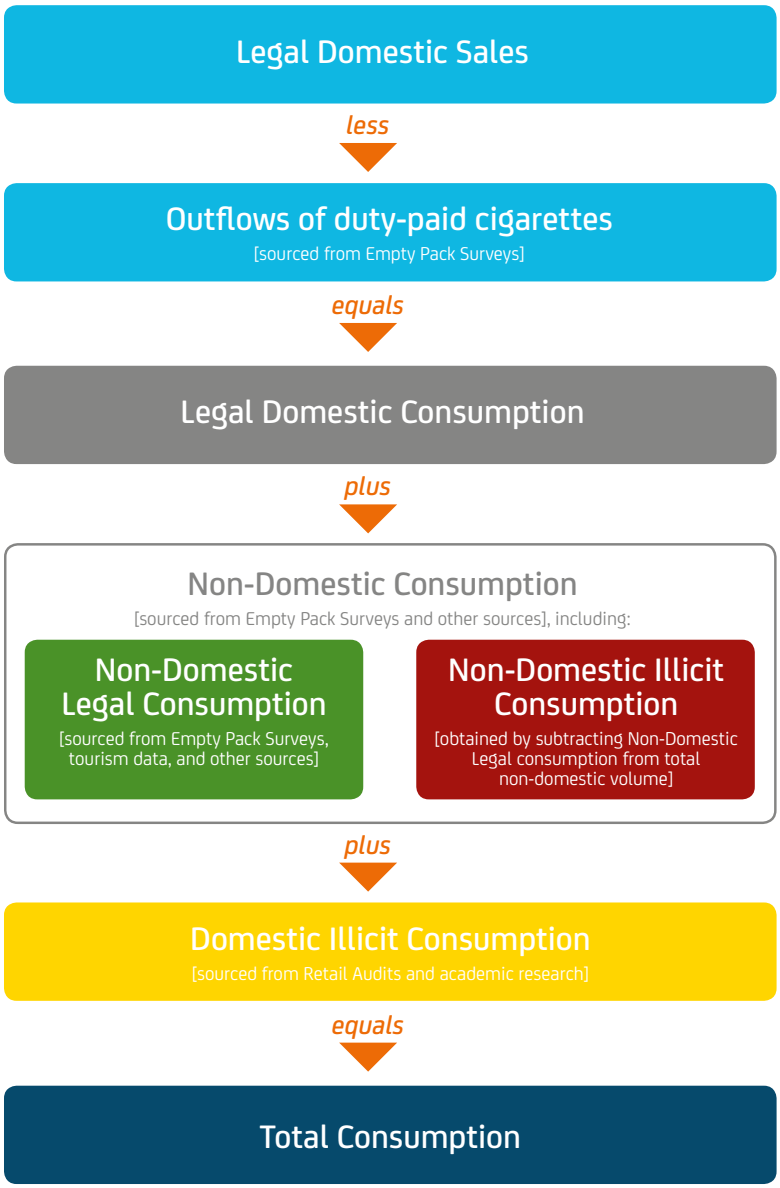
Methodology: Stage 1 – Empty Pack Survey Results

Vietnam[1] City/Region	Number of Samples						ND Incidence (%)					
	2012[2]	2013	2014	2015	2016	2017	2012[2]	2013	2014	2015	2016	2017
Bien Hoa	500	500	-	500	1,000	500	34.1	25.3	-	27.9	31.7	40.4
Buon Ma Thuot	200	200	-	200	400	200	31.9	29.2	-	23.7	44.2	48.0
Can Tho	500	500	-	500	1,400	700	75.5	67.3	-	67.7	41.4	44.0
Da Nang	500	500	-	500	1,400	700	9.0	4.7	-	4.8	6.5	7.0
Ha Long	200	200	-	200	400	200	7.0	3.0	-	11.0	25.3	11.5
Ha Noi	2,000	2,000	-	2,000	2,400	1,200	7.2	5.2	-	10.9	2.9	17.3
Hai Duong	-	-	-	-	400	200	-	-	-	-	11.0	54.5
Hai Phong	500	500	-	500	1,400	700	15.4	3.8	-	11.8	16.5	19.9
Hue	300	300	-	300	600	300	11.0	16.7	-	17.0	11.1	18.3
Long Xuyen	200	200	-	200	400	200	72.5	67.9	-	66.1	40.4	11.0
Nha Trang	300	300	-	300	600	300	8.2	12.3	-	16.1	36.1	N/A
Qui Nhon	200	200	-	200	400	200	16.9	11.4	-	9.0	14.3	1.5
Rach Gia	200	200	-	200	400	200	72.6	73.0	-	80.7	54.8	56.5
Sa Dec	-	-	-	-	300	150	-	-	-	-	58.8	42.0
Tan An	-	-	-	-	400	200	-	-	-	-	46.1	45.0
Tay Ninh	-	-	-	-	300	150	-	-	-	-	57.8	44.0
Thai Binh	-	-	-	-	400	200	-	-	-	-	3.0	13.5
Thanh Pho Ho Chi Minh	4,000	4,000	-	4,000	6,000	3,000	45.0	37.4	-	43.0	44.0	43.2
Viet Tri	-	-	-	-	400	200	-	-	-	-	13.5	39.5
Vinh	200	200	-	200	400	200	6.5	2.0	-	6.0	16.0	2.0
Vung Tau	200	200	-	200	600	300	28.6	65.2	-	29.5	37.7	33.6
Total	**10,000**	**10,000**	**-**	**10,000**	**20,000**	**10,000**	**32.3**	**27.2**	**-**	**31.5**	**29.9**	**31.6**

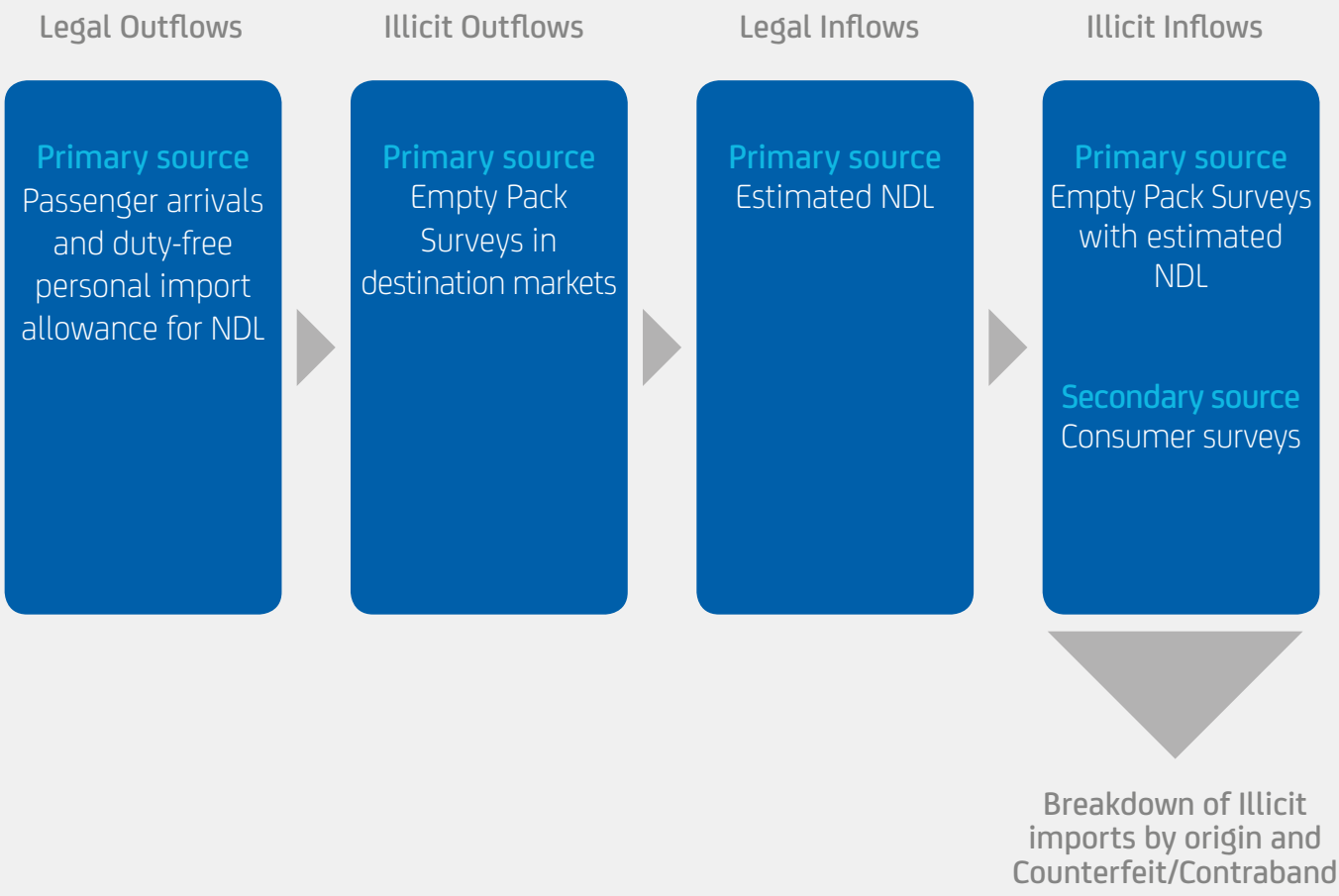
[1]The EPS conducted in Vietnam probably over-estimates Non-Domestic Incidence as the coverage fails to capture the pattern of Inflows outside the major cities, which are likely to be much less sizable. For the purposes of this Report, and to provide a more complete representation of the market, we therefore scale down the Non-Domestic Incidence level from the EPS using supporting evidence provided by the Vietnam Tobacco Association.
[2]The Empty Pack Survey was undertaken in 2011 Q4.

Methodology:
Stage 1 – Total Consumption

- In the IT Flows Model, Total Consumption estimates are built up as follows, starting with data on Legal Domestic Sales of cigarettes in each market, incorporating estimates of Outflows of domestic duty-paid cigarettes, Inflows of Non-Domestic Legal cigarettes and finally, estimates of Illicit Consumption (both Domestic Illicit and Non-Domestic Illicit).

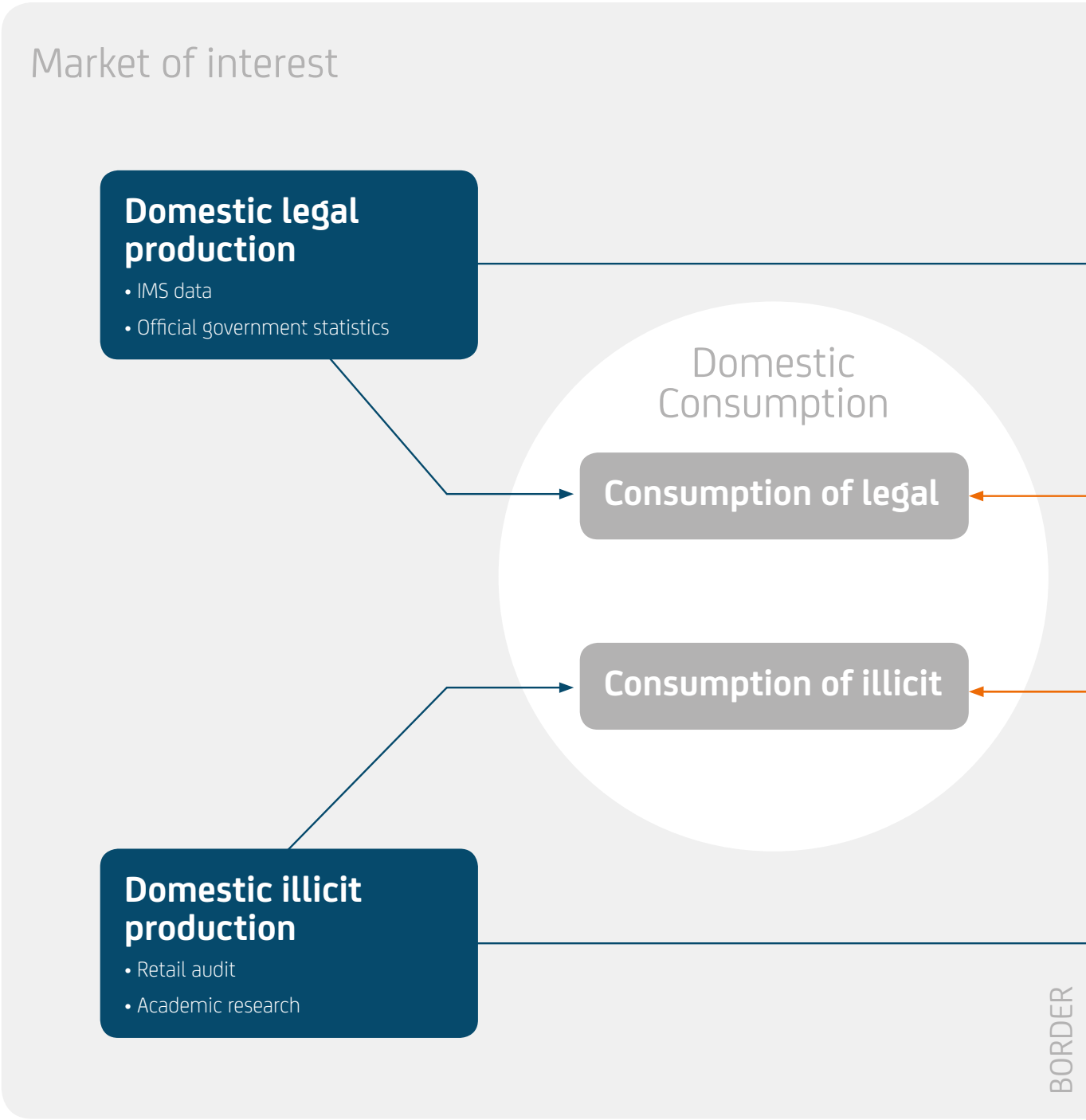


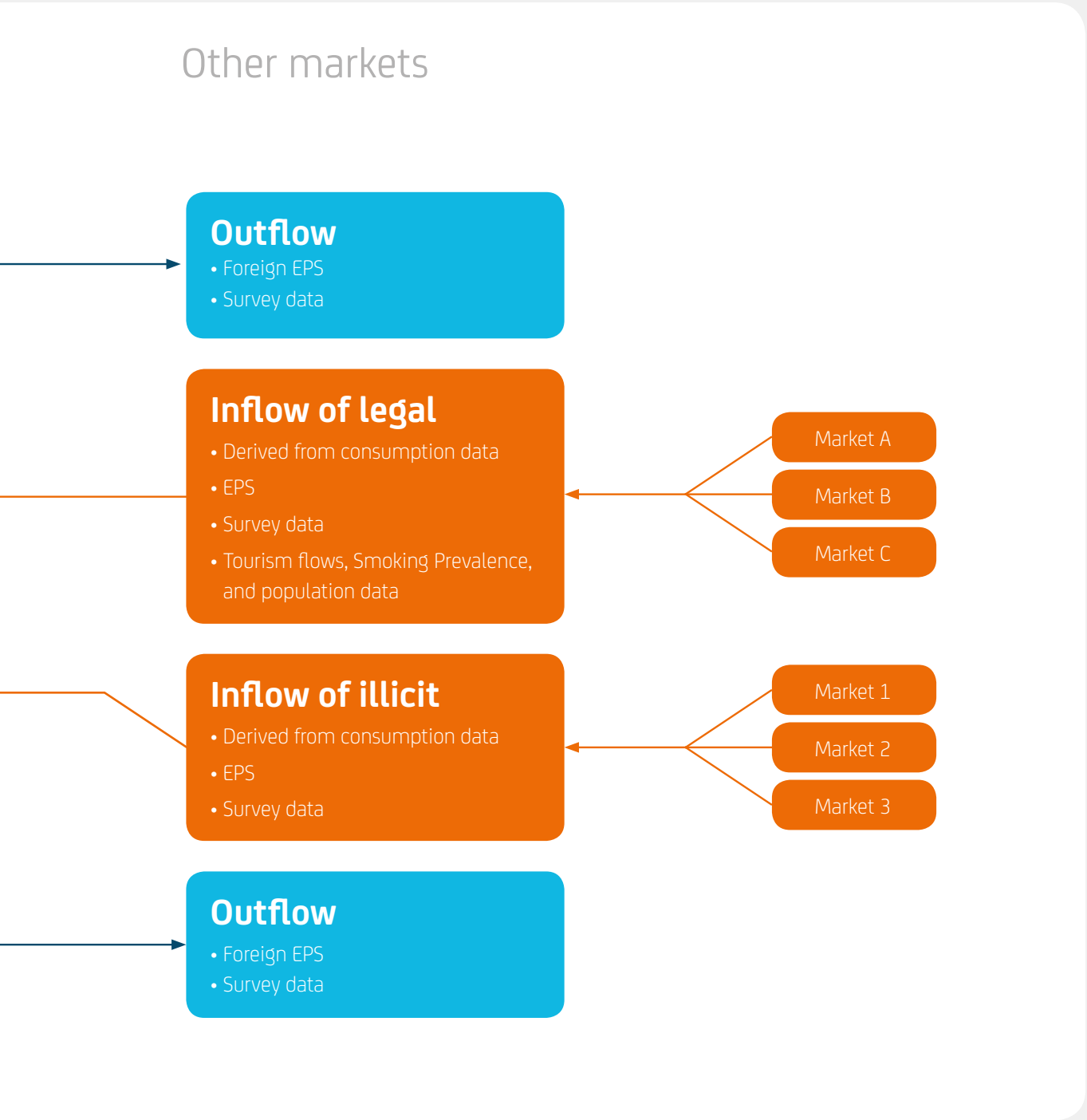
Methodology: Stage 2 – Preliminary sizing of trade flows



- Once initial estimates of Total Consumption by market are established, **Stage 2** of the modelling process involves the aggregation of legal Outflows and Inflows of cigarettes (exports and imports) as calculated in Stage 1 to check for discrepancies in cross-market trade flows.
- The final stage of the modelling process, **Stage 3**, involves minor adjustments to the estimates of legal and illicit Outflows and Inflows to ensure that bilateral trade flows balance between markets and the net impact at the regional level is consistent.

Methodology: Stage 3 – Iteration through IT Flows Model




Other markets
Outflow
• Foreign EPS
• Survey data
Inflow of legal
• Derived from consumption data
• EPS
• Survey data
• Tourism flows, Smoking Prevalence, and population data
Market A
Market B
Market C
Inflow of illicit
• Derived from consumption data
• EPS
• Survey data
Market 1
Market 2
Market 3
Outflow
• Foreign EPS
• Survey data

Methodology for estimating Tax Loss

Methodology: Estimating Tax Loss

- Illicit cigarettes are consumed as an alternative to legal duty-paid cigarettes. Independent of the IT Flows Model, estimating the value of Tax Loss due to the Illicit Consumption of cigarettes is key to the scope of this Report.
- By Tax Loss, this Report is specifically trying to capture the impact of Illicit Consumption on indirect taxes only i.e., Excise Tax, Earmarked Tax, and sales tax (GST/VAT, etc.). It is recognised that the erosion of legitimate business resulting from Illicit Consumption may lead to additional revenue losses through direct taxes, e.g., corporate tax and income tax. However, data limitations prevent a robust estimate of the impact on direct taxes and so we restrict the analysis to indirect taxes.
- The aim is to estimate the value of tax revenue that would have been generated for the government had the volume of Illicit Consumption been legally purchased in the domestic market, and therefore subject to the appropriate tax system in place. Given illicit cigarettes often retail at much lower prices than legal duty-paid cigarettes, it is recognised that if the illicit products were not available in the market, Total Consumption would likely fall as smokers would either reduce their consumption of cigarettes, or switch to low-value, lower tax alternatives. However, the purpose of this Report is to provide an ex-post analysis of actual consumption volumes (legal and illicit), which are therefore used as a base for estimating the value of Tax Loss due to Illicit Consumption of cigarettes.
- Different markets apply very different tax systems, depending on their own specific goals and requirements. Some systems are relatively complex. This is the case in Indonesia for example, which operates a multi-tiered specific tax system that varies depending on the cigarette type and production volume. By contrast, some markets operate very simple systems (e.g., Taiwan charges a single specific rate on all cigarettes regardless of production volume or retail price).
- The first step to estimating the Tax Loss resulting from Illicit Consumption is understanding the individual tax system in place in each market, including not only Excise Tax but also applicable VAT/GST or other sales taxes, as well as any additional Earmarked Taxes that may be chargeable.
- For markets with multi-tiered or ad valorem excise systems, a weighted-average tax rate (including Excise and Earmarked Taxes) was derived by multiplying each tier's relevant rate by its corresponding LDS volume, and then dividing the sum by the total LDS volume. The exception to this is in Cambodia and Laos, where the Excise and Earmarked Tax rates are based on the Most Sold Brand due to data limitations.
- For markets with VAT/GST or other sales-tax systems in place, the weighted-average rate is derived by applying the relevant % standard rate to the retail price of each brand and then multiplying the resulting unit rate by the brand's corresponding LDS volume. The sum of this is then divided by the total LDS volume for the market. Again, the exception to this is in Cambodia and Laos, where the VAT/GST rate is based on the Most Sold Brand due to data limitations.
- Above weighted-average tax rates were then multiplied by the estimated volume of Illicit Consumption from the IT Flows Model to derive the total Tax Loss. Implicit within this calculation is the assumption that the distribution of Illicit Consumption by market segment is similar to that of LDS.
- The methodology employed to estimate the value of Tax Loss associated with Illicit Consumption of cigarettes is the same as that used in the previous Asia Illicit Tobacco Indicator Reports, but represents a small deviation from that used in the "Asia-11 Illicit Tobacco Indicator 2013" Report, which was based on the rate of tax (Excise Tax, VAT/GST or other sales taxes, and Earmarked Taxes) applied to the Most Sold Brand in each market.
- The assumptions behind the Tax Loss estimates are outlined in the following pages. Figures are presented on a calendar year basis, with the exception of Australia (July-June), Hong Kong (April-March), Myanmar (April-March), New Zealand (July-June), Pakistan (July-June), Singapore (April-March), and Thailand (October-September), which are based on fiscal year.

Methodology: Estimating Excise Tax Loss

Market	Excise Tax structure 2017	Basis for Excise Tax rate assumption 2017	Excise Tax rate assumption (LCU per 1,000 cigarettes or kg of tobacco)					
			2017	2016	2015	2014	2013	2012
Australia	Single-tier specific with biannual index-linked tax increase (de facto)	Weighted average tax rate for cigarettes and OTP	597.6 (cigarettes) and 748.6 (OTP)	522.8 (cigarettes) and 654.1 (OTP)	453.0 (cigarettes) and 568.4 (OTP)	384.6 (cigarettes) and 480.8 (OTP)	351.0 (cigarettes) and 438.8 (OTP)	345.0 (cigarettes) and 431.1 (OTP)
Brunei	Single-tier specific	Universal tax rate	N/A	N/A	250	250	250	250
Cambodia	Single-tier ad valorem rate of 20% of the ex-factory selling price, defined as 90% of the retail price before VAT and any discount	Tax rate applied to the Most Sold Brand	10,717	8,423	5,824	4,880	3,841	N/A
Hong Kong	Single-tier specific	Universal tax rate	1,906	1,906	1,906	1,906	1,706	1,706
Indonesia	Multi-tier specific based on cigarette type, production volume and retail price (12 tiers)	Weighted average tax rate	505,000	417,700	392,000	354,000	312,760	289,100
Laos	Single-tier ad valorem rate of 60% of the ex-factory price sanctioned by law, although lower in practice	Tax rate applied to the Most Sold Brand	31,915	31,915	14,998	14,998	14,998	N/A
Macao	Single-tier specific	Universal tax rate	1,500	1,500	891.7	500.0	N/A	N/A
Malaysia	Single-tier specific	Universal tax rate	400.0	400.0	302.2	266.0	237.0	228.6

Methodology: Estimating Excise Tax Loss

Market	Excise Tax structure 2017	Basis for Excise Tax rate assumption 2017	Excise Tax rate assumption (LCU per 1,000 cigarettes or kg of tobacco)					
			2017	2016	2015	2014	2013	2012
Myanmar	Multi-tier specific structure based on the pack price	Weighted average tax rate	11,990	10,794	6,700	4,800	4,500	N/A
New Zealand	Single-tier specific with biannual index-linked tax increase (de facto)	Weighted average tax rate for cigarettes and OTP	778.8 (cigarettes) and 1,107.9 (OTP)	699.5 (cigarettes) and 996.1 (OTP)	633.5 (cigarettes) and 902.3 (OTP)	N/A	N/A	N/A
Pakistan	Two-tier specific	Weighted average tax rate	1,155	1,862	1,641	1,303	1,071	917
Philippines	Single-tier specific	Universal tax rate	1,500	1,336	1,160	963	600 (Domestic) and 1,250 (Non-Domestic)	280
Singapore	Single-tier specific	Universal tax rate	388	388	388	388	352	352
South Korea	Single-tier specific	Universal tax rate	50,350	50,350	50,350	32,050	N/A	N/A
Taiwan	Single-tier specific	Universal tax rate	736	590	590	590	590	590
Thailand	Both ad-valorem and specific rates are calculated and the greater of the two rates apply	Weighted average tax rate	2,118	1,913	1,622	1,533	1,567	1,720
Vietnam	Single-tier ad valorem rate of 70% of the net ex-factory price	Weighted average tax rate	171,664	171,500	153,669	160,109	151,821	138,695

Methodology: Estimating Sales Tax Loss

Market	Sales tax structure 2017	Basis for sales tax rate assumption 2017	Sales tax rate assumption (LCU per 1,000 cigarettes or kg of tobacco)					
			2017	2016	2015	2014	2013	2012
Australia	GST of 10%	Weighted average tax rate	93.4 (cigarettes) and 105.7 (OTP)	83.2 (cigarettes) and 94.8 (OTP)	77.8 (cigarettes) and 99.1 (OTP)	60.8 (cigarettes) and 71.7 (OTP)	56.2 (cigarettes) and 64.6 (OTP)	61.1 (cigarettes) and 76.3 (OTP)
Cambodia	VAT of 10%	Tax rate applied to the Most Sold Brand	7,602	6,268	6,818	6,365	5,909	N/A
Indonesia	VAT of 9.1%	Weighted average tax rate	90,900	80,800	74,400	63,900	58,410	55,696
Laos	10%	Tax rate applied to the Most Sold Brand	63,636	63,636	31,818	31,818	27,273	N/A
Malaysia	GST of 6%	Weighted average tax rate	45.0	45.5	32.7	15.7	14.6	13.6
Myanmar	Commercial tax of 5%	Weighted average tax rate	1,602	1,259	1,200	1,200	1,200	N/A
New Zealand	GST of 15%	Weighted average tax rate	157.2 (cigarettes) and 221.6 (OTP)	143.0 (cigarettes) and 204.3 (OTP)	141.5 (cigarettes) and 179.7 OTP	N/A	N/A	N/A
Pakistan	GST of 17%	Weighted average tax rate	423.0	571.8	392.7	392.7	323.9	261
Philippines	VAT of 12%	Weighted average tax rate	275	257.5	216.5	168.0	136.6 (Domestic) and 273.2 (Non-Domestic)	128.6
Singapore	GST of 7%	Weighted average tax rate	38.5	38.5	37.0	37.0	34.8	38.9
South Korea	VAT of 10%	Weighted average tax rate	20,492	20,399	20,603	11,350	N/A	N/A
Taiwan	VAT of 5%	Weighted average tax rate	191.5	182.5	187.5	176.8	174.6	192.8
Thailand	VAT of 7%	Weighted average tax rate	212.4	202.8	174.5	176.1	178.7	191.6
Vietnam	VAT of 10%	Weighted average tax rate	41,769	42,900	40,093	41,839	39,633	36,012

Methodology:
Estimating Earmarked Tax Loss

Market	Earmarked Tax structure 2017	Basis for Earmarked Tax rate assumption 2017	Earmarked Tax rate assumption (LCU per 1,000 cigarettes or kg of tobacco)					
			2017	2016	2015	2014	2013	2012
Cambodia	Public lighting tax (3% of Most Sold Brand retail price excluding VAT) and tax stamp (single-tier specific).	Tax rate applied to the Most Sold Brand	4,714	2,326	2,486	2,354	2,273	N/A
Laos	Tax stamp (single-tier specific) and import tax.	Tax rate applied to the Most Sold Brand	25,000	25,000	25,000	25,000	25,000	N/A
South Korea	Education tax, Individual consumption tax, public health fund, green fund, and farmer subsidy. All single-tier specific.	Universal tax rate	95,370	95,370	95,370	34,075	N/A	N/A
Taiwan	Health surcharge, single-tier specific.	Universal tax rate	1,000	1,000	1,000	1,000	1,000	1,000
Thailand	5% "sin tax" on Excise Tax paid, split between health (2%), TV (1.5%) and Sports (2%). Provincial tax for cigarettes sold outside of Bangkok, and 10% municipality tax.	Weighted average tax rate	188.0	177.0	144.6	124.4	124.5	133.6
Vietnam	Health surcharge of 1.5% of Excise Tax base.	Weighted average tax rate	3,679	3,700	2,364	2,463	1,551	N/A

Methodology: Estimating Tax Loss

Market	Source	Exchange rate assumption (Local currency/USD)					
		2017	2016	2015	2014	2013	2012
Australia	Reserve Bank of Australia	1.33	1.37	1.19	1.09	0.97	0.97
Brunei	International Monetary Fund	N/A	N/A	1.39	1.29	1.26	1.24
Cambodia	International Monetary Fund	4,051	4,059	4,068	4,038	4,027	N/A
Hong Kong	Hong Kong Monetary Authority	7.81	7.76	7.76	7.75	7.76	7.76
Indonesia	International Monetary Fund	13,381	13,308	13,389	11,865	10,461	9,387
Laos	International Monetary Fund	8,352	8,179	8,148	8,049	7,846	N/A
Macao	Monetary Authority of Macao	8.04	7.99	7.99	7.99	N/A	N/A
Malaysia	International Monetary Fund	4.30	4.15	3.91	3.27	3.15	3.09
Myanmar	International Monetary Fund	1,356	1,261	1,218	997	963	N/A
New Zealand	Reserve Bank of New Zealand	1.40	1.40	1.50	N/A	N/A	N/A
Pakistan	International Monetary Fund	110.0	104.8	104.3	101.4	103.0	96.8
Philippines	International Monetary Fund	50.4	47.5	45.5	44.4	42.4	42.2
Singapore	Monetary Authority of Singapore	1.36	1.38	1.39	1.29	1.26	1.24
South Korea	Bank of Korea	1,131	1,160	1,131	1,053	N/A	N/A
Taiwan	Central Bank of China	30.4	32.3	31.9	30.4	29.8	29.6
Thailand	Bank of Thailand	34.5	35.4	33.5	32.2	30.5	31.2
Vietnam	International Monetary Fund	22,370	21,935	21,698	21,148	20,933	20,828

Source: All data collected via Haver Analytics

Methodological comparison with other studies

Methodological comparison with other studies

Sources	Advantages	Disadvantages
Empty Pack Surveys (EPS) – This involves collecting discarded empty cigarette packs and noting their Market Variant.	– Approach is (in principle) easily comparable across markets. – Avoids the problem of under-reporting of smoking by consumers in consumer surveys as estimates are based on physical evidence. – Cost effective.	– May not be able to fully distinguish between legal and illegal packs in all cases (a problem shared with other methodologies). – Risk of sampling problems, e.g., if areas sampled are unrepresentative, or illicit consumption trends are very seasonal. May be a particular problem in large and diverse markets or markets with inaccessible areas. – Does not cover homes, workplaces, or rural areas in many cases.
Passer-by surveys – Interviewers stand in areas of heavy foot traffic, ask passers-by to show their cigarette packs, and note down whether they bear tax-paid markings/domestic labelling.	– Direct method of assessing consumption patterns.	– Legal situation with regard to purchasing illicit cigarettes may vary, affecting response rate and cross-market comparison; risk of being unrepresentative if under-sampling, e.g., of elderly, women, rural populations, foreign nationals; well known that consumers under-report even legal consumption, so risk of downward bias. – Expensive.
Pack swap – Variant of the above where consumers are asked to exchange their cigarette packs for a reward.	– Direct method of assessing consumption patterns. – Can collect social and demographic data to adjust sample to be representative. – Can cover rural areas also.	– Relies on self-reporting of smoking habits to some extent. – Smokers may still be reluctant to take part due to legal risks/ embarrassment. – May not be wholly representative, e.g., if varied response rates across social groups – weighting small samples of under-represented groups could magnify any sampling error. – Expensive.
Telephone interviews – Interviewers conduct telephone surveys, asking respondents about smoking habits, including their purchases of illegal tobacco.	– Can choose targeted respondents randomly, less risk of unrepresentative sample.	– Downward bias from under-reporting of smoking behaviour still likely to be a risk. – Consumers may not know for sure if cigarettes they have smoked are illegal. – In poor markets, telephone survey unlikely to be representative due to low level of telephone connections.

Methodological comparison with other studies

Sources	Advantages	Disadvantages
Comparing consumption estimates with legal sales ("bottom up" approach) – This involves using data from consumption surveys (Smoking Prevalence rates, cigarettes smoked per day) and demographic data to produce a "bottom up" estimate of total cigarette consumption. This can then be compared with data on legal sales, and the difference (if the former is larger) can be seen as an estimate of illegal consumption.	– Simple and direct approach of estimating consumption. – Normally relatively easy to collect data on legal sales. – Provides an estimate of total Illicit Consumption including Bootlegging.	– Smoking Prevalence data may be distorted downward by under-reporting, especially in markets with social stigma against smoking.
Surveys/audits of retailers – This approach relies on the analysis of the inventory books of point-of-sale units belonging to a panel of retailers.	– Direct collection of data at the retail level – May bypass problem of under-reporting of smoking behaviour.	– Sample of retailers might be unrepresentative, especially if retail industry is very fragmented. – Retailers may not display illicit stock. – May miss channels of distribution other than legitimate retail.
Comparing import and export data – This involves comparing a market's recorded imports of cigarettes with recorded exports of cigarettes to that market by trading partners. If the latter is larger, this may be evidence of smuggling.	– Taxes on exports are rare, so little incentive to under-report at the exporter end. – Data available from the UN COMTRADE database.	– Relies on assumption that "lost" tobacco exports are eventually smuggled into the market designated as the destination market (problematic with complex trade patterns involving intermediate ports, or with goods diverted offshore). – Other reasons for discrepancies besides smuggling: CIF versus FOB will tend to underestimate (can be adjusted for, though); time lags in shipping/recording (can be accounted for); mismeasurement/ poor customs reporting standards (can do little about this). – Only provides an indication on large-scale smuggling and not bootlegging, so inappropriate for markets where the latter is a problem. – Does not measure consumption of domestically produced illegal cigarettes, only those imported, so not appropriate for markets where domestically produced illicit is a major problem.

Methodological comparison with other studies

Sources	Advantages	Disadvantages
Extrapolating from seizures data – This method scales up reported seizures of illicit tobacco products to produce an estimate of overall illicit trade. A scaling factor of 10 is sometimes used; Joossens & Raw (2002) suggest a possible seizure/interception rate of 10%. UNODC Globalization of Crime used interception rate of 7%, also for European trade, for wider range of Counterfeit products.	– Uses actual data about the illicit market.	– Unclear what conversion factor should be used to scale up seizures data. Interception rate is unobservable and might also vary across markets and through time as customs effort/procedures vary. As a result, estimates based on this method are likely to be subject to a high margin of error, and cross-market comparisons using this method are likely to be unreliable. – While seizures data may be useful for spotting trends in the size of the illicit market, its value for estimating the level of illicit trade may be limited. – Joossen & Raw's suggested 10% interception rate is for European markets – for Asian markets, which are far more diverse, interception rates could vary substantially.
Econometric estimates – A variety of approaches are used to estimate illicit consumption using econometric modelling. For example, some authors estimate a model of cigarette consumption as a function of price, income, etc., in a context where we know illegal consumption is virtually non-existent (e.g., in isolated markets with no domestic production), i.e., where we can assume that legal sales = consumption. The model is then applied out-of-sample to predict cigarette consumption in markets where smuggling is an issue, taking the difference between the predicted value and legal sales as an estimate of Illicit Consumption. Alternatively, a model of cigarette consumption is estimated including "illicit" variables measuring incentives for engaging in illicit cigarette trade. The coefficients on these "illicit" indicators are then set to zero, with the difference between the predicted level of consumption and actual consumption taken as an estimate of total Illicit Consumption.	– Could avoid under-reporting problem of consumption survey approaches; should include all forms of illicit.	– Relatively complex approach with higher data and computational requirements compared with other approaches; relies on assumption of out-of-sample validity of estimated demand curve (what if demand functions differ in markets with smuggling?).

Glossary of terms

Glossary of terms

ASEAN Association of South East Asian Nations, consisting of Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam.

BAT British American Tobacco.

bn Billion.

Bootlegging Small-scale Contraband.

Chop-chop Illicit unbranded loose tobacco consumed in Australia.

CIF Cost, Insurance, and Freight.

C&C Counterfeit and Contraband.

Contraband (CB) Genuine product that has been bought in a low-tax market and which exceeds the legal border limits, or is acquired without payment of taxes for export purposes to be illegally re-sold (for financial profit) in a higher-priced market. There are generally two types of Contraband: Bootlegging and wholesale smuggling.

Counterfeit (CF) Cigarettes that are illegally manufactured and sold without permission of the trademark rights holder.

CPI Consumer Price Index.

Domestic Illicit Cigarettes that are legally produced by trademark rights holder to be illegally sold and consumed in the same market.

Duty-Free (DF) Purchases made outside the domestic market that have no state, local, or provincial taxes, import duties, or any other type of taxation added, and are subject to purchase volume restrictions.

Earmarked Tax Taxes whose revenues are reserved for a specific group or use.

EPS Empty Pack Surveys. Independent research agencies collect empty cigarette packs discarded by smokers in public places and record brands and Market Variants.

Excise Tax An indirect tax on the consumption of certain goods. Excise Taxes on cigarettes can be either specific, i.e., expressed as a monetary amount per quantity/weight of the product; ad valorem, i.e., expressed as a proportion of the value of a product; or a combination of both. For the purpose of this Report, Earmarked Taxes levied on cigarettes are also considered as an Excise Tax.

FCTC The WHO Framework Convention on Tobacco Control.

FOB Free on Board.

GST General Sales Tax (Goods and Services Tax in Australia), a tax levied on goods and services transactions.

Illicit Consumption Consumption of Non-Domestic Illicit (Counterfeit, Contraband, and Non-Domestic with Unspecified Market Variant cigarettes) and Domestic Illicit cigarettes or loose tobacco. Typically, taxes applicable in the market where illicit cigarettes/tobacco are consumed are not paid.

Illicit Whites Cigarettes that are usually produced legally in one market, primarily for smuggling. While they may also be exported legally from some countries, they are smuggled across borders during their transit to the final market of sale where they have no legal distribution and are sold without payment of tax.

In-Market Sales (IMS) Primary source of Legal Domestic Sales volumes.

Inflows/Outflows Inflows of Non-Domestic product into a market/Outflows of product from a market.

IT Illicit Trade.

IT Flows Model Developed for this Report to estimate Illicit Consumption in markets and trade flows between markets.

ITIC International Tax and Investment Center.

JTI Japan Tobacco International.

JT Japan Tobacco.

Legal Domestic Consumption (LDC) Legal Domestic Sales net of Outflows.

Legal Domestic Sales (LDS) Sales of genuine domestic tax-paid product through legitimate, domestic channels.

Market Variant Term used to designate the market in which a pack of cigarettes was initially intended to be sold. To be sold in a given market, a pack has to bear the required labelling (e.g., health warning) and potentially a tax stamp or a banderol. The EPS methodology (or, e.g., that of pack swap surveys) estimate the incidence of packs by Market Variant. As such, packs that do not bear the health warning and/or stamp required in the given market are considered Non-Domestic.

Most Sold Brand Cigarette brand variant with the largest annual legal sales volume in a given market.

mn Million.

Non-Domestic Illicit Counterfeit, Contraband, and imports of other illicit cigarettes.

Non-Domestic (ND) Product that was not originally intended for the market in which it is consumed.

Non-Domestic Legal (NDL) Product that is brought into the market legally by consumers, such as during a cross-border trip.

OE Oxford Economics.

OE Tourism Model A comprehensive data set of tourism metrics covering 190 countries and 20 years of detailed historical data.

OECD The Organisation for Economic Co-operation and Development.

OTP Other Tobacco Products, which are tobacco products other than manufactured cigarettes. These include "roll-your-own"/"make-your-own," i.e., loose tobacco for the purpose of hand rolling or tubing (including Chop-chop in Australia), cigars and cigarillos, and smokeless tobacco products.

PM Philip Morris International.

pp Percentage points.

Relative Income Price (RIP) The proportion of nominal per capita income needed to purchase 100 cigarette packs.

RYO Roll-Your-Own.

Smoking Prevalence The percentage of smokers in the total adult population.

Tax Loss Government revenues that are lost due to tobacco tax (Excise Tax, including Earmarked Taxes, and VAT/GST/sales tax) that is not paid on illicit cigarettes. Import duties were not considered in the Tax Loss estimates.

tn Trillion.

Total Consumption Total Consumption of legal and illicit cigarettes in a market or 17 markets included in this Report.

UN The United Nations.

Unspecified Market Variant Unspecified Market Variant refers to cigarette packs that do not bear specific market labelling or Duty-Free labelling. The intended market is not known.

UNWTO The World Tourism Organisation.

VAT Value-Added Tax.

WHO World Health Organisation.

Report terms of reference

Methodology: Report terms of reference

The Terms of Reference were agreed between Philip Morris International Management SA, an affiliate of Philip Morris International (PM), and Oxford Economics (OE).

1.1 Project Background

- In view of developing a comprehensive set of illicit trade data in the Asia region, PM commissioned OE and the International Tax and Investment Center (ITIC) to assess existing data on illicit trade (data from industry and any other sources available) and to estimate the volumes and related foregone revenues for the year 2012. This resulted in the commissioning of the Asia Illicit Trade Assessment Year I study and the publication of the report "Asia-11: Illicit Tobacco Indicator 2012" in September 2013.
- OE and ITIC were subsequently engaged to undertake the Asia Illicit Trade Assessment Year II, III, IV, and V studies, which led to the following publications: "Asia-14: Illicit Tobacco Indicator 2013" in September 2014; "Asia-16: Illicit Tobacco Indicator 2014" in January 2016; "Asia Illicit Tobacco Indicator 2015" in December 2016; and "Asia Illicit Tobacco Indicator 2016" in December 2017.
- In 2018, OE was commissioned independently to undertake the Asia Illicit Trade Assessment Year VI (scope: full year 2017), with the following objectives.

1.2 Objectives

- For each of the selected markets:
  - Validate the existing data (industry and other sources) on illicit trade.
  - Estimate Illicit Consumption in terms of volume, incidence, and penetration.
  - Provide an overview of the main types of illicit products consumed and major sources of Inflows for each market.
  - Estimate the annual Tax Loss from illicit trade.
  - For these estimations and the relevant markets, provide a comparison with the results of the Asia Illicit Trade Assessment Year I, II, III, IV and V.[1]

- On a regional perspective:
  - Provide a regional overview allowing a comparative analysis between the markets.
  - Provide a comparison with the results of the Asia Illicit Trade Assessment Year I, II, III, IV, and V.

1.3 Scope

- Markets covered in the Asia Illicit Trade Assessment Year V.[1]

[1]Australia, Cambodia, Hong Kong, Indonesia, Laos, Macao, Malaysia, Myanmar, New Zealand, Pakistan, Philippines, Singapore, South Korea, Taiwan, Thailand, and Vietnam.

1.4 Methodology

- Compile, analyse, and validate existing market research on illicit trade covering 2017 data. This will consist of Empty Pack Surveys and additional forms of research such as:
  - Industry market research surveys,
  - Studies commissioned by competitors, Governments, and Non-Governmental Organisations (NGOs), and
  - Alternative data sources (e.g., seizure data, assessment of smoking prevalence, etc.).
- Analyse and validate domestic duty-paid sales volumes.
- Differentiate legal and illegal non-domestic or non-duty-paid consumption where relevant (e.g., through consumer surveys, analysis of passenger data, tourism statistics). The supplier is invited to propose a method to split legal and illegal non-domestic or non-duty-paid consumption.
- Cross-check with alternative data sources (e.g., seizure data, assessment of smoking prevalence levels, studies commissioned by competitors, Governments, NGOs, etc.).
- Interview external subject matter experts to cross-reference data and gather qualitative inputs. These experts can include government officials (e.g., law enforcement), researchers, and National Manufacturers' Associations.
- PM and its local affiliates will assist by providing all relevant data.

1.5 Deliverables

- The deliverables of this project will consist of the following:
  - An executive summary report,
  - Individual reports for a selection of markets,[2]
  - A methodological overview report and,
  - Results (as detailed in the "Objectives" paragraph) at a market and regional level, updated on a dedicated website (http://illicittobacco.oxfordeconomics.com/).

1.6 Expected use of results

- OE will release the results of this project publicly via the website.

[2]Australia, Hong Kong, Indonesia, Macao, Malaysia, New Zealand, Pakistan, Philippines, Singapore, South Korea, Taiwan, Thailand, and Vietnam.

OXFORD ECONOMICS
(HEADQUARTERS)
Abbey House, 121 St Aldates
Oxford, OX1 1HB, UK
Email: mailbox@oxfordeconomics.com
Tel: +44 1865 268900

LONDON
Broadwall House, 21 Broadwall
London, SE1 9PL, UK

NEW YORK
5 Hanover Square, 8th Floor
New York, NY 10004, USA

SINGAPORE
6 Battery Road
#38-05
Singapore 049909

illicittobacco.oxfordeconomics.com

www.oxfordeconomics.com