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Cigarette price level and variation in five Southeast Asian countries

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ABSTRACT

Objectives To monitor and analyse impacts of the interaction between tobacco excise tax policy and industry price strategy, on the price level and variation of cigarettes sold in five Southeast Asian countries (Indonesia, Cambodia, Lao PDR, the Philippines and Vietnam).

Methods Prices of cigarette sold by sticks and packs were collected through an in-person survey of retailers during 2011. Mean cigarette prices and price variation were calculated in each study country for single cigarettes, whole packs and brand groups.

Results Price variation of whole packs was greater in countries with ad-valorem excise tax structures (Cambodia, Lao PDR and Vietnam) than in countries with multitiered specific excise taxes (Indonesia and the Philippines). The price variation for single sticks appeared to be driven by local currency denomination. Cigarettes sold individually cost more per stick than cigarettes sold in whole packs in every brand group except for Indonesia's domestic brands.

Conclusions Tobacco industry strategy and excise tax structure drove the price level and variation of cigarettes sold in packs, while currency denominations influence the selling price of single sticks. To maximise the effectiveness of tobacco tax policies, countries should adopt specific excise tax structures to decrease cigarette price variation, which would minimise opportunities for smokers to 'trade down' to a cheaper brand to avoid a tax-driven price increase.

INTRODUCTION

Bundled into the retail price of a cigarette are taxes, production costs, manufacturer's profits, as well as distributor and retailer margins. The final retail price is the result of a host of decisions made by a series of actors, namely governments, tobacco companies and retailers. Even though governments influence prices through excise tax policy, the tobacco industry's decisions determine how much cigarettes actually cost. Monitoring the tobacco industry's response to tax policies and other regulatory measures can guide development of pro-public health tobacco control policies.

Over 80 million people currently smoke cigarettes in the five Southeast Asian countries that are the subjects of our study: Indonesia, Cambodia, Lao PDR, the Philippines and Vietnam.¹ Between one-third and one-half of these cigarette users will die because of their habit and almost all will suffer from smoking-related diseases.¹ Male smoking prevalence in all these countries is greater than 40% and is either increasing (Cambodia, Lao PDR and Indonesia) or remains high (Philippines and Vietnam).²⁻⁴ Simultaneously, the rapid economic

growth (combined study country average annual Gross Domestic Product (GDP) growth was 5.6% from 2001 to 2011) is increasing the affordability of tobacco products.⁵

With the exception of Indonesia, all countries in the region have signed and ratified the WHO Framework Convention on Tobacco Control (WHO FCTC).⁶ WHO FCTC encourages parties to adopt comprehensive tobacco control policies including well-designed tobacco excise tax policies.⁷ Raising tobacco excise taxes is widely considered to be the most cost-effective tool available to curb the tobacco epidemic.⁸

Countries may employ either or both of two types of tobacco excise tax structures: specific (assessed on the quantity of a product) and ad-valorem (levied as a percent of product price). Ad-valorem tax incentivises tobacco companies to offer lower-priced cigarettes because it reduces their tax liability. Under this tax structure, smokers can reduce the impact of a tax increase by switching to a cheaper brand. A uniform specific tax is independent of price, which motivates the industry to increase its prices in order to capture more profit.⁹ Additionally, the tobacco industry, like the manufacturers of any consumer goods, knows that their consumers have different levels of willingness-to-pay for their products. Therefore, the industry is motivated to create brands at varying price points in order to extract the maximum possible revenue from each segment of consumers, thus ensuring that pretax prices under an ad-valorem structure are relatively similar to pretax prices under a specific structure. Given the different incentives, cigarette prices should have more variation under an ad-valorem when compared to a specific tax structure.^{10 11} If cigarette price variation is small, consumers are more likely to quit or reduce consumption, instead of switching to a cheaper brand in the event of a price increase.⁹ In this way, smaller price variation increases the public health impact of tobacco tax policy.

WHO recommends that excise tax makes up at least 70% of the retail price of cigarettes, but none of our study countries reach this mark; taxes range from just 11% of retail price in Cambodia to 52% in the Philippines for the most popular brands (table 1).⁹ As of 2011, Indonesia and the Philippines used multitiered specific taxes with lower-priced brands taxed less than higher priced brands. In this way, multitiered specific structures resemble ad-valorem tax structures. In 2011, the top tier was 87% and 940% higher than the bottom tier in Indonesia and the Philippines, respectively, among the brands sampled in our data.¹² Such a tax structure is expected to drive larger price variation than more narrowly spaced

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Table 1 Excise tax structure and tax rates on most popular cigarette brand in 2010^{5 31}

Country	Brand	Specific excise				Ad-valorem excise			
		Structure	Percentage of retail price	LCU	I\$	Structure	Percentage of retail price	LCU	I\$
Indonesia	A Mild 16	25 Tiers	46	6038	0.91	None	0	–	–
Cambodia	ARA	None	0	–	–	Uniform	11	145	0.09
Lao PDR	Adeng Red	Uniform	2	100	0.03	Uniform	18	900	0.24
Philippines	Fortune	4 Tiers	52	11.4	0.46	None	0	–	–
Vietnam	Vinataba	None	0	–	–	Uniform	33	4620	0.55

Structure refers to the country's structure, while % of retail price, LCU and I\$ refers to tax rates on the most popular brand. Indonesia specific tiers were determined by cigarette type, manufacturing method and factory manufacturing capacity, while Filipino specific tiers were determined by net-of-tax retail prices. I\$, International Dollars; LCU, local currency unit.

tiers. Lao PDR had a mixed excise tax structure that contained ad-valorem and specific components while Cambodia and Vietnam used only ad-valorem cigarette excise taxes.

Retail price is also affected by distributors and retailers' margins and the decision to sell cigarettes as a whole pack or by individual cigarettes. WHO FCTC recommends that parties ban the sale of individual cigarettes to ensure that cigarettes are always sold in boxes with warning labels and that the cost of entry to smoking is sufficiently high to deter youths.^{7 13} However, single-stick sale bans are difficult to enforce.^{14–16} Furthermore, the public health impact of single cigarette sales is unclear.^{13 17} As of 2011, Lao PDR and Indonesia had passed laws banning single stick sales.^{2 18}

A growing body of literature using empirical data began to examine the association between tobacco excise tax structures, cigarette price levels and their variations.^{19–22} Our study considers the cases of five low-income and middle-income countries in Southeast Asia where cigarettes are relatively inexpensive. Since none of the countries employ a uniform specific tax, we compare the impact of ad-valorem to tiered specific tax structure on the price level and the price variation. We also examine prices of cigarettes sold by the single stick and their relationship to the prices of cigarettes sold in whole packs.

METHODS

In 2011, the Cigarette Price and Retailer Survey was conducted by the Southeast Asian Initiative on Tobacco Tax, a project that aims to support pro-public health tobacco excise tax policies.²³ The survey in Indonesia, Cambodia, Lao PDR, the Philippines and Vietnam used a common protocol and collected data on cigarette prices for whole packs and single sticks. The protocol called for research teams to survey provinces in each country that represented urban and rural areas, and then to randomly sample districts within those provinces (see online supplementary appendix 1). In each district, teams were instructed to randomly select three district halls, unique landmarks, or schools as starting points, face the starting point's entrance and head to the left if the district's name started with the letters A to K, or to the right if the name started with a letter between L and Z. Every third encountered store that sold cigarettes was surveyed, up to a maximum of 60 stores per district. The goal was to sample a wide variety of retailers ranging from street vendors and sari-saris (home-based stores in the Philippines) to supermarkets. Due to budget constraints, the surveys were not designed to be nationally representative.

The brands included in the survey were selected based on their market share and they were classified into two groups of brands. Domestic brands were defined as those manufactured in the country and/or whose trademarks were owned (at least in

part) by local governments or corporations. International brands were defined as those whose trademarks were not owned by corporations or governments based in their own country. Vietnam also included two illicit brands and classified them as international. The number of brands collected per country varied reflecting varying degrees of brand proliferation. Researchers recorded the price of single sticks, whole packs and cartons of cigarettes separately for each chosen brand sold at each retailer.

The country level data were combined into a dataset containing observations of 14 551 cigarette packs and 4908 single cigarettes from 1874 stores (table 2). Prices were converted from local currency units to International Dollars (I\$) to adjust for purchasing power parity and facilitate cross-country comparison.²⁴ Because all prices were converted to I\$, the price levels are influenced by the relative strength of each country's currency and level of economic development. Prices of cigarettes sold in small packs were scaled up to a standardised 20 sticks to enable pack price analyses.

We examined the price variation of cigarettes using three methods: (1) comparing the coefficients of variation (CV), (2) studying the price gap for 20-stick packs between the most and least expensive brands, and (3) examining price point concentration, or the fraction of single sticks within a brand group that were sold at the most commonly observed retail price in a country. The CV is calculated by dividing the SD by the mean of a sample; the resultant value allows the direct comparison of variance between samples with different base units. Finally, in order to evaluate differences in CV within countries, we employed robust tests for equality of variance (w_0 =Levene's robust test statistic). The data management and statistical analyses were performed with Stata MP V11.2.²⁵

RESULTS

Cigarette price variation, measured by the CV for standardised 20-stick packs of all brands was smallest in Indonesia, followed by Vietnam and the Philippines, then Lao PDR and Cambodia (table 2A). Indonesia and the Philippines had, by far, the smallest CV within brand groups. The CV of cigarette prices sold by single sticks is largest in Cambodia followed by Lao PDR and the Philippines (table 2B). However, the Philippines had much narrower price ranges within brand groups. Vietnam had equal price variation across brand groups for single sticks (for w_0 , $p=0.232$) and 20-stick packs (for w_0 , $p=0.321$). Additionally, we see in table 2A,B that the CV for whole pack prices was equal to or greater than the CV for single sticks across almost all countries and brand groups.

The last column of table 3 displays the mean 20-stick pack price of the least expensive brand as a percentage of the most expensive brand (least % of most). Indonesia had the smallest

Table 2 Mean prices (I\$) for 20-stick packs, single sticks, and per stick sold in whole packs

Country	Stores	All rands		International brands			Domestic brands		
		Mean	CV	Mean	CV	n	Mean	CV	n
(A) Standardised 20-stick packs									
Indonesia	614	2.022	0.177	1.759	0.162	2593	2.164	0.143	4779
Cambodia	300	1.569	0.632	2.255	0.355	1008	0.685	0.298	781
Lao PDR	197	1.599	0.559	2.780	0.496	204	1.322	0.283	871
Philippines	391	1.154	0.358	1.424	0.162	1602	0.669	0.186	890
Vietnam	310	2.014	0.367	2.157	0.329	1454	1.452	0.392	369
Total	1812	1.786	0.378	1.868	0.345	6861	1.712	0.404	7690
(B) Single sticks									
Indonesia	364	0.133	0.145	0.119	0.145	45	0.133	0.143	1509
Cambodia	211	0.117	0.396	0.134	0.257	590	0.049	0.346	144
Lao PDR	128	0.093	0.303	0.110	0.939	4	0.093	0.288	371
Philippines	431	0.065	0.334	0.078	0.178	1252	0.040	0.219	643
Vietnam	173	0.114	0.174	0.115	0.170	278	0.112	0.19	72
Total	1307	0.100	0.400	0.099	0.342	2169	0.101	0.438	2739
(C) Price per stick sold in unstandardised whole packs									
Indonesia		0.132	0.332	0.088	0.162	2593	0.156	0.223	4779
Cambodia		0.078	0.632	0.113	0.355	1008	0.034	0.298	781
Lao PDR		0.080	0.559	0.139	0.496	204	0.066	0.283	871
Philippines		0.075	0.549	0.093	0.428	1602	0.044	0.437	890
Vietnam		0.101	0.367	0.108	0.329	1454	0.073	0.392	369
Total		0.108	0.467	0.099	0.357	6861	0.117	0.512	7690

CV, coefficient of variation; n, count; stores, number of stores selling cigarettes by pack or stick included in survey data.

gap between low- and high-priced cigarettes, while Cambodia had the largest price gap.

We observed a high degree of price-point concentration for cigarettes sold as single sticks. In Vietnam, 76% of international brand and 86% of domestic brand single sticks were sold for VND 1000 (I\$0.119). The Philippines displayed a similar level of price concentration for each brand group; wherein 57% of international brand single sticks were sold for PHP 2 (I\$0.08), and 86% of domestic brand single sticks sold for PHP 1 (I\$0.040). Indonesia's market for domestic brand single sticks concentrated 45% of singles at IDR 1000 (I\$0.152). Such price-point concentration is likely attributable to local currency denominations.

Mean nominal prices of cigarettes sold in standardised 20-stick packs for all brands as well as brand groups are presented in table 2A. The Philippines had the least expensive cigarettes among the study countries in both groups. International brand cigarettes cost the most in Lao PDR while domestic brands cost most in Indonesia. Vietnam and Indonesia had the highest mean prices across all brands. Table 2B describes prices for cigarettes sold as single sticks. Again, the prices among all brands was lowest in the Philippines, while the most expensive international brand single sticks were observed in Cambodia and the most expensive domestic single sticks were in Indonesia.

Table 2B,C present per-stick prices by packaging for each country. Singles cigarettes sold in Cambodia, Lao PDR and Vietnam were more expensive than whole packs ($p<0.001$), while single sticks were actually less expensive in the Philippines ($p<0.001$).

Table 2B,C also report per-stick prices by brand groups for different packaging. For whole packs, the largest per-stick price difference between international and domestic brands was in Cambodia (I\$0.079, $p<0.001$), the smallest price difference was in Vietnam (I\$0.035, $p<0.001$), while Indonesia was the only

country whose domestic brands were more expensive than its international brands (I\$0.068, $p<0.001$). For single sticks, international brands were more expensive than domestic brands in Cambodia and the Philippines, while the opposite was true again for Indonesia ($p<0.001$).

Table 3 reports the mean prices of the three most and three least expensive cigarette brands in each country. The most expensive brands were all international and the least expensive brands were all domestic, except for Indonesia, where this pattern was mostly reversed. The British American Tobacco (BAT) brand 555 and the Japan Tobacco brand Mild Seven were among the three most expensive brands in each country in which they were observed. In the Philippines, three international Philip Morris brands were the most expensive, but two of the company's domestic brands, Fortune and Champion, were among the least expensive. Further, all but one domestic cigarette brand (Vinataba) in Vietnam cost less than VND 10 000 (I\$1.19) per pack, while all but two international brands (Bastion and Era) cost more than VND 10 000. Even clearer separation in prices between brand group was seen in the Philippines, where a pack of the most expensive domestic brand (Fortune) cost 55%, or PHP 10, less than the cheapest international brand (Winston). The least expensive brands available in each country were relatively affordable as it cost between 1.31% of GDP per capita to buy 100 packs of Lapin in Lao PDR and 2.33% of GDP per capita to buy 100 packs of Pall Mall in Indonesia. When compared with global cigarette affordability, where the median was 4.18% of GDP per capita in 2006, our study countries have some of the most affordable cigarettes among low-income and middle-income countries.²⁶

DISCUSSION

This study contributes to a growing body of literature on the association between tax structures and cigarette price level and

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Table 3 Mean 20-stick pack prices for three most and three least expensive brands of cigarettes, I\$

Country	Three most expensive				Three least expensive				Least % of most
	Brand	Mean (\$)	CV	n	Brand	Mean (\$)	CV	n	
Indonesia	Dji Sam Soe*	2.60	0.075	600	GG Merah*	1.72	0.077	344	42
	GG Internasional*	2.41	0.059	581	Lucky Strike	1.57	0.054	550	
	Djarum Super*	2.39	0.071	452	Pall Mall	1.09	0.071	259	
Cambodia	555	3.26	0.061	209	Liberation*	0.49	0.181	63	10
	Mild Seven	3.09	0.098	123	Cambo*	0.43	0.134	117	
	Marlboro	3.07	0.130	68	Lapin*	0.33	0.134	21	
Lao PDR	555	4.15	0.138	18	National*	0.63	0.218	8	13
	Benson & Hedges	4.13	0.086	25	Combo*	0.60	0.213	7	
	Mild Seven	3.79	0.144	14	Lapin*	0.56	0.161	16	
Philippines	Philip Morris	1.54	0.119	429	Fortune*	0.72	0.128	509	35
	Marlboro	1.52	0.119	535	Champion*	0.63	0.148	258	
	Hope	1.28	0.138	392	Mighty*	0.54	0.306	123	
Vietnam	555	3.27	0.182	165	Bastion*	0.86	0.123	65	22
	Dunhill	2.96	0.115	55	Era*	0.76	0.159	49	
	Mild Seven	2.59	0.115	49	Du Lich*	0.71	0.193	56	

For each country, formula for Least % of most = $\frac{\text{Mean 20 Stick Pack Price of Least Expensive Brand}}{\text{Mean 20 Stick Pack Price of Most Expensive Brand}}$

*Domestic brand.

CV, coefficient of variation; GG, Gudang Garam; n, count.

variation.^{19–22} We study this topic by collecting data from retailers, as opposed to asking consumers about how much they paid for their cigarettes. This method of data collection accurately records the actual retail prices of cigarettes and is not subject to the recall or rounding biases inherent in surveys of consumers.^{27–28} Although tiered specific structures can act as de-facto ad-valorem structures, we found that such structures, as applied in Indonesia and the Philippines, had less cigarette price variation than observed ad-valorem structures. Our findings provide evidence against the use of ad-valorem excise tax structures, however, this should not be understood as an endorsement of widely spaced tiered specific systems. Due to the selection of countries participating in the survey, we could not evaluate a uniform specific excise tax, the structure recommended by WHO in their Technical Manual on Taxation.⁹

While prices of whole packs responded to the excise tax structure, the prices of cigarettes sold as single sticks were influenced by local currency denominations. The least expensive brand of cigarettes in four study countries costs far less than I\$1 per pack and thus are very affordable by international standards. International brands were more expensive than domestic brands with the exception of Indonesia.

Indonesian domestic cigarettes (kreteks) are sold in packs of less than 20 sticks (usually 16), and when we scaled up prices to 20-stick packs, we negate the implicit 'volume discount' for international brands (white cigarettes) that are sold in packs of 20. Un-scaled retail pack prices of kreteks and white cigarettes in Indonesia are nearly equal despite the difference in the number of sticks. The symmetry between the products goes further; the Global Adult Tobacco Survey found that kretek smokers in the survey consumed, on average, 11.8 cigarettes per day or 74% of a 16-stick pack, and white stick smokers consumed, on average, 14.7 cigarettes per day or 74% of a 20-stick pack.²⁹ Therefore, an average Indonesian kretek smoker spends the same amount on their habit as an average white stick smoker.

In the two countries, Lao PDR and Indonesia, where single stick sales are banned, we found that 59.3% and 64.0% of retailers surveyed, respectively, sold single cigarettes. Those figures were not that different when compared to Cambodia or Vietnam where 70.3% and 55.8% of retailers, respectively,

legally sold single cigarettes. However, almost all retailers in the Philippines (95.8%) sold single cigarettes, a finding that underscores the importance of this form of sale in the Philippines. The pervasive nature of single cigarette sales despite the bans speaks to the difficulty of enforcing such a law. In light of this finding, countries may want to prioritise alternative tobacco control measures over single-stick sales bans, especially since the evidence of the benefit of such bans is unclear.

Our study has several limitations. We are restricted by cross-sectional survey data, which was not nationally representative, in our ability to make temporal inferences relating to changes in tax structure, within a country, to changes in price variation. Surveying a neighbouring country with a uniform specific excise tax structure, like Malaysia, could serve as an ideal benchmark to compare against our study countries' complex tiered specific and ad-valorem structures. As future waves of the Cigarette Price and Retailer Survey are conducted, we will be able to observe changes in price level and variation over time and perhaps draw causal linkages to excise tax structure. Encouragingly, the Philippines adopted significant tobacco excise tax structure reform legislation in December 2012, which mandated collapsing the country's four specific tax tiers into two in 2013, and then into a single tier by 2017.³⁰ This change should reduce the price variation compared to what we observed in our 2011 survey.

What this paper adds

- ▶ Reports findings from the first multinational comprehensive cigarette price surveillance of retailers in Southeast Asia.
- ▶ Provides empirical evidence that two countries in Southeast Asia with tiered specific excise tax structures have smaller cigarette price variation than three countries in the region that employ ad-valorem excise tax structures.
- ▶ Links excise tax structure to tobacco industry price strategy. The prices of whole packs respond to tax structure, while currency denomination influences the prices of cigarettes sold as single sticks.

Correction notice This article has been corrected since it was Published Online First. Reference 20 has been amended to 'Chaloupka FJ, Kostova D, Shang C. Cigarette excise tax structure and cigarette prices: evidence from the global adult tobacco survey and the U.S. National Adult Tobacco Survey. *Nicotine Tob Res* 2014;16(Suppl 1):S3–9.'

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Contributors ACL, HR and SR conceived of and designed the study. ACL conducted the data cleaning and analysis. ACL and HR drafted the initial manuscript. SR and EUD reviewed drafts and materially contributed to the discussion. KF developed the standardised research protocol and oversaw the implementation of the Cigarette Price and Retailer Survey and provided insight on the survey methods to the manuscript.

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