

FCTC Ratification, Smoking Prevalence and GDP per Capita : Lesson Learn for Indonesia

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Abstract

Background The stagnated tobacco control progress in Indonesia needs to be accelerated through a more comprehensive implementation of Framework Convention of Tobacco Control (FCTC) measurement. Nevertheless, the tobacco industry argument concerning the negative economic impacts of tobacco control still hinders the government to ratify or even sign the FCTC, which has been ratified by more than 180 countries. This study aims to bring the empirical evidence on the tobacco industry argument concerning FCTC. This study applied two stage least square estimation strategy to unbalanced panel data at country level. On the first stage we estimate the impact FCTC ratification on smoking activity, and on the second step, estimating the influence of smoking activities on macroeconomic performance.

Results The result of this study shows that FCTC ratification is negatively related to a country's smoking prevalence, in which the ratifying party of FCTC has lower smoking prevalence. Moreover, country who ratifies FCTC longer is also associated with lower smoking prevalence. Whereas FCTC ratification is beneficial in reducing smoking prevalence, the declining smoking prevalence is not related to the decline in GDP per capita.

Conclusions The result of this study shows the decrease in smoking prevalence has nothing to do with the macroeconomic indicator. Hence, FCTC ratification, which is an important driver for tobacco control actions acceleration, should not be seen as a backfire to the economy. Instead, FCTC ratification could be mutually beneficial for the health and economic aspects as it provides comprehensive guidance and protocols by taking into account the well-being states of both aspects.

Background

The tobacco control situation in Indonesia is getting worrisome as during the past decade the tobacco control indicators show stagnated progress or even declining progress in some important indicators. According to Basic Health Research (*Riset Kesehatan Dasar/RISKESDAS*), the slight decrease in smoking prevalence during 2013–2018 from 29.3–28.8% of overall smoking prevalence for the population aged 10 + years was followed by an increase in smoking prevalence among female and a consistent rise in smoking prevalence among minor aged 10–18 year.[1] The female smoking prevalence nearly doubled from 2.5% in 2013 to 4.8% in 2018 whilst the smoking prevalence among the population aged 10–18 years consistently from 7.2% in 2013 to 8.8% and 9.1% in 2016 and 2018, respectively.

The non-optimal tobacco control effort in Indonesia resulting in stagnated progress is related to weak Framework Convention on Tobacco Control (FCTC) protocols enforcement in the country. Compared to other similar countries, Indonesia, being the only country that is neither a party nor a signatory of FCTC, is faced by though tobacco use situation as shown in Fig. 1 below.

Figure 1 above shows the comparisons in smoking prevalence between Bangladesh, Brazil, Pakistan, and Indonesia. Amid the four countries have a relatively similar large number population and falling into the same category of middle-income developing countries, the three former countries are parties of FCTC

while Indonesia is not. Bangladesh ratified the FCTC in 2004 while both Pakistan and Brazil ratified FCTC in 2005. Figure 1 above shows that the three countries had successfully reduced the overall smoking rates consistently and significantly since 2005. In contrast, within the same period, Indonesia experienced increasing smoking prevalence by nearly 5%. Brazil, amid being the world's largest tobacco exporter, has successfully driven its smoking prevalence rate to 13.9% below the world smoking prevalence rate of 20.5%.[2] Among the four countries, Brazil is the only country that has complete policies on all of the MPOWER measurements, with remarkably 83% of tobacco tax implemented.[3] While Pakistan and Bangladesh still have rooms for moderate and or minimal policies are some of the MPOWER measurements, both countries, under FCTC ratification, can fully cover all the important policies measurement.[4, 5] Whereas Indonesia, being neither the party nor signatory of FCTC, remains with very weak policies on tobacco advertising bans and cigarette affordability.[6, 7] Hence, it comes as no surprise that Indonesia still struggles with tobacco control efforts.

Amid the alarming tobacco use condition, after 15 years, Indonesia still yet to ratify the Framework Convention on Tobacco Control (FCTC). Indonesia is currently the only country in Asia-Pacific to not ratify FCTC. FCTC, which was agreed upon by 192 WHO members country in 2003 and effective as per 2005, is currently ratified by more than 180 countries as it is seen as an important protocol to enforce tobacco control regulation. Economic concern still is the main reason that hinders Indonesia from FCTC ratification. It is believed that FCTC ratification which allows comprehensive tobacco control policies enforcement in Indonesia will negatively impact the economy through the decline in tobacco production and tobacco industry economic activities. The argument against FCTC ratification in Indonesia believed that the decline in tobacco production and tobacco industry economic activities will decrease the tobacco farmers' welfare, increases unemployment for tobacco industry workers, and eventually lead to major macroeconomic impact – poverty rate and unemployment rate increase and GDP rate decrease. Despite the strong statement provided by the opposition view, there is still no solid evidence to support this argument. This paper hence aims to provide evidence on how tobacco control actions under FCTC ratification impacts the economy by comparing the economic conditions of the countries that have ratified the FCTC between 2005–2010.

The topic of the economic impact of FCTC is very important for both academic discussion and the policymaking process. Lack of academic investigation on this topic leaves out the room for any negative speculation against the FCTC protocol and hence the academic research is very much needed to fill the space. Moreover, to investigate the economic impact of FCTC will help the policymakers to understand that while FCTC is highly important for tobacco control efforts, it does not necessarily relate to negative macroeconomic indicators as the tobacco industry does not significantly contribute to the Indonesian economy.

Methods

The study employs unbalanced panel data using two-stage least square (2SLS) estimation analysis. The technique that is used in 2SLS regressions requires two stages: in the first stage, we estimate the impact

of FCTC ratification on smoking prevalence activity. In the second stage, the instrument-estimated value from stage one is then computed as a predictor when estimating the effect of smoking activity in the economy. The sample in the panel dataset consists of 87 countries over the period between 2000 and 2016. Due to our main focus on this research is to compare the enforcement of FCTC ratification at the country level, the primary sample is countries that ratified FCTC between 2005 and 2010.

The model to be estimated is given by

$$Y_{i,t} = \beta_0 + \beta_1 X_{i,t} + \beta_2 T_{i,t} + \beta_3 D_{i,t} + \varepsilon_{i,t} \quad (1)$$

In which a Y is the dependent variable of smoking prevalence, X are the independent factors that explains the smoking behaviour, T is a variable of time counts of ratification or the length or the duration of a country's FCTC ratification in year, and D is a dummy variable representing country that is the ratifying party of FCTC. Subscripts i and t explains correspondences of country i at time t , whereas ε is an error term.

Table 1
List of Variables

Variables	Description	Source
Smoking Prevalence	Percentage of males' smoking prevalence who currently smoke any tobacco products	World Bank
Taxes on Goods and Services	Percentage of taxes on goods and services over value-added of industry and services	World Bank
Productive Age	Percentage of the working-age population of the total population. The working-age is defined as those aged 15 to 64	World Bank
Mean Years of Schooling	Average years of education degree	Our World in Data
Exchange Rate	Exchange rate of each country to the US dollar	World Bank
Consumer Price Index	Changes in the price level of goods and services purchased by consumers	World Bank
Value-Added Agriculture	Value-added agriculture calculated as a percent of Gross Domestic Product (GDP)	World Bank
Democratization Index	Index scoring to measure the country democracy	Economist Intelligence Unit
Corruption Index	Index scoring based on how corrupt the governance	Transparency International
Openness	The difference between total exports and imports of goods and services measured as a share of GDP	World Bank
Dummies for FCTC ratification	1 if a country ratifies FCTC; 0 otherwise	WHO
Time count of ratification	Duration of each country ratify FCTC (in years)	WHO
Source: Author's definition		

After regressing for the first model (model (1)), with the hypothesis of existing correlation between FCTC ratification and smoking behaviour, the effect of FCTC ratification will be linked to relevant macroeconomic indicators. On the second model estimation (model (2)), macroeconomic proxy as dependent variable used in this study is per capita GDP. The effect of FCTC ratification is denoted as \hat{Y} , smoking prevalence hat (the difference between actual smoking prevalence and the first regression residual value). M denoted other macroeconomic variables representing correlation between

macroeconomic indicators and per capita GDP. Subscripts i and t explains correspondences of country i at time t , whereas ε is an error term.

$$Z_{i,t} = \beta_0 + \theta_i \hat{Y}_{i,t} + \beta_i M_{i,t} + \varepsilon_{i,t} \quad (2)$$

Results

Table 2
Descriptive Statistics

Variable	Mean	Std. Dev.	N
Smoking Prevalence	36.418	14.166	783
Taxes on Goods and Services	11.485	5.329	508
Productive Age	63.410	6.849	774
Mean Years of Schooling	8.199	3.193	723
Exchange Rate	682.850	2459.397	707
Consumer Price Index	104.937	26.681	736
Value Added Agriculture	11.614	11.601	763
Democratization Index	5.516	2.005	566
Corruption Index	43.843	16.803	402
Openness	-0.047	0.232	683
Dummies for FCTC ratification	0.777	0.417	783
Time count of ratification	5.587	3.633	783
Source: Authors Calculation			

The dependent variables in Eq. (1) describes the smoking prevalence percentage per total adult population. Our variable of interest on FCTC ratification includes the dummy variable that explain a country's participation in FCTC ratification and the duration of FCTC ratification (measured in year). Control variables that describes smoking behaviour are taxes variable (percentage of total value added to industrial and services sector) and the productive ages population.

$$Y_{i,t} = \beta_0 + \beta_i X_{i,t} + \beta_i T_{i,t} + \partial_i D_{i,t} + \varepsilon_{i,t} \quad (1)$$

Table 3
Regression Estimation of Eq. 1

Dependent: Smoking Prevalence	
Time Count of Ratification	-0.433***
	(0.07)
Dummies for FCTC (D = 1)	-2.373***
	(0.65)
Taxes	0.008
	(0.07)
Productive Age	0.340**
	(0.12)
Constant	19.245*
	(7.55)
N observations	506
N-degree of freedom	434
BIC	2475.6
R-squared	0.374
Note: The dependent variable is the smoking prevalence of males overall adults. Standard errors are shown in parentheses. ***, ** and * denote p-value < 0.01, < 0.05 and < 0.10 respectively.	
Source: Authors Calculation	

The FCTC coefficients, both on the FCTC ratification duration and the FCTC ratification participation appear to significantly affect smoking prevalence. The effect of dummy FCTC is significantly negative at the significance level of 1%. This means that smoking prevalence in a country will decline if the country is a ratifying party of FCTC. Moreover, the longer a country participated in FCTC ratification, the lower the smoking prevalence will be. Whereas the percentage of productive ages population shows a positive significant relationship with the smoking prevalence. This means that the higher the share of productive ages population in a country, the higher is the smoking prevalence in the country. Whereas the percentage of value added taxes is not statistically significant to the smoking prevalence. This means that the smoking behaviour in a country is not driven by the tax rate.

Table 4
Regression Estimation of Eq. 2

Dependent: GDP per capita (log)	
Smoking Prevalence hat	-0.000
	(0.00)
Mean years of schooling	0.111***
	(0.02)
Exchange rate (log)	0.086**
	(0.03)
CPI (log)	-0.173*
	(0.07)
Value added Agriculture (%)	-0.008***
	(0.00)
Democratization Index	(0.059)***
	(0.01)
Openness	0.037
	(0.08)
Corruption Index	0.002*
	(0.00)
Constant	8.151***
	(0.35)
N observations	234
N-degree of freedom	171
BIC	-941.9
R-squared	0.450
Standard errors are shown in parentheses. ***, ** and * denote p-value < 0.01, < 0.05 and < 0.10 respectively.	
Source: Authors Calculation	

Holding other variable constant, the effect of smoking prevalence hat is not statistically significant. This result showing an insignificant relationship between smoking behaviour and per capita GDP. Intriguingly, the smoking prevalence hat shows an inverse relationship with per capita GDP. This indicated that the higher is the smoking prevalence, the lower per capita GDP will be. Unfortunately, the relationship between the two variables is not statistically significant.

However, other control variables such as mean year of schooling, exchange rate, consumer price index, value-added agriculture, democratization index, and corruption index are statistically significant to GDP per capita. Among the other controlling variables, only the openness is not statistically significant to the per capita GDP.

Based on the regression estimation result, when a country is a ratifying party of FCTC, the country will experience a declining smoking prevalence. However, the changes in smoking prevalence is not statistically significant to the macroeconomic indicators. In general, it can be concluded that being a party of FCTC ratification will not directly impact the macroeconomic activities of a country.

Discussion

The result above implied two imperative discussions that are the main interest of the study. Firstly, the countries that participate in FCTC ratification will have higher probability to succeed in reducing their smoking prevalence. This is consistent with the previous studies that found negative association between FCTC implementation and the countries smoking prevalence.[8– 11] Moreover, this study also found the negative association between the years of FCTC ratification and the changes in smoking prevalence. The negative relationships between FCTC variables and the smoking prevalence inferred the importance of FCTC ratification in supporting a country's tobacco control effort.

The second key finding of the study is that the changes in smoking prevalence – which is also determined by FCTC ratification – does not necessarily related to the macroeconomic indicator (in this case GDP per capita). GDP per capita is a very broad macroeconomic indicator determined by numbers of factors. This study finds that cigarette consumption – portrayed by the smoking prevalence is not one of the determinants of the countries' GDP. This finding is counterintuitive with the premise that the declining tobacco industry contribution will negatively impact the economy. The data on tobacco industry economic contribution (i.e. through tobacco taxes, labour absorption, and tobacco farming, and even tobacco exports), primarily in major tobacco producing countries, is seemingly positive. However, the magnitude of the tobacco economic contribution is oftentimes overstated and resulted in the misleading argument that tobacco control will be an economic backfire.[12] Moreover, the tobacco industry economic contribution still does not worth the health cost borne by the country due to increasing smoking related NCDs, loss of productivity, and premature deaths.[13, 14] The failure to calculate for the negative externalities created by smoking frequently overlooked by the tobacco industry proponent. A study in Canada implied that the total tobacco-related costs from direct, indirect, and various induced types of impact exceeded the tobacco industry contribution through tobacco taxes by not less than \$291.8 Million

in 1977.[15] In addition, the study in China as the largest tobacco producing country also found that compared to the other cash crops, tobacco has the lowest economic rate of return while at the same time the government tax revenue from tobacco industry continues to decline.[16]

Intuitively, it is safe to say that FCTC ratification (leading to declining cigarette consumption) is not necessarily related to the changes in GDP. As opposed to the tobacco industry argument, the finding of this study suggests that declining smoking prevalence as the result of a more comprehensive tobacco control effort under FCTC ratification might reduce the country's healthcare cost. Previous studies argued that smoking cessation is related to reduction in healthcare cost, primarily in short-term healthcare costs. [17, 18] Moreover, reducing smoking prevalence could be done at relatively low costs, resulting in higher long-term benefits due to increasing health aspects.[19, 20] In addition, one of the way this could be done with mutually beneficial outcomes for the economy and health aspect is by raising tobacco taxes. Increasing tobacco tax rate will simultaneously increase government tax revenue and decrease tobacco-related medical costs.[21] This adds to yet another evidence on the importance of demand-side tobacco control for both economic and health aspects.

As important as demand-side control, supply-side tobacco control will also lead to the desired economic and health benefits. Controlling for tobacco supply, which is also part of FCTC agreement, will be highly important in protecting the impacted groups welfare. As one of the main concerns that still hinders Indonesia on becoming FCTC ratifying party is the tobacco farmers and tobacco industry workers welfares. Nevertheless, the current Indonesian tobacco business practice which highly relies on imported tobacco products, potentially brings a substantial loss to Indonesian tobacco farmers as well as the economy.[22] In contrast, article 17 of FCTC mentioned the support for viable alternative economic activities for the impacted groups.

Conclusions

Upon discussing the importance of controlling for tobacco demand and supply, FCTC ratification, which in this paper found to be one of the factors that influences the decline in smoking prevalence, will be the important key to accelerate the tobacco demand and supply control in a country. As FCTC provides comprehensive measures on tobacco control actions, FCTC ratification, which this paper found to have no direct impact on the macroeconomic indicator, will assist the country to accelerate the decrease in smoking prevalence. Contrary to what the industry believes, not only is FCTC beneficial to the health aspects by the declining smoking prevalence, some key tobacco control efforts in FCTC ratification are also advantageous for the economy.

Declarations

Ethical Approval and Consent to participate

Ethical approval is not applicable.

Consent for publication

Not applicable.

Availability of supporting data

Data is available upon request to: Rifai Afin (rifai.afin@trunojoyo.ac.id)

Competing interests

None declared.

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Authors' contributions

AA and RA conceptualized the study. MH and ARJ conducted data collection. RA and MH analysed the data. AA, RA, MH, and NA drafted the manuscript. All authors approved the final version of the manuscript.

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Not Applicable

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Figures

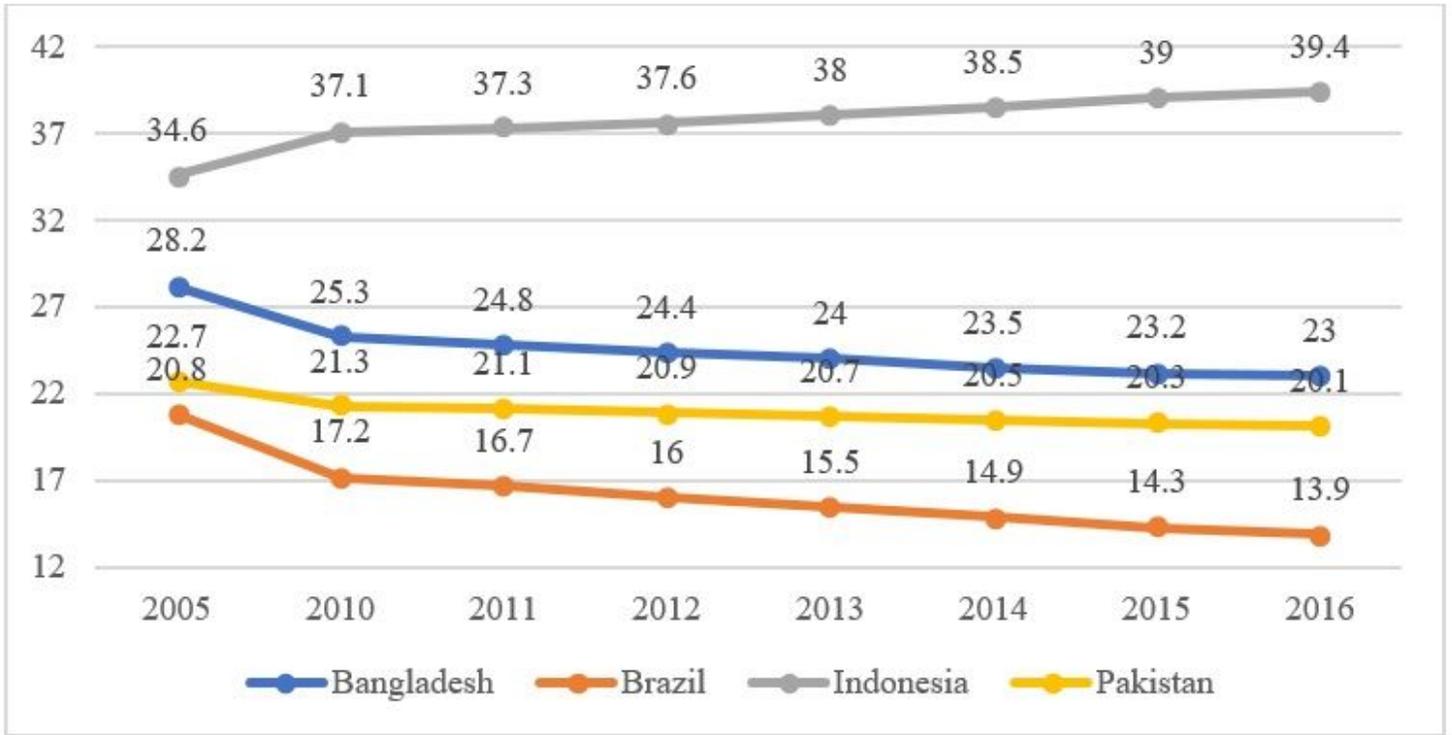


Figure 1

Bangladesh, Brazil, Indonesia, and Pakistan Smoking Prevalence Comparisons 2005-2016 (Age 15+, Both Sexes, Excludes Smokeless Tobacco) Source: World Bank, 2020