

Association of Macroeconomic Indicators with Violence Incidents in Narathiwat Province of Southern Thailand – Responses for Adaptive Agricultural Management

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ABSTRACT

The problem of violence incidents in Narathiwat province of Southern Thailand has been chronic since the crucial weapon attack on January 4, 2004. The violence has been escalated into a large scale problem in Narathiwat and the other of two border provinces causing losses of properties and lives of the people. The objective of this study is to empirically investigate relationships between macroeconomic indicators and violence incidents in Narathiwat province. Annual time series data during 1996-2017 were collected, unit root and co-integration tests were performed, and correlation coefficients were used as a tool of analysis. The study finds that there was a significant difference in number of violence incidents between 1996-2003 (before) and 2004-2017 (after). There existed long-run equilibriums between macroeconomic indicators and violence incidents. The correlation coefficients between the macroeconomic indicators and number of violence incidents confirmed the economic deprivation of opportunity cost argument. The higher was the real industrial gross provincial product, the lower was the likelihood or willingness to get involved in the violent activities as indicated by a negative correlation coefficient. Regarding the real gasoline price, the higher were the prices, the more was the number of violence incidents. A novelty of this work is that the study explicitly took into consideration both of the arguments in explaining the association between the macroeconomic indicators and number of violence incidents in Narathiwat province. There existed cope-up and adaptive agricultural strategies in terms of avoiding agricultural activities in remote area at odd times. The gasoline prices should be controlled or subsidized to farmers. This is to increase the opportunity costs for the involvement in the violence incidents.

Key words: Violence incidents, Macroeconomic indicators, Unit root test, Co-integration test, Correlation coefficient, Narathiwat province

INTRODUCTION

Terrorism and violence incidents are threats to life and property of citizens in many countries around the world. The number of terrorism around the world increased and tended to steadily increase (Choosonsaeng, 2004).

The National Consortium for the Study of Terrorism and Responses to Terrorism (2016) had reported that in 2012, there were 6,671 of terrorists. Their terrorism attacks executed in over 11,000 people and injured more than 21,600 people. In addition, 1,280 people were taken in hostage or kidnapped. A form of terrorism was explosion attacks at 62 percent and other weapons at 25 percent. The rest 13 percent were killings, hostages and attacks on infrastructure facilities.

In Thailand, major violence incidents mostly occurred in the three southern border provinces of Thailand; Narathiwat, Pattani and Yala and also four districts of Songkhla; Nathavee, Chana, Thepha, and Saba Yoi called “Fai-Tai”. They have happened regularly and increased since 2004. The violence incidents during 14 years (2004-2017) resulting in 6,637 deaths and 12,677 injuries. In 2007, the violence incidents had most incurred, then it rise and fall, but it incurred more than before 2004 (Center for Deep South Watch, 2018). The new wave of the violence incidents have had negative consequences and stagnation to economic, and the livelihoods of people in the southern border area that even in normal circumstances the average per capita income is low (considered on the gross provincial product), and are in the lowest level in the South (Office of the Economic and Social Development Board Economic and Social, 2018). The public has adapted in some level in working in the midst of violence incidents. Besides there is also a shift in the structure of the economy that partly due to the huge budget of government fuelling in the area during the past decade, including the expansion of local businesses that are in contrast with the situation of the violence incidents. These violence incidents not only affect losses in both life and property of the people, but also affected socio-economic conditions of the people such as women became widowed, children became orphaned, local people migrated to other provinces, and household income decreased. These have hindered the province economic growths and welfare of the local residents (Bundhuwong, 2017).

Analysis of socio-economic situation and causes of violence incidents in the three southern border provinces of Thailand. Whether it is before or in the midst of violence incidents. If the related people know the long-term relationship between macroeconomic variables and the violence incidents. It will be able to use this relationship that occurs between macroeconomic variables and violence incidents in case of analyzing the long-term direction of

the violence incidents, that in the future, the economy and society, and the causes of the violence incidents that we analyze will still have the same relationship, or it can be analyzed how macroeconomic and the violence incidents variables have a speed of adaptation. Due to the theorem in economics that at least, in the long run, socio-economic variables should be moving in a consistent direction. Even in the short run, the movement of the variables may not be quite certain of any direction. The results of this study are expected to benefit to the related people so that decisions towards appropriate plans and policies can be made to solve the problem and to achieve stability and sustainable in the area.

THE EMERGENCE OF TERRORISM AND VIOLENCE INCIDENTS

The most important socio-economic explanation of roots of terrorism and violence incidents generally focus on two main aspects.

Firstly, poor economic conditions and lack of economic opportunities are supposed to favor the emergence of terrorism and violence incidents. In fact, poverty and income inequality would feed frustration, hatred and grievance which make violence more likely. In the presence of widespread poverty, the opportunity cost for individuals is very low. This is supposed to favor the recruitment process undertaken by terrorist organizations. This point (which is based on the classical opportunity-cost argument) is commonly known as economic deprivation argument.

Secondly, an interpretation of the causes of terrorism and violence incidents can be defined as immiserizing modernization argument. According to this argument developed by Olson (1963, cited by Caruso and Schneider, 2011), economic growth were expected to produce a shift in the distribution of interest so as to fuel the grievances of some groups of the society. That is to say, the basic intuition of this argument is that socio-economic changes over a long-run affect the socio-economic conditions. In this view, terrorist organizations would flourish if they are able to collect and capitalize on the grievances of losers. Therefore, terrorism and violence incidents emerge in the presence of economic growth and development (Caruso and Schneider, 2011).

Caruso and Schneider (2011) and others studied the empirical evidence. For example, there was a positive relationship between unemployment and Palestinian suicide bombings in West Bank (Sayre, 2009), unemployment is a leading factor to explain violence in Northern Ireland (Honaker, 2010), unemployment appeared to increase the willingness to participate in civil violence among the group of young school individuals in Nigeria's Delta (Oyefusi, 2010). The association between unemployment and civil violence was

not statistically significant unless an interaction term between unemployment and education was considered. These findings confirm punctually that some macroeconomic indicators might not be significantly associated with the violence incidents on their own. There exists interactions between the macroeconomic indicators that exhibit the significant associations. The economic deprivation of opportunity cost and immiserizing modernization arguments can jointly explain the associations between these interacted indicators and violence incidents.

In addition, Malik and Zaman (2013) examined macroeconomic consequences of terrorism in Pakistan. The study evaluated the short-run and long-run relationships between terrorism and economic factors over a period of 1975–2011. The result revealed that macroeconomic factors, i.e., population growth, price level, poverty and political instability caused the terrorism incidence in Pakistan. However, income inequality, unemployment and trade openness had no long-run relationship with the terrorism incidents in Pakistan. And also the research by Ismail and Amjad (2014), The determinants of violence incidents are economic and social variables such as, real GDP per capita, political rights, Inflation, poverty, inequality, and literacy levels. These factors have long-term relationships with violence incidents.

RESEARCH METHODOLOGY

Research methodology is composed of data collection and analysis, and description of main explanatory variables, their sources and expected associations. They are presented as follows.

Data collection and analysis

Data collection and analysis process involves data acquisition, data adjustment and data analysis as described in the following sub-sections.

Data acquisition. The annual time series data of macroeconomic indicators and the violence incidents in Narathiwat province during 1996 to 2017 were obtained from the Center for Deep South Watch (CDSW), Office of the National Economic and Social Development Board (ONESDB), Department of Provincial Administration (DPA), Petroleum Authority of Thailand (PTT), and Rubber authority of Thailand (RAT).

Data adjustment. The Augmented Dickey-Fuller test for unit root was performed to check if the studied variables were stationary at the same level $I(0)$, first difference $I(1)$, or at the higher degree of differences, i.e. $I(2)$. The test results provide evidences that any two variables are co-integrated in the long

run. The non stationary series may have spurious correlation if they are not co-integrated (Griffiths, *et al.* 2010, Aunthong, 2012).

There were evidences of co-integration in the violence incidents variable and macroeconomic indicators even if they possessed different integrated orders. The violence incidents variable is integrated at I(0) or stationary at level, while the macroeconomic indicators were integrated at I(1) or stationary at first difference. The error terms were stationary at I(0) indicating an existence of co-integration.

Data analysis. There are several ways to measure associations between macroeconomic indicators and violence incidents, such as the scatter diagram and covariance between two variables. Karl Pearson had devised a method for describing the degree of correlation between two variables that were measured in interval or ratio scale by avoiding the measurement of the two variables that affected to the relationships solution, by dividing the covariance by the standard deviation of each variable, and called correlation coefficient (Weisstein, 2016).

The associations between macroeconomic indicators and the violence incidents are examined. It is important to note that there may be a non-linear relationship between two continuous variables, but computation of a correlation coefficient does not detect this. Therefore, it is always important to evaluate the data carefully before computing a correlation coefficient (Boston University School of Public Health, 2015).

Correlation coefficients are between -1.00 and +1.00. The size of the correlation or degree of oscillation of the variables can be considered from the numerical correlation coefficient. The plus or minus sign indicates the direction of the relationship between variables, positive means that two variables are related in the same direction, negative sign means that two variables are in opposite. If the value is one, then the strength of the relationship between the two variables is perfect. If the value is close to one, the strength of the relationship is high. On the contrary, if the value is close to zero, the relationship between the two variables is weak. If the value is zero, there is evidently no relationship between the two variables (Nissapa, 2012).

Main explanatory variables, sources and expected associations

In order to study the traits of the violence incidents in Narathiwat province, one dependent variable was defined as number of violence incidents per year. These chosen dependent variables are assumed to capture aspects and emergence of the violence incidents. This variable is expected to have some noticeable associations with provincial macroeconomic conditions. The violence incidents per year in Narathiwat province varies with the macroeconomic indicators of this province. The main explanatory variables reflecting macroeconomic indicators are described and summarized as follows.

Immigration (number of people moving in the province) is expected to form a negative relationship with the violence incidents. The more is the violent incidents, the less is the immigration. Therefore, following the economic deprivation argument, immigration can be predicted to be negatively associated with the violence incidents, *ceteris paribus*.

Emigration (number of people moving out of the province) is expected to form a positive relationship with the violence incidents. The more is the violent incidents, the more is the emigration. Therefore, following the economic deprivation argument, emigration can be predicted to be positively associated with the violence incidents, *ceteris paribus*.

Unemployment rate is also commonly assumed as a proxy for the broad social welfare. The higher is the unemployment rate, the higher is the number of violence incidents because of a lower opportunity cost. Therefore, following the economic deprivation argument, unemployment rate can be expected to be positively associated with the violence incidents, *ceteris paribus*.

Gross provincial product growth rate (GPP growth rate) captures the stimulus for economic development. The association between the GPP growth rate and the violence incidents is expected to be negative, *ceteris paribus*, it supports the economic deprivation argument.

Real gross provincial product per capita (real GPP per capita) is commonly assumed to be the proper indicator for the macroeconomic conditions. Therefore, a negative association between the real GPP per capita and the number of violence incidents, *ceteris paribus*, is expected to confirm the economic deprivation argument.

Real agricultural gross provincial product (real AGPP), real industrial gross provincial product (real IGPP), and real trade and service gross provincial product (real TRGPP) are commonly assumed to be indicators for the macroeconomic conditions. Therefore, negative associations between real agricultural gross provincial product, real industrial gross provincial product, real trade and service gross provincial product and the number of violence incidents, *ceteris paribus*, are expected to confirm the economic deprivation argument.

Real gasoline price is also commonly assumed to be an indicator for the macroeconomic conditions. The higher is the real gasoline price, the higher is the number of violence incidents because it makes the people miserable. Therefore, a positive association between real gasoline price and the number of violence incidents, *ceteris paribus*, is expected to be positive revealing the economic deprivation argument.

Real para-rubber price is commonly assumed to be an indicator for the macroeconomic conditions. The higher is the para-rubber price, the lower is the number of violence incidents because it makes the people happy. Therefore, a negative association between the para-rubber price and the number of violence

incidents, *ceteris paribus*, is expected to be negative confirming the economic deprivation argument.

Summary of expected relationships between the studied macroeconomic indicators and violence incidents, and their possible explanation by the economic arguments is as follow:

Macroeconomic indicators	Expected relationships with the violence incidents	Possible economic indicators argument
Immigration	Negative	Economic deprivation
Emigration	Positive	Economic deprivation
Unemployment rate	Positive	Economic deprivation
GPP growth rate	Negative	Economic deprivation
Real GPP per capita	Negative	Economic deprivation
Real agricultural GPP	Negative	Economic deprivation
Real industrial GPP	Negative	Economic deprivation
Real trade and service GPP	Negative	Economic deprivation
Real gasoline price	Positive	Economic deprivation
Real para-rubber price	Negative	Economic deprivation

RESULTS AND DISCUSSION

Facts and figures of violence incidents in Narathiwat province during 1996-2017 is presented along side with their explanations comparing before (1996-2003) and after (2004-2017) of the escalation of the violence incidents. The analysis of data incorporates descriptive statistics, correlation coefficients and their relevant hypothesis testings.

Violence incidents in Narathiwat province

An annual data on the violence incidents in Narathiwat province showed that violence incidents had existed in low number during 1996 to 2003. It can be observed that the number of violence incidents started to escalate in 2004 (Kruse mosque massacre, Takbai Police Station clash, etc.) and reached the highest number in 2005 at 912 times, followed by 2007 and 2006 that the violence incidents were 632 and 594 times, respectively. From 2008 onwards the numbers of violence incidents gradually increased and started to decrease in 2014. But they were still much higher than the pre-2004 incidents as shown in Figure 1

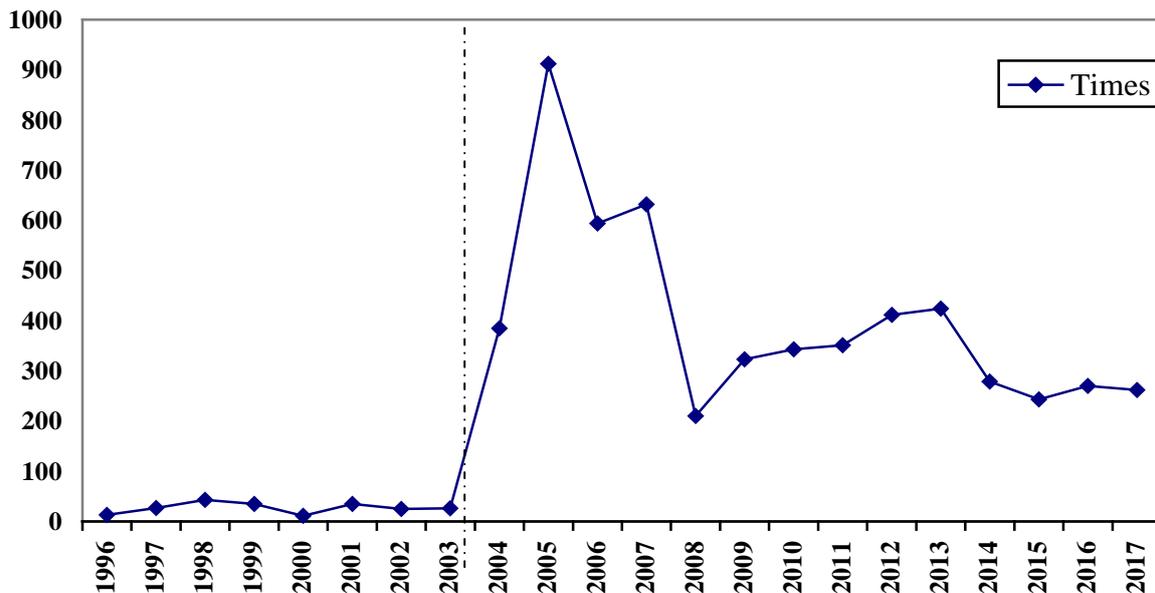


Figure 1. Number of violence incidents in Narathiwat province during 1996-2017

Source: Center for Deep South Watch (2018)

With respect to the macroeconomic indicators, the economic growth during 1996 to 2003 when the violence incidents existed in low number was at 8.5%, and went down and reached the lowest at -8.1% in 2000, then increased and reached the highest at 22.5% in 2003.

For the period of 2004-2017. It can be observed that the economic growth slightly decreased at 11.3% in 2004. The violence incidents fluctuated during in 2005 to 2017, the economic growths also fluctuated and reached the highest at 26.3% in 2010, and the lowest at -23.7% in 2012, and continued to have negative growths.

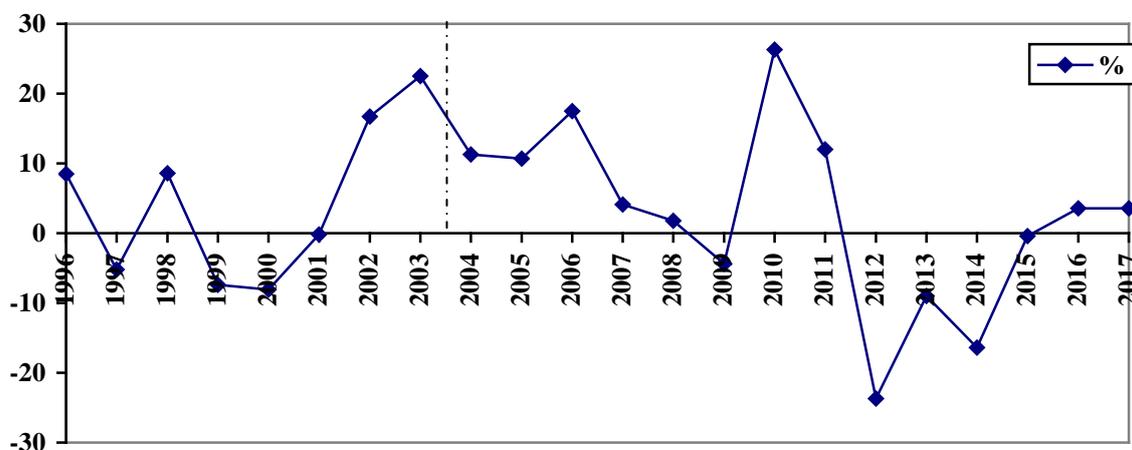


Figure 2. Economic growth (%) of Narathiwat province during 1996-2017

Source: Office of the National Economic and Social Development Board (2018)

Explanation of the violence incidents

As shown in Table 1, the descriptive statistics results revealed that there were statistically significant differences in most of the macroeconomic indicators and the violence incidents between the before (1996-2003) and after (2004-2017) the escalation of the violence incidents in Narathiwat province. It can be observed that the violence incidents increased more than 16 times from the mean value of 26.75 times during 1996-2003 to 402.86 times during 2003-2017. The GPP growth rate significant decreased from 4.43% to 1.68%, the significant increase in the violence incidents, the real GPP per capita, real agricultural GPP, real industrial GPP, and real trade and service GPP increased in accordance with the increase in population and its transaction in the provincial economy. Besides the real prices of gasoline and para-rubber decreased.

Table 1. Descriptive statistics of the violence incidents and macroeconomic indicators (1996-2017)

Variable	Source ¹	1996-2003 ²		2004-2017 ²		P-value
		Mean	Std.D.	Mean	Std.D.	
Number of violence	CDSW	26.75	10.27	402.86	184.65	0.000***
Immigration	DPA	31,125.00	5,261.57	37,727.50	4,565.85	0.015**
Emigration	DPA	24,512.38	2,719.38	37,111.50	4,306.85	0.000***
Unemployment rate	ONESDB	3.23	0.55	2.25	0.69	0.003***
GPP growth rate	ONESDB	4.43	10.74	1.68	14.38	0.000***
Real GPP per capita	ONESDB	18,895.49	838.79	23,461.78	2,000.57	0.000***
Real agricultural GPP	ONESDB	6,526.85	1,158.76	8,225.67	1,420.03	0.010***
Real industrial GPP	ONESDB	2,542.57	337.49	2,763.76	272.52	0.367 ^{ns}
Real trade and service	ONESDB	10,322.54	572.19	13,278.16	908.48	0.000***
Real gasoline price	PTT	9.27	1.20	9.14	1.31	0.828 ^{ns}
Real para-rubber price	RAT	29.58	5.56	29.89	7.98	0.919 ^{ns}

Note: 1.CDSW=Center for Deep South Watch, ONESDB=Office of the National Economic and Social Development Board, DPA=Department of Provincial Administration, PTT=Petroleum Authority of Thailand, RAT=Rubber Authority of Thailand.

2.Number of observation for 1996-2003 and 2004-2017 are 96 and 168 respectively.

3.Test of differences between two means.

***Significant at 1%, **Significant at 5%, ^{ns} Non-significant.

As shown in Table 2, during 1996-2003 before the escalation of the violence incidents, the correlation coefficients result showed only a negative and significant relationship between real industrial GPP and the violence incidents (-0.679*) implying that a decrease in transaction and investment in industries was associated with an increases in the violence incidents. This association is in line with the economic deprivation argument. The other macroeconomic indicators exhibited non-significant relationships with the violence incidents. These non-significant correlation coefficients indicated that

the violence incidents were independent from most of the studied macroeconomic indicators. They occurred but were not significantly related with the violence incidents.

During 2004-2017 when the violence incidents had been escalated, there was a negative and highly significantly association between the real industrial gross provincial product and the number of violence incidents (-0.668***), the economic deprivation of opportunity cost argument is confirmed. That is the lower is the set of economic opportunities for individuals, the higher is the likelihood or the willingness for people to get involved in the violence incidents. In other words, the higher is the level of well-being obtained from the industrial sector, the lower is the number of the violence incidents in Narathiwat province. There was a positive association between real gasoline price and the number of violence incidents (0.629**), the economic deprivation of opportunity cost argument is again confirmed. That is violence incidents emerge in the presence of high costs of necessary inputs. The other macroeconomic indicators exhibited non-significant relationships with the violence incidents. These non-significant correlation coefficients indicated that the violence incidents were independent from most of the studied macroeconomic indicators.

Table 2. Pairwise correlations between the violence incidents and macroeconomic indicators, 1996-2017

Variables	Incidents	
	1996-2003	2004-2017
Immigration (people/year)	-0.236	-0.024
Emigration (people/year)	-0.392	0.069
Unemployment rate (%)	0.054	0.172
GPP growth rate (%)	0.020	0.217
Real GPP per capita (baht)	0.017	0.200
Real agricultural GPP (million of baht)	0.161	0.379
Real Industrial GPP (million of baht)	-0.679*	-0.668***
Real Trade and service GPP (million of baht)	0.405	-0.268
Real gasoline price (baht/litre)	-0.265	0.629**
Real para-rubber price (baht/kg)	-0.629	0.146

Note: Test of significance of correlation coefficients.
 ***Significant at 1%, **Significant at 5%, *Significant at 10%.

RESPONSES FOR ADAPTIVE AGRICULTURAL MANAGEMANT

According to the results, the violence incidents cointegrated with the macroeconomic indicators. This indicated that there existed the long-run equilibrium between the studied macroeconomic indicators and violence incidents in Narathiwat province. Most of the macroeconomic indicators

exhibited non significant correlation with the violence incidents both before and after the violence-eccalated year (2004). The significant macroeconomic indicators associated with the violence incidents were the real industrial GPP in both before (1996-2003) and after (2004-2017) periods.

The significant agriculture-related macroeconomic indicators was the real gasoline price exhibiting a positive association. An increase in the real gasoline price was associated with an increase in the violence incidents indicating a pressure from the increases in costs of agricultural inputs and living expenditure of farming households.

The economic deprivation of opportunity cost argument can explain the above evidence of the positive association. Increasing stress in carrying on with increasing costs of living can lead to lower opportunity cost leading to more involvement in the violence incidents.

Based on the study results and in the short run, the farmers in Narathiwat province have avoided working in their rubber plantation in remote areas at night time as their cope-up strategies. They seek their employment opportunities in other sectors (industrial, and trade and services in the province or other provinces and regions. Some farming households have migrated to other provinces

In the long run, the farmers need direct government assistance for their adaptive responses to the violence incidents. Direct investment in industrial sectors to increase employment opportunities of the affected farmers is needed. The prices of gasoline must be controlled, or subsidized in the case of farming households.

Under the conditions of gasoline price, and cost of living are rising, the farmers apply some strategies, comprising both short-term cope-up strategies and long-term adaptive strategies. Some strategies are of success, some are not available and some are not effective. Major strategies comprise of (Bui et al., 2013);

- 1) using gasoline from other sources (cheaper gasoline from neighboring countries),
- 2) avoid working in rubber plantation in remote areas at odd time,
and
- 3) emigrating out of the province.

SUMMARY AND CONCLUSION

This study aims to study the relationships between macroeconomic indicators and violence incidents in Narathiwat province during 1996 to 2017. The unit root test was performed using the Augmented Dickey-Fuller test, and

the co-integration test was performed using the Engle and Granger method. These tests guaranteed that the correlation analysis results were not spurious.

The study concluded the economic deprivation of opportunity cost argument. Firstly, it clearly demonstrated that the violence incidents in Narathiwat province were negatively significant associated with the real industrial gross provincial product i.e., the higher is the set of economic opportunities for an individual, *ceteris paribus*, the lower is their involvement in unproductive (or even destructive) violences.

Secondly, There was a positive and significant association between the real gasoline price and the number of violence incidents.. That is, the higher was the real gasoline price, the more was the number of violence incidents. Again the economic deprivation of opportunity cost is confirmed.

However, as we noted earlier, the opportunity cost argument can take different shapes. Briefly, the immiserizing modernization argument is structured around the concept of future opportunity cost whereas the economic deprivation argument is structured around the concept of current opportunity cost. The cope-up and adaptive strategies of the farmers were to avoid working in remote areas at odd times. The government can enhance the agricultural sector to cope-up with the violent incidents by controlling or subsidizing farmers with gasoline prices.

Eventually, a novelty we would claim for this research work is that we explicitly took into account the economic arguments in relation with the violence incidents in Narathiwat province where it could be similar to other southern border provinces of Thailand, i.e. Pattani, Yala and some districts in Songkhla provinces.

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REFERENCES

Aunthong, A. 2012. Econometrics of Terrorism. Chiang Mai: Login Design Work. (in Thai).

- Boston University School of Public Health. 2015. Introduction to Correlation and Regression Analysis. (Online). <http://www.sphweb.bumc.bu.edu/>. Accessed on 1 December 2015.
- Bui, T. M. H., Schreinemachers, P. and Berger, T. (2013). Hydropower development in Vietnam: Involuntary resettlement and factors enabling rehabilitation. *Land Use Policy*, 31, 536-544.
- Bundhuwong, C. (2017). Economy and Development in Southern Border Provinces: Critical Investigation. A decade of anthropology and sociology with Southern Border Provinces Education (2017): 31-68.
- Caruso, R. and Schneider, F. 2011. The socio-economic determinants of terrorism and political violence in Western Europe (1994-2007). *European Journal of Political Economy* 27 (2011): S37-S49.
- Center for Deep South Watch. 2018. Terrorist incidents and the number of injuries and deaths in the three Southern Border Provinces of Thailand since 2004-2017. (Online). <http://www.deepsouthwatch.org>. Accessed on 25 February 2018.
- Choosonsaeng, T. 2004. Terrorism in the view of the United States. (Online). <http://www.wing2.rtaf.mi.th/>. Accessed on 1 Mach, 2015.
- Department of Provincial Administration, 2018. Annual population. (Online). [http:// www.dopa.go.th](http://www.dopa.go.th). Accessed on 24 February 2018.
- Griffiths, W.E., Hill, R.C. and Lim, G.C. 2010. Using Eviews for Principle of Econometrics. 3rded. New Jerseys: John Wiley and Sons.
- Gurr, T.R. 1968. Psychological factors in civil violence. *World Politics* 20: 245–278.
- Gurr, T. 1970a. *Why Men Rebel*. Princeton University Press, Princeton NJ.
- Gurr, T. 1970b. Sources of rebellion in western societies: some quantitative evidence. *The Annals of the American Academy of Political and Social Science* 391: 128–144.
- Honaker, J., 2010. Unemployment and Violence in Northern Ireland: a missing data model for ecological inference. Paper presented to QuaSSI, Penn State, February 2010.
- Ismail, A. & Amjad, S. (2014). Determinants of terrorism in Pakistan: An empirical investigation. *Economic Modelling* 37 (2014) 320-331.
- Kuznets, S. 1955. Economic growth and income inequality. *The American Economic Review* 45: 1–28.
- Malik, Z. and Zaman, K. 2013. Macroeconomic consequences of terrorism in Pakistan. *Journal of Policy Modeling* 35: 1103–1123.

- Marohabout, P., Choonpradub, C. and Kuning, M. 2009. Terrorism Risk Modeling in Southern Border Provinces of Thailand during 2004 to 2005. *Songklanakarin J. Social Sciences and Humanities* 15 (6): 885-895.
- National Consortium for the Study of Terrorism and Responses to Terrorism. 2016. *Terrorism and Responses to Terrorism*. (Online). <http://www.start.umd.edu/>. Accessed on 20 April 2016.
- Nissapa, A. 2012. *Principles of Econometrics for Agricultural Management*. Songkhla: Faculty of Natural Resources, Prince of Songkla University.
- Office of the National Economic and Social Development Board. 2018. Special area development plan in the three southern border provinces of Thailand year 2004–2017. (Online). <http://www.nesdb.go.th>. Accessed on 23 February 2018.
- Olson, M. 1963. Rapid growth as a destabilizing force. *The Journal of Economic History* 23: 529–552.
- Oyefusi, A., 2010. Oil, youths, and civil unrest in Nigeria's Delta. *Conflict Management and Peace Science* 27, 326–346.
- Petroleum Authority of Thailand. 2018. Price of fuel. (Online). <http://www.pttplc.com/>. Accessed on 21 February 2018.
- Ray, D., 2010. Uneven growth: a framework for research in development economics. *The Journal of Economic Perspectives* 24: 45–60.
- Rubber Authority of Thailand. 2018. Price of rubber. (Online). <http://www.rubber.co.th/>. Accessed on 22 February 2018.
- Sayre, E., 2009. Labor market conditions, political events, and Palestinian suicide bombings. *Peace Economics, Peace Science and Public Policy* 15 (1) <http://www.bepress.com/peps/vol15/iss1/1>.
- Weisstein, E.W. 2016. Correlation coefficient. From MathWorld--A Wolfram Web Resource. (Online). <http://mathworld.wolfram.com/>. Accessed on 20 September 2016.