DETERMINANTS OF TAX REVENUE: A COMPARISON BETWEEN ASEAN-7 PLUS CHINA AND 8- EUROPEAN COUNTRIES

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ABSTRACT

The aim of this paper is analyzing the level ratio of tax revenue and GDP depending on different consumer behaviors between two groups of countries: ASEAN-7 plus China (called the Eastern) and eight European countries (called the Western). The study applied the Feasible Generalized Least Square model to confirm the robustness of the Panel Corrected Standard Errors model, and the results indicate that all countries have a positive association between tax revenue with the human capital and FDI variables. In addition, in the Eastern, forest area and broad money has a statistically significantly positive impact on tax revenue while gross savings has a negative one. Further, the Western witnessed the positive impact with gross savings while broad money variables lead to a decrease in tax revenue. The major results indicate that in the East, the Governments should focus on how to improve their taxation by promoting the broad money - M2 and expanding the forest area as well as support their consumers spending more instead of saving. In contrast, European countries try to reduce the M2, encouraging their consumers to save more. The Eastern and Western governments may control natural and demographic determinants aimed to support taxation and sustainable economic growth.

Keywords: Tax revenue, FDI, Broad money (M2), HDI and the Eastern and the Western regions.

1. INTRODUCTION

Governments around the world always use taxation as a means for financing their spendings by imposing charges on citizens and corporate entities. In the long run, they try to control the gap between the level of revenue and public funds taxation. The empirical findings of the analysis of the determinants of tax collection have occupied a central status related to tax. Most of the literature uses various determinants such as tax effort, tax revenue on the gross domestic product (GDP), control variables including tax burden which is measured by total time based on taxes on total time,

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total tax ratio, inflow foreign direct investment (FDI) on GDP, Human Development Index (HDI)…Most studies focus on developing countries and high-income countries. In developing countries, the governments often try to increase their tax ratio to spend more for education, health care, public infrastructure because they want to grow or reduce poverty (Le et al., 2012). To support the Government on spending more through increasing taxation, some researchers suggested that to increase the capability of taxation, the Government should focus on studying the taxpayers' behaviors. In the past decades, all researchers follow the utility theory to investigate the taxpayer and authorities' behaviors by applying the traditional tax model with supply-side and demand-side factors. According to Goldin (2012), taxpayers' attitude and behaviors may be affected by tax cost that leads to monetary policy. Moreover, there is a big gap in philosophy and psychology between the Eastern and the Western regions that drives the social and economic behaviors (Coward, 2008). Cassette and Paty (2008) concluded that the tax competition depended on the demographic and economic relation in the Western Europe, while it did not depend on the Eastern Europe. The problem here is how different consumer behaviors affect tax revenue in different regions between the Eastern and the Western.

This paper is motivated by two main considerations. First, we find out the relationship between tax revenue on GDP (*Taxre*) and other economic and demographic determinants. The determinants can be classified into three categories. The first one is economic factors including broad money – M2 on GDP (*Bom*), gross savings on GDP (*Sav*). These factors are also considered consumer behaviors. Foreign direct investment on GDP (*Fdi*), it would be called the trade status of a country. The second category is a demographic component including the ranking of the human development index (*Hdir*) and the incidence of tuberculosis (*Intub*). The third one is the natural component including forest area on the total land area (*Frl*) because the agricultural sector contributes the meaningful GDP for ASEAN and China in explaining tax ratio.

We may know that ASEAN was established on 8 August 1967 including ten countries such as Cambodia, Indonesia, Malaysia, Philippines, Singapore, Thailand, Vietnam, Lao PDR, Brunei, Myanmar. Then ASEAN + 3 (i.e. Japan, China, Korea) was institutionalized the cooperation mechanism since in 2000. Moreover, European countries include Czech Republic, Denmark, Hungary, Norway, Poland, Russian Federation, Sweden, Switzerland which are in the Nordic and Central of Europe. Eight European countries are chosen because those belong to the Nordic and Central Europe in comparison with the Eastern Asian region. Furthermore, these countries owned the database of broad money on GDP, while the others don't have this data such as Germany, France, Finland, etc. (See the WDI on the World Bank database, 2019). The dataset is retrieved from World Development Indicators, ADB library, OECD database and UNDP which have yielded a reliable database which contains proxies of tax revenue, and economic & demographic variables. These two groups of countries are chosen because we can compare two regions' tax systems and other macroeconomic factors. Furthermore, the present paper aims to contribute to the literature on research methodology by using two kinds of the model such as cross-sectional time-series generalized least square Model (FGLS) and panel corrected standard error (PCSE) Model to analyze this topic.

The estimation results are used as benchmarks to compare tax revenue on GDP between two group regions: Eastern and Western. Secondly, we want to make a comparison of how differences between tax revenue in different ways of their citizens are consumed in the complex economic context with other macro and demographic determinants and the distinction of natural resources

such as forest land area. Further, the literature on supply-side factors of production functions on the level ratio of tax revenue and GDP for these regions tends to thin.

The rest of this paper is organized and proceeds in the following way. In section 2, we provide a literature review of previous scholars about this topic. Section 3 presents our models and equation, variables and data collection. Section 4 discusses the empirical results. In section 5, the papers give conclusions and policy implications for tax authorities in these countries.

2. LITERATURE REVIEW

2.1. Tax with economic factors (GDP, FDI, consumer behaviour such as broad money and gross savings)

Tax plays a substantial role for all Governments all over the world. In fact, tax contributes to the Government income for expenditure. These are two types of taxes, which includes direct tax and indirect tax. On the one hand, direct tax refers to tax according to properties, incomes and corporate profits etc., while value added tax, sales tax, import duty, etc. are considered indirect tax. In the valuable role of tax, there are numerous studies investigating the relation between economic growth with tax (Ibanichuka et al., 2016; Lien & Thanh, 2017; Stoilova, 2017). McKinnon (1991) and Morrissey, Von Haldenwang, Von Schiller, Ivanyna, Bordon (2016) meanwhile these existing attempts emerge GDP, FDI while there is a little few attempts aim to demonstrate the relation between diseases, influence of consumer behaviours and forest land. The fact that most previous scholars aimed to concentrate on a specific region such as EU – region, OECD, America, Asia, however it is hard to witness a broad picture in the context of measuring economic growth with tax.

By applying regression analysis in a dynamic panel data model which had 105 developing countries for over 25 years, Gupta (2007) suggested that the more countries depend on taxation on goods and services as the crucial income of tax revenue, has poorer revenue performance, and vice versa. Whereby, a range of determinants such as GDP per capita, share of agriculture in GDP, trade openness and impact of foreign aid are significant and strong in affecting revenue performance. However, the other structural factors such as foreign debt, corruption have a constraint on impact on revenue performance. Sub Saharan African countries are better performing above their potential while Latin American countries face a downward in their revenue potential. Pessino and Fenochietto (2010) on the other hand applied a stochastic frontier model with panel data for 96 countries over 16 years, for the period 1991 to 2006. The paper emphasized the negative relation between tax revenue as percent of GDP and inflation, income distribution, the ease of tax collection and corruption. In addition, the paper also demonstrated that role of tax capacity in contributing to social security. In terms of developed and developing countries, Lien and Thanh (2017) explored tax revenue is always positive and has strong significance impact on economic growth for a dynamic panel data of 82 countries for the period 2000 to 2015.

Regarding the EU region, Stoilova (2017) applied the OLS method to estimate the tax structure including consumption tax, tax on property and personal income for EU – 27 countries during 1996 – 2013. The result confirmed the taxes seem less likely to affect to economic growth. Specifically, taxes on productions and imports have a strong positve impact while value added taxes have an

opposite side in terms of growth for EU – 28 regions. The property taxes are neutral and the personal income tax and social contributions contribute significantly to economic growth. With respect of Asian countries, Padda and Akram (2009) demonstrated the negative effect in short run in both India and Pakistan while it witnessed the positive effect for first year in Sri Lanka.

In order to explore specifically, this scholar tends to emerge more variables including foreign status, consumers' behaviours. Whereby, FDI is a substantial factor for productivity and export growth in the host country (Blomström & Kokko, 1996). Regarding FDI, Mahmood and Chaudhary (2013) applied ARDL and its error correction model in order to investigate the relationship between FDI and GDP per person with tax revenue. The result shows the significant and positive effect on this relation in the belief that FDI will generate welfare by increasing the tax revenue to the government. In addition, Sedmihradsky and Klazar (2002) confirmed the crucial role of FDI in contributing to the growth of GDP as well as successful restructuring of the economy by adopting dataset for the 1990s in Central European countries. However, with the significant wave of FDI, host country also need to develop system in order to support external sources fast and without administration costs. Secondly, with respect to consumer behaviours, there was a few research attempts to investigate this relation. Most researchers followed the utility theory to evaluate the tax payer's behaviour or tax evasion (Weber et al., 2014). These authors also confirmed that all previous research applied the game theory or laboratories experiment to guess the relation of consumer behaviours and tax payment. However, the testing may be a bias due to the individual decision making. There are a few studies that employ the social culture of consumers to assess the influence of the way which customers used money on taxes based on the panel secondary data. To investigate this issue, Chaudhry (2010) found broad money (M2) is positively to the tax revenue and is statistically significant over the period 1973 – 2009. With this period, Pakistan has narrow tax base, most likely depend on agriculture sector and shadow economy, therefore, in order to increase the level of taxation, it is crucial for boosting the openness, broad money and political stability. Goldin (2012) provided the evidence, which noted that the salience of taxes cost by monetary could shift the taxpayer's behaviours and attitude. Moreover, taxation in Asian is too diversity (Martinez-Vazquez, 2011) or Cassette and Paty (2008) noted that in the Western Europe, the taxes depended on the demographic and economic characteristic, while it did not in the Eastern Europe.

Furthermore, savings is another factor that many studies explore the relation with tax revenue. This determinant is one of the key sources of economic growth and determine the saving rate has been discussed in number of papers. Please (1967) said that domestic savings likely increase even when the government decrease the tax base. Tanzi and Zee (1998) explored the association between tax revenue/GDP ratio with the household saving rate for 19 OECD countries over a period of two and half decades (1971 – 1995). Only 5 countries witnessed a rise in both tax revenue/GDP ratio and the household saving rate while the rest countries experienced the contrast. The evidence means that the conventional view that the impact of income taxes on household savings is much greater than that of consumption taxes.

Lastly, we all may know that there is a big difference of cultural social behaviours in the Eastern and Western regions (Graham, 1989; Kupperman, 1989). Coward (2008) suggested that the Western and Eastern philosophy and psychology are diverse, it may lead the social as well as economic behaviour so that it needs to study more depending on different religions. On the other hand, there is a little paper that employed the empirical model to define the effects of this difference on taxation with the panel secondary data that relied on how different these regions were. Thus,

this paper aims to find the differences between the Eastern and the Western about determinants in tax revenue.

2.2. Tax with demographic factors

In contemporary days, HDI (human development index) is considered a substantial factor for every government in global scale, whereby every government needs to assure security, happiness and welfare for their citizens. Specifically, Popova and Kozhevnikova (2013) stated that there is a direct relation between budgets and the development of human capital through tax redistribution for European countries. Ofoegbu et al. (2016) explored the positive and significant impact between tax revenue with human development index for the period 2005 to 2014. In addition, this study revealed that measuring the effect of tax revenue on economic development using HDI demonstrated a lower relationship than measuring the association with GDP therefore applying GDP will illustrate the full picture of the relation between tax revenue and economic development in Nigeria. Sherwani et al. (2017) demonstrated the correlation of human development index in low, medium, high and very high human developed nations. Accordingly, developing countries simply identify GDP or wealth as a determinant for its economic and social growth and concentrate on development while developed countries focus on both development and social sphere for their citizens such as better education, quality of life, etc.

As compared with previous scholars, there exists a gap in exploring the role between diseases with tax while most predecessors empirically investigate these issues in the context of economic growth (Bloom & Mahal, 1997; Dixon et al., 2001; Acemoglu et al., 2003; Acemoglu, 2007). Most attempts demonstrated the negative effect in the appearance of diseases with economic growth (Bloom & Mahal, 1997; Dixon et al., 2001; Acemoglu, 2006; Haacker, 2004). Due to the fact that disease will slow down the economic growth therefore it will reduce the growth in domestic tax base, as the consequence, government revenue is attempted to reduce also.

Previous studies focus on the level of taxation on economic factors (inflow foreign direct investment, economic growth, trade openness...); demographic factors (age dependency, population growth rate) and institutional factors (civil liberties, corruption, governance quality, voice accountability…) (Binh & Lien, 2019). All previous research examines the level of tax effort in low-income countries and high-income countries.

There are few studies combining two regions as developing countries that represent the Eastern and developed countries, which stands for the Western.

2.3. Tax with natural resources

Another aspect that our study also follows to investigate that is tax with natural and disease problems. In terms of forest property taxes (taxes with natures), this issue is considered one of crucial source of revenue for countries and public services. Specifically, private owned forest lands contribute a number of benefits to society in direct impact as well as broader social context. Of the direct impact, forests products industry is one substantial industry, that provides working status for people in the United states. Of the social scale, a clear example related to this issue that is private forest lands influence on water quality, aiding in the maintenance of crucial biological cycles as well as other activities prolonged such as hiking, fishing, hunting, etc. (Hibbard et al., 2001). There

are some studies investigate the relation between tax with natures segments. Jacobson and McDill (2003) summarized the three special forest tax programs in Pennsylvania. The first law was passed in 1887 and aimed to reduce forest exploitation. The second law in 1913 to encourage second – growth timber management and the third law was passed in 1974, the issue allowed for current use assessment for farm and forestland. However, the first two tax programs spent for over 50 years with little effective impact on forest management due to administrative barriers to participation, landowners were afraid of giving up too much control on their land, lack of compensations for landowners and lack of publicity about the programs. However, in the appearance of existing studies, there are few attempts to explore the role between tax and natural resources.

3. METHODOLOGY

3.1. *Model, hypotheses and variables:*

The model is: T = f(E, D, I), where E represents the economic factors, D stands for demographic variables and I is institutional proxies that control and drive the tax collection of a country. Furthermore, Binh and Lien (2019) also argued tax collection of a country may depend on tax rate and tax compliance burden. Bird et al. (2004) mentioned that economic, demographic are supply-side factors to determine the tax base and institutional variable is considered the demand side factor. Continue to develop the previous argument, this study tries to guest the role of consumer behaviours on a country's defining tax collection. Moreover, the most previous researchers explored the role of forest in climate change, while its indirect impact on tax collection is not considered? This study tries to investigate how different ways of consumer pay for their spending and how did they prefer to save the money can affect tax collection in different regions such as ASEAN and its close area namely China (The Eastern) to compared with European regions (the Western).

Following Binh and Lien (2019)'s equation: TR = F(X, Y, Z)   (1),
and TR = G (*Rate, CB*, X, Y, Z)   (2),
the paper summary the general idea of the study is below:

Taxre = E(*B, N, T, H*), where *B* interprets the behaviours of consumer in the market. In the paper this factor can be expressed by two variables: "*Bom*" and "*Sav*". N stands for nature factor that is forest land area. *T* denotes the trade proxy, which says the "*FDI*" variable, remain two variables "*Intub*" and "*Hdir*" represents the human capital (*H*).

From above arguments, this study designs the empirical quadric model as seen below:

$$Taxre_{iJ,t} = \lambda_0 + \lambda_{1iJ}Bom_{iJ,t} + \lambda_{2iJ}Sav_{iJ,t} + \lambda_{3iJ}FrliJ,t + \lambda_{4iJ}FDI_{iJ,t} + \lambda_{5iJ}Intub_{iJ,t} + \lambda_{6iJ}Hdir_{iJ,t} + \eta_i, \quad (3)$$

Hypotheses: H$_1$: λ_{1iJ} # λ_{2iJ} # λ_{3iJ} # λ_{4iJ} # λ_{6iJ} # λ_{6iJ} , and H$_2$: λ_{iJ} # 0 depending on J

where:
- *Taxre* = Tax revenue ratio (% of GDP)
- *Bom* = Broad money (% of GDP, the sum of currency outside banks
- *Sav* = Gross savings (% of GDP)
- *Frl* = Forest area (% of land area)
- *FDI* = Foreign direct investment, net inflow (% of GDP)
- *Intub* = Incidence of tuberculosis (per 100,000 people)
- *Hdir* = human development index ranking (Dummy variable with zero value for the HDI is under mean of Human development index and 1 for the other once)
- η_i = error term for un-observation
- *i* denotes the countries *i* and *J* is the group of countries, $i = 1 - 16$ and $J = 1 - 2$

The research aims to compare the assessment of influence of consumer behaviours as well as of forest land area on tax collection capability in different regions, the study investigates above model for two-group data by grouping the panel dataset into two smaller groups such as ASEAN-7 plus China and EU-8 countries over the period from 2000 to 2018. There are not enough large panel data that is why this research conducts the panel corrected standard error (PCSE) model to compare with the panel data by feasible generalized least square (FGLS) model to evaluate the impact of above designed equation.

3.2.   Data and its source

Except the data of tax revenue and human development index, this research extracted the remain data of the World development indicator from the World Bank website. Tax revenue ratio for China and ASEAN-7 Plus countries were collected from the Key indicators of Asian Development Bank and for Eight European countries from OECD database. The study collected Human development index from the database of the United Nations Development - UNDP's website.

4.   RESULTS AND DISCUSSION

Table 1 shows the descriptive statistics about dependent variable and independent ones. The paper has 302 observations for *Taxre* and 304 observations for each independent proxy covering the period 2000-2018. In term of *Taxre*, Cambodia got the lowest ratio of 7.54% GDP in 2003 and Denmark got the highest of 36.50% GDP in 2014. Cambodia got the lowest data for the variables *Bom* in 2000, *Sav* in 2004, *Hdi* in 2000 while China got the maximum data for *Bom* and *Sav* in 2008.

Table 1: Descriptive Statistics of data whole data (16 countries in total including 8 Asian countries and 8 European countries)

Variables	Obs	Mean	Std. Dev.	Min	Max
Taxre	302	17.36	6.54	7.54 Cambodia (2003)	36.50 Denmark (2014)
Bom	304	83.15	43.57	12.91 Cambodia (2000)	209.45 China (2008)
Sav	304	30.90	9.20	12.55 Cambodia (2004)	52.24 China (2008)
Frl	304	37.86	16.31	13.14 Denmark (2005)	68.92 Sweden (2014-18)
Hdi	304	0.78	0.12	0.42 Cambodia (2000)	0.95 Norway (2018)
Intub	304	134	170	4 Norway (2018)	590 Philippines (2000)
Fdi	304	4.88	7.73	−41.46 Hungary (2018)	54.65 Hungary (2016)

Source: World development indicators[1], Human development index[2], Key Indicators[3] and OECD's database[4]

Table 2: Correlation matrix

Variables	*Taxre*	*Bom*	*Sav*	*Frl*	*Hdir*	*Intub*	*Fdi*
Taxre	1						
Bom	−0.23 (0.00)***	1					
Sav	−0.10 (0.08)*	0.52 (0.00)***	1				
Frl	−0.16 (0.00)***	−0.18 (0.00)***	−0.29 (0.00)***	1			
Hdir	0.45 (0.00)***	0.11 0.05	0.10 (0.09)*	−0.26 (0.00)***	1		
Intub	−0.43 (0.00)***	−0.24 (0.00)***	0.06 0.34	0.19 (0.00)***	−0.81 (0.00)***	1	
Fdi	−0.09 (0.10)*	0.09 (0.10)*	0.06 0.29	−0.10 (0.09)*	0.05 0.35	−0.08 0.15	1

Note: *** $p < 0.01$; ** $p < 0.05$ and * $p < 0.1$
Source: World development indicators[1], Human development index[2], Key Indicators[3] and OECD's database[4]

Table 2 shows that almost independent variables have a negative relationship with tax revenue ratio, except Human development index rank at first glance. To ensure the least bias from correlation between cross data, the study conducts VIF (Variance inflation factor) test to check multicollinearity. Hair et al. (2014) and Lien (2018) suggested that the VIF should be smaller than the value of $1/(1-0.952) = 10.256$. Then VIF is bigger than 10 the multicollinearity was high (a rule of thumb), so, it causes multicollinearity. In this case, the finding confirms all coefficients of VIF test are smaller than 4, it is clear that the variables in regression model do not violate multicollinearity. This indicates how well the predictors predicts the outcome variable, multicollinearity cannot reduce the predictive power of the model (see appendix table A1).

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[1] World Bank group: World development indicator (2019): https://datatopics.worldbank.org/
[2] UNDP's website: http://hdr.undp.org/en/content/human-development-index-hdi.
[3] ADB data library: Key indicators (2019) https://data.adb.org/
[4] OECD database: https://data.oecd.org/

Using the HDI indicator from UNDP, we can conclude that eight European countries have high HDI from 0.78 (low in Russia Federation) to 0.94 (high in Norway) compared to the data : 0.52 (low in Cambodia) – 0.89 (high in Singapore) in ASEAN-7 plus China. To explore the role of human capita, the research computes the HDI rank (*Hdir*) by calculating the average of the HDI indicator by country and by year and get the mean for 7-ASEAN Plus is 0.69 and 0.87 for eight European countries. The study continues to develop the dummy variable for HDI rank factor by taking the zero value for all indicators that are below the mean and one for the equal or higher one of the mean (see appendix table A3).

Table 3: The main results of using time-series Feasible generalized least square (FGLS) and panel corrected standard error models PCSE

3.1 The results of FGLS model

Variables	China and ASEAN – 7 PLUS		8 –EUCountries	
	Coef.	Z statistic	Coef.	Z statistic
	Std. Err.	P>z	Std. Err.	P>z
	0.03	3.04	–0.18	–15.80
Bom	(0.01)	(0.00)***	(0.01)	(0.00)***
	–0.05	–1.74	0.03	0.39
Sav	(0.03)	(0.08)*	(0.07)	(0.70)
	0.03	1.44	–0.08	–3.59
Frl	(0.02)	(0.15)	(0.02)	(0.00)***
	0.04	1.04	0.02	0.40
Fdi	(0.04)	(0.30)	(0.04)	(0.69)
	–0.005	–2.20	–0.09	–4.41
Intub	(0.00)	(0.03)**	(0.02)	(0.00)***
	3.95	7.98	8.58	7.41
Hdir	(0.50)	(0.00)***	(1.19)	(0.00)***
	11.85	5.22	31.64	18.45
Constant	(2.27)	(0.00)***	(1.62)	(0.00)***
Number of obs	150		150	
Number of groups	8		8	
Wald chi2	164.93	(0.00)***	357.62	(0.00)***
Log likelihood	–330.69		-432.06	

Note: *** p< 0.01; ** p<0.05 and * p<0.1

3.2 The results of PCSE model

Variables	China and ASEAN – 7 PLUS		8 –EU Countries	
	Coef.	Z statistic	Coef.	Z statistic
	Std. Err.	P>z	Std. Err.	P>z
	0.03	2.91	–0.18	–14.47
Bom	(0.01)	(0.00)***	(0.01)	(0.00)***
	–0.05	–1.56	0.03	0.37
Sav	(0.03)	(0.12)*	(0.07)	(0.71)
	0.03	2.49	–0.08	–765
Frl	(0.01)	(0.01)***	(0.01)	(0.00)***
	0.04	1.05	0.02	0.44
Fdi	(0.04)	(0.30)	(0.04)	(0.66)
	–0.005	–1.77	–0.09	–4.68
Intub	(0.00)	(0.08)*	(0.02)	(0.00)***
Hdir	3.95	5.38	8.58	5.09

	(0.73)	(0.00)***	(1.69)	(0.00)***
	11.85	5.12	31.64	22.55
Constant	(2.32)	(0.00)***	(1.40)	(0.00)***
Number of obs	150		152	
Number of groups	8		8	
Wald chi2	521.81	(0.00)***	1173.18	(0.00)***
R-squared	0.52		0.70	

Note: *** $p < 0.01$; ** $p < 0.05$ and * $p < 0.1$

The result of table 3 shows that all λ_1, λ_3 and λ_5 c coefficients are statistically significant negative at one percent and have the expected signs in eight European countries. In both groups of countries, the Human Development index supports the hypothesis with $\lambda_6 > 0$ and significant statistically. Furthermore, *Fdi* has a positive effect on tax revenue statistically insignificant for the Western as well as the Eastern.

Beside, the big different finding is that the variables such as *Bom* and *Frl* play positive roles in enhancing tax revenue in China and ASEAN–7, while they reduce tax revenue in EURO-8. The variable "*Sav*" has a negative statistically significant impact at the 10 percent level in ASEAN–7 plus China. In the contrast, "*Sav*" has positively affect to tax revenue in EURO–8 statistically insignificant. The finding also provides the evidence that support Haacker (2004)'s confirmation that tuberculosis has a negative relationship with taxation.

Collecting the secondary data and applying both FGLS and PCSE models support this research to confirm the different effect of relationship between tax revenue and other macroeconomic and demographic factors depending on the group countries as seen as above table 3.1 and 3.2. The main findings are listed as below:

Firstly, in both groups of countries, inflow of foreign direct investment and human development index are two beneficial factors that promote the tax revenue, while disease is a harmful factor for taxation in the Eastern as well as in the Western.

Secondly, broad of money – M2 and gross saving have different impacts on tax collection depending on each group of countries. The finding provides the evidence of important role of M2 in ASEAN–7 plus China and its opposite side of effect in EU–8 countries. Gross saving can reduce the tax revenue in ASEAN–7 plus China, while it has a positive influence without significance in EU–8 countries.

Lastly, the nature factor in this study is the forest land area has an insignificant positive effect on taxation in the Eastern, however it has a reverse effect in the Western.

From the findings, the research contributes the suggestion to the policymakers for both regions to increase tax collection. First, the governments have to shed some lights on the policy to control diseases such as the incidence of tuberculosis as well as to improve the human development index. The governments in the Western and Eastern may focus on increasing the inflow of foreign direct investment for enhancing their collection of tax too. Secondly, in the Eastern, policy makers should design the payment mechanism that lets their citizens use a broad range of money and does not

engage in savings. While the Western governments should handle the forest land area and aim to develop sustainability as well as control the use of broad money inside domestic.

Furthermore, both the results in table 3.1 and 3.2 interpreted that the developed model guarantees robustness and reality owing to the same signal of the effect of major factors as well as control variables such as: consumer behaviour, nature, trade and human capital in the Eastern and Western regions (see table 3.1 and 3.2). The results also confirmed that PCSE and FGLS models are appropriate models for analysing the small panel data with large T and small N.
This research also supports the hypothesis H_1 and H_2

Table 4: summary of supporting hypotheses

Variables	Hypotheses		Accepted	
	ASEAN– 7 plus China	8 –EUCountries	ASEAN– 7 plus China	8 –EUCountries
Bom - λ_1	# 0	# 0	> 0 with significant	< 0 with significant
Sav - λ_2	# 0	# 0	< 0 with significant	> 0 without significant
Frl - λ_3	# 0	# 0	> 0 without significant	< 0 with significant
Fdi - λ_4	# 0	# 0	> 0 without significant	
Intub - λ_5	# 0	# 0	< 0 with significant	
Hdir - λ_6	# 0	# 0	> 0 with significant	

5. CONCLUSION

Applied both FGLS and PCSE models, this research strongly confirms that in both the Eastern and Western regions, human capital always plays an important role in enhancing the taxation, which gains the biggest coefficient on affecting tax revenue. Especially in the Western, this factor contributes to the higher impact than in the Eastern (i.e. +8.58 versus +3.95). The Government in these regions should focus on increasing the human development index by issuing effective educational policies as well as handling the disease. Secondly, the taxation in different regions may be collected with different levels depended on the different ways of consumers spend their money or save the money in each region. Broad money in the ASEAN-7 plus China can be a beneficial factor for taxation, while it is a negative factor in 8-European countries. Moreover, the saving may be a good variable in Europe for tax revenue but in Asia, it is a bad factor. Lastly, forest area has a positive impact on taxation in the Eastern while it has a negative effect in the Western. This result matches well with the conclusion of Pessino and Fenochietto (2010) that is broad money on GDP is likely to increase tax revenue. This proves differences in taxation collection among those countries. Thus, it seems to be that the habit to use cash in ASEAN–7 and China which is still high and be one of tax collection's factors. However, this will be conductive to difficulties in controlling corruption and transparency. So, it will lead to shed some lights for us to clarify between broad money and governance quality in near future. Beside, ASEAN–7 and China's governments should improve their governing institutions, adopting a long term vision for taxation reforms (i.e. Change in the tax system should be oriented to improved its quality), the authorities of these countries can

achieve their purposes in improving tax revenue and economic performance. In developing countries, the governments often try to increase their tax ratio to spending more for education, health care, public infrastructure because they want to grow or reduce poverty. Policy makers face the choice of either scaling down expenditures or increasing taxes, the trade-offs for development become much more apparent and may motivate appropriate decisions toward timely tax reform.

Secondly, gross savings plays an important role in tax revenue in both the regions. Especially, gross savings has a negative impact on tax revenue in the Eastern while it is one of vital sources of economic development based on economic theories in the Western.

Furthermore, the governments in both regions should issue effective socio-economic policies in improving money supply and increasing savings, attracting FDI, investing more in human capital, controlling diseases and effectiveness in using land area for keeping the countries on the path of development.

The limitation of the paper is that we do not have enough data about three ASEAN countries such as Lao PDR, Myanmar, Brunei, and only eight European countries out of 27 countries. Moreover, the paper is short of many variables such as civil liberties, political rights, child mortality rates and the proxy of education, institutional factors (quality of governance, voice accountability)... So, in our ambition we will solve these issues for future research.

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APPENDIX

Table A1: VIF test results

Variables	Vif	1/Vif
Intub	3.81	0.26
Hdir	3.49	0.29
Sav	1.77	0.57
Bom	1.72	0.58
Frl	1.15	0.87
Fdi	1.02	0.98
Mean Vif		**2.16**

Table A2: The Rank of Human Development Index in the EASTERN and the WESTERN countries

ASEAN – 7 plus China	HDI 2000	HDI 2001	HDI 2002	HDI 2003	HDI 2004	HDI 2005	HDI 2006	HDI 2007	HDI 2008	HDI 2009	HDI 2010
Cambodia	0.42	0.43	0.45	0.47	0.48	0.49	0.50	0.52	0.52	0.52	0.54
Indonesia	0.60	0.61	0.62	0.62	0.63	0.63	0.64	0.64	0.65	0.66	0.67
Malaysia	0.72	0.72	0.72	0.73	0.73	0.73	0.74	0.75	0.76	0.77	0.77
Philippines	0.63	0.63	0.64	0.64	0.65	0.66	0.66	0.66	0.67	0.67	0.67
Singapore	0.82	0.82	0.83	0.84	0.85	0.87	0.87	0.88	0.88	0.89	0.91
Thailand	0.65	0.66	0.67	0.67	0.68	0.69	0.69	0.71	0.71	0.72	0.72
Vietnam	0.58	0.59	0.59	0.60	0.61	0.62	0.62	0.63	0.64	0.65	0.65
China	0.591	0.599	0.61	0.622	0.631	0.643	0.657	0.67	0.681	0.69	0.702
MEAN YEAR	**0.63**	**0.63**	**0.64**	**0.65**	**0.66**	**0.67**	**0.67**	**0.68**	**0.69**	**0.69**	**0.70**

ASEAN – 7 plus China	HDI 2010	HDI 2011	HDI 2012	HDI 2013	HDI 2014	HDI 2015	HDI 2016	HDI 2017	HDI 2018	MEAN COUNTRY	HDIR
Cambodia	0.54	0.54	0.55	0.56	0.56	0.57	0.57	0.58	0.58	**0.52**	0
Indonesia	0.67	0.67	0.68	0.69	0.69	0.70	0.70	0.70	0.71	**0.66**	0
Malaysia	0.77	0.78	0.78	0.79	0.79	0.80	0.80	0.80	0.80	**0.76**	1
Philippines	0.67	0.68	0.68	0.69	0.70	0.70	0.70	0.71	0.71	**0.67**	0
Singapore	0.91	0.91	0.92	0.92	0.93	0.93	0.93	0.93	0.94	**0.89**	1
Thailand	0.72	0.73	0.73	0.73	0.74	0.75	0.75	0.76	0.77	**0.71**	1
Vietnam	0.65	0.66	0.67	0.67	0.68	0.68	0.69	0.69	0.69	**0.64**	0
China	0.702	0.711	0.719	0.727	0.735	0.742	0.749	0.753	0.758	**0.68**	0
MEAN YEAR	**0.70**	**0.71**	**0.72**	**0.72**	**0.73**	**0.73**	**0.74**	**0.74**	**0.74**	**0.69**	1

8– EURO Countries	HDI 2000	HDI 2001	HDI 2002	HDI 2003	HDI 2004	HDI 2005	HDI 2006	HDI 2007	HDI 2008	HDI 2009	HDI 2010
Czech Republic	0.80	0.81	0.81	0.82	0.82	0.84	0.84	0.85	0.85	0.86	0.86
Denmark	0.86	0.88	0.88	0.89	0.90	0.90	0.91	0.90	0.91	0.91	0.91
Hungary	0.77	0.78	0.78	0.79	0.80	0.80	0.81	0.81	0.82	0.82	0.83
Norway	0.92	0.92	0.92	0.92	0.93	0.93	0.94	0.94	0.94	0.94	0.94
Poland	0.79	0.79	0.80	0.80	0.80	0.81	0.81	0.82	0.82	0.83	0.84
Russian Federation	0.72	0.73	0.73	0.74	0.75	0.75	0.76	0.77	0.77	0.77	0.78
Sweden	0.90	0.90	0.90	0.91	0.90	0.90	0.90	0.91	0.90	0.90	0.91
Switzerland	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.92	0.92	0.93	0.93
MEAN YEAR	**0.83**	**0.84**	**0.84**	**0.85**	**0.85**	**0.85**	**0.86**	**0.86**	**0.87**	**0.87**	**0.87**

8– EURO Countries	HDI 2011	HDI 2012	HDI 2013	HDI 2014	HDI 2015	HDI 2016	HDI 2017	HDI 2018	MEAN COUNTRY	HDIR
Czech Republic	0.87	0.87	0.87	0.88	0.88	0.89	0.89	0.81	**0.85**	0
Denmark	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93	**0.91**	1
Hungary	0.82	0.83	0.84	0.83	0.84	0.84	0.84	0.85	**0.82**	0
Norway	0.94	0.94	0.95	0.95	0.95	0.95	0.95	0.95	**0.94**	1
Poland	0.84	0.84	0.85	0.85	0.86	0.86	0.87	0.87	**0.83**	0
Russian Federation	0.79	0.80	0.80	0.81	0.81	0.82	0.82	0.82	**0.78**	0
Sweden	0.91	0.91	0.93	0.93	0.93	0.93	0.94	0.94	**0.91**	1
Switzerland	0.93	0.94	0.94	0.94	0.94	0.94	0.94	0.95	**0.92**	1
MEAN YEAR	**0.88**	**0.88**	**0.89**	**0.89**	**0.89**	**0.90**	**0.90**	**0.90**	**0.87**	1

Source: Human development index from UNDP's website: http://hdr.undp.org/en/content/human-development-index-hdi