The Impact of Exposure to Idiosyncratic and Covariate Shocks on Economic Condition of Rural Households in Southern and Eastern Pattani Province

Pha-Isah Leekoi

School of Economics, Finance and Banking, Universiti Utara Malaysia, Malaysia

Abstract: This study employedTobitmodel to examine how exposure to idiosyncratic and covariate shocks impact on the economic condition of rural households in Southernand Eastern Pattani Provinceof Thailand. The study also investigated the householdscharacteristics of the rural households that are responsible for the unfavorable economic condition of rural dwellers in Thailand. The Sampling procedures use for selecting sample is multi-stage sampling techniques. A sample size of 236 households were randomly selected from the chosen village in Southern and Eastern area of Pattani province.The resultsindicatethat exposure to idiosyncratic and covariate shocks have impact on the households' economic condition in terms of the asset and income of the householdsin the study area. Similarly, certain characteristics of the households also influence their livelihood will be impacted by shocks. It is recommended that having a better and in depth understanding of the concerned impact on the households' economic condition could assist in designing an appropriate policy measure which could be useful in alleviating the suffering of households from the negative effects of exposure to shocks on their livelihood.

Key words: Tobit model · Rural dwellers · Thailand

INTRODUCTION

The large proportion of the people living in the developing countriesare found in the rural areas, they provide the large supply of agricultural products that feed the nation, yet most of them live in poor condition of life. Though most of them are fully engaged in agriculture as source of income but this income are unstable due to changes in weather, pest infestation, drought, floods and market forces. The implication of this is agriculture activities contends with varying forms of shocks that have the prospect of negativelyaffecting the rural households' income.

The economicimplication of experiencing shocks by rural household is not just the loss of income but may include loss of critical, valuable asset. Such loss leads to shocksthat can also cause other disutility like pain, grief or depression. Most rural households, due to their engagement in agricultural production, are prone to ecological shocks, including drought, flooding,and crop pests or livestock diseases. These are consequences of damages on agricultural output and which in turn reduce

income from agriculture [1-3]. By being unable to take proactive measure such as having been insured ex-ante against shocks, the adverse effect of shocks is generally more pronounced among the poor. This condition is more likely to lead to reduction in consumption among the poor thanthe wealthier households [4]. Similarly, the condition of the rural poor usually exposed them to health shocks such as illness and death of a household member than wealthier households [1]. In some circumstances, the situation may even make the rural householdsmuch more fragile to health shocks than to crop income shocks [5]. Consequently, if individual or household defencelessness to prevent a dangerous shocks that has the tendency of turning them to poverty [6-8].

There are certain dynamics that may determine the frequency as well as intensity of shock that a household will experience. This dynamic are the reasons that determine the level of the capacity of households to cope with a shock. In this regards, shocks can be categorized into types: the *covariate*and the *idiosyncratic.* When shock event like the case of floods or droughts, happens and the effects is shared among individuals living within

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Corresponding Author: Pha-isah Leekoi, School of Economics, Finance and Banking,
Universiti Utara Malaysia, Malaysia.

the same locality, such shock is referred to as *covariate*.Shocks can also be *idiosyncratic*type of shockwhich means that they are uncorrelated and affect only individual households; an example is accident or an illness [9]. The extent of the correlation between these shockseventsis what informed how this shock is categorised as regionally covariate, nationally covariate and internationally covariate. Although it may be considered that job loss is a mere event since it affects one particular individual. But what is being over looked is the fact that if it is a major macroeconomic crisisand leadsto job loss. It may even be affecting most workers in a specific region and thus can be considered as a covariate shock. Consequently, it may not be as obvious to determine whether a shock is idiosyncratic or covariate as it depends on its underlying sources and impacts [10].

Tongruksawattana, Waibel and Schmidt [11] emphasized on the fact the rural households have been exposed to different kind of shocks which severely affect the livelihoods of rural households. However, the sources of these shocks are ruin/destruction/damage of house/rental house/shop, land, plantation/orchard, stock/bond, gold, truck/car/motorcycle, livestock), income (income loss), food consumption (reduce consumption of food), education (stop sending children to school), health (worse health and no money for treatment), psychological (stress) and social (have problem or dispute with the neighbors in the community). These myriads of shocks are due to the impact of exposure to shocks on economic condition of the households. In the context of Thailand, income fluctuation is the source of most of the shocks being experienced by rural households [12, 13]. Apart from this, it is observed that the Thai people, especially in the southare relatively vulnerable to high risk including violent crimes from insurgencythat attack personsdaily. The areas affected include the three provinces of Pattani, Yala and Narathiwat. The consequence of this shock event is the aggravation of the unfavorable economic and social condition of the households in these areas [14].

The foregoing account of the nature and impact of varying types of shocks ravaging the rural household of Pattani, informed the objective of this study. Therefore, this study aimsat determining how and the effect of idiosyncratic and covariate shocks on the economic condition of rural households in Southern and EasternPattani province of Thailand. In pursuing this objective, the discussion of the issues in this study will involve empiricalreview of literatures on shocks that account for the impact of shocks on the livelihood of rural household. A description of the data collection and methodfollows whilethe next section the results of the estimation and the last section concluding remarks about policy implications.

Literature Review: Literature on shocks insists that shock plays important role in segmentation of a population alongside economic classifications. Carter [15] points out that as a result of shocks some population may suffer from food insecurity and fall deeper into the poverty trap. To compound their problems, the absence of risk management instruments among the rural householdsfurther plunge them into poverty [16]. The impact of this shock event is not limited to the poor as the non-poor households are equally vulnerable at the particular time period.What makes the difference, however, is a function of the asset base of a household and the instruments taken or available in order for the household to respond to a shock. A scenario that illustratesthis is the case of a household whose income is relatively high and which allows him to have high level of savings. In addition, such a household can afford enough insurance protection and is able to acquire liquid asset.In comparison to another household in the same community and the same economy, whose savings is low and therefore cannot afford the luxury of insurance protection. The same household is faced with deceasedincome of the breadwinner who is responsible for the income of the household.Therefore, the presence of the risk management instrument like welfare effect may be the saving grace why the death of a breadwinner will be less consequential for the family.

A review of the literatures shows that households in rural area face some irregularity and variability in their incomes due to occurrence of shocks events. The impact of these shocks events tends to be persistencefor a long time.In India, Bliss and Stern [17] demonstrates the effects of holding up the start of production by two weeks on the tendency of encountering a decline in yields among farmers. By using a panel data collected over a period of 10 years for an International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) villages, the study was able to show that a relatively small shock event of late start of production of not more than two weeks have severely affected the farmer and led to reduction in yield by 20 percent for the study population of farmers in Palanpur. This is similar to what Kinsey, Burger and Gunning [18] found outamong rural households in a

resettlement area in Zimbabwe which recorded a greater frequency of harvest failures. Another insight to the issue was provided that a study in Pakistan, by using panel data, Alderman [19] revealed that with successive shocks, consumption smoothing is more difficult than with single shocks. Some shocks may have persistent effects, for example, health problems tend to have consequences that last.

In a study in Bangladesh, Foster [20] shows that regardless of sex, child growth was affected during and after the severe floods in 1988. However, other studies such as Behrman [21], using panel data from ICRISAT, shows that the inability to smooth consumption implies that child health suffers in the period before the major harvest and girl were the most affected. Early study by Jacoby and Skoufias [22] found that income shock are the major sources of child withdrawal from school in South India (ICRISAT-villages). The consequence of this phenomenon is low percentage of development of human capital among the population.

Furthermore, Behrman and Deolalikar [23] examined a set of data provided about the nutrient intakes of individual person in India. He found that the estimated price and wage elasticity of intakes are substantially and significantly higher for females than for males. This finding suggests that women and girls share have disproportionate burden of rising food prices. In another study, a sample of Indonesia households, according to Gertler and Gruber [24] reveals that although 30 percent of the sample could cope with low-frequency health shocks but with serious long term effects. However, these households can cope with 70 percent of the high-frequency but smaller health shocks.

Using cross sectional survey, Sherina, Razali, Shiran and Sam [25] studied the impact of nutritional risk on physical and mental health among the elderly in semi-urban area in Selangor. Data was gathered through questionnaire-guided interview technique. The results of this study show that about 25.3 percent and 36.3 percent have moderate and high nutritional risks respectively. This is an indication that nutrition risk is a dominant health problem among the elderly. However, among the factors responsible for the situation, the study found that marital status, age, depressive symptoms, functional disability and chronic illness are the main factors that influence the nutritional risks for the elderly. The study of Fischer and Buchenrieder [26] in Vietnam, who investigated the theoretical connections among poverty,

vulnerability and risk, the outcome shows that factors like limited endowment, low access to capital and assets market, low access to service institutions, human and economic risks have impact on the rural livelihoods in Vietnam.

The foregoing review provided insight into the impact of the shocks being experienced by the people living in the rural areas. It has been able to show that shocks are sources of pain, anxiety and destabilization of the rural households.

MATERIALS AND METHODS

Data: Samples of 236 households were randomly selected through multi-stage sampling procedure to participate in the study. The households were drawn from Southern and Easternareas of Pattani province located in the Southernmost of Thailand. Both primary and secondary data were collected for the study. The primary data were collected through a well structuredquestionnaire which was administered to household heads. The secondary data were sourced from different government establishment including Department of Statistics, National Statistic office, Provincial Statistical Office and Department of Provincial Administration.

Model Specification: The model for the study was based on the Tobit model to specify relationship between the independent and the dependent variables involved in this study. When a study requires the estimation of relationship between a non-negative dependent variable Υ_i and an independent variable (or vector) X the Tobit model has been found to be reliable and appropriate. Tobit model is a statistical model developed by James Tobin [27]. As explained by Parsad and Sanju [28], the Tobitmodel, also known as a censored regression, has the capacity to estimate linear relationships between variables when there is either left or right censoring in the dependent variable (also known as censoring from below and above) respectively.

The aim of this study is to examine the impact of exposure to idiosyncratic and covariate shocks on economic condition (in terms of households' asset and income) of rural households in Southern and EasternPattani province of Thailand. Hence, the Tobit model is found suitable. Tobit model has been greatly suggested for large applications wherein dependent variables can be observed to be zero for few persons in the sample [28]. The dependent variable (Y_i) in this study

has zero values for households who do not experience impact on their economic condition which is indicative of censoring of an underlying variable and thus requires Tobit estimators [29].

The Tobit model developed by Tobin [11] and as adopted by Haddad and Ahmed [30] and Omonona [31] is shown as equation (1):

$$Y_i = \beta X_i + e_i \tag{1}$$

Where Y_i = the impact of idiosyncratic and covariate shocks on household economic condition; $Y_i=1$ for households who experience impact on their economic condition and $Y_i=0$ otherwise, β= vector of respective parameters, ε= error term, X_i= vector of independent variables, in this study $X_i = \chi_1 - \chi_{11}$: χ_1= gender of household head, χ_2= age of household head, χ_3= primary education of household head, χ_4= secondary education of household head, χ_5= tertiary education of household head, χ_6=size of the household, χ_7= location of house, χ_8= house condition, χ_9= household income, χ_{10}= exposure to idiosyncratic shocks and χ_{11}= exposure to covariate shocks.

Description of Variables: The description of variables in the Tobit model as shown in Table 1.

Table 1: Description of Variables in the Tobit model

Variable Name	Description
The impact of shocks on household's assets	'1' refers to the impact of shocks on household assets holdings (e.g. ruin/destruction/damage of house/rental house/shop, land, plantation/orchard, stock/bond, gold, truck/car/motorcycle, livestock such as cattle/goat etc.) and '0' otherwise.
The impact of shock on household's income	'1' refers to the impact of shock on household income (e.g. income loss) and '0' otherwise.
Household exposure to idiosyncratic shocks	'1' refers to the households' exposure to any type of idiosyncratic shocks (e.g. job losses, business bankrupt, family member died/sick/accident, theft, death of livestock, etc.) and '0' otherwise.
Household exposure to covariate shocks	'1' refers to the households' exposure to any type of covariate shocks (e.g. flood, landslide, storm, drought, etc.) and '0' otherwise.
Gender	'1' refers to male and '0' female.
Age	Denotes a continuous variable measured in years
Primary education	'1' refers to primary education of household heads and '0' otherwise.
Secondary education	'1' refers to secondary education of household heads and '0' otherwise.
Tertiary education	'1' refers tertiary education of household heads (vocational, bachelor's degree and higher than bachelor's degree) and '0' otherwise.
Household size	Denotes a continuous variable (adult equivalent units)
Location of house	Denotes a continuous variable (refers to distance to the nearest town /how far from town) expressed in kilometres.
House condition	'1' refers to poor condition of house and '0' otherwise.
Household income	Denotes a continuous variable (refers to monthly total income of household from main employment, side income, transfer and other income) measured in Baht.

RESULTS AND DISCUSSION

A breakdown of the findings of the study is contained in Table 2. The aim of the study is to examine the impact of exposure to idiosyncratic and covariate shocks on economic condition (in terms of households' asset and income) of rural households in Southern and Eastern Pattani. Using the Tobit model, the analysis revealed that Log likelihood in the model *Impact on Asset* and *Impact on Income* are found to be -59.678 and -58.323, respectively. The LR statistics in these models are 53.52 and 215.75, respectively. These values are significant at 1 percent probability level implying that these models have a good fit.

In the *Impact on Asset* model, the variables of interest which are exposure to idiosyncratic and covariate shocks are found to be significant which implies that exposure to these shocks have an impact on asset of the households. Similar results are found for *Impact on Income* model. Exposure to idiosyncratic and covariate shocks seem to have a significant impact on household income.

The significance of focusing on the impact of exposure to idiosyncratic shocks on households' asset and income is due to a number of reasons. When households are confronted with idiosyncratic shocks, the result is destabilization of the family with potential to threaten the society fabric. Shocks in practical term is job loss, business bankrupt, family member may died, sick or

Table 2: Tobit Estimation of exposure to idiosyncratic and covariate shocks on economic condition of the households

Variables	Coefficient (*Impact on Asset*)	t-value	Coefficient (*Impact on Income*)	t-value
Constant	-3.7884**	-2.46	-1.6924***	-3.59
Gender of household head (χ_1)	-0.8026*	-1.87	0.3489**	2.53
Age of household head (χ_2)	0.0369*	1.69	0.0047	0.66
Primary education of household head (χ_3)	-0.6734	-1.13	-0.1410	-0.67
Secondary education of household head (χ_4)	-0.0334	-0.05	0.1570	0.68
Tertiary education of household head (χ_5)	-1.0990	-1.19	-0.0289	-0.10
Size of the household(χ_6)	-0.0507	-0.63	-0.0037	-0.15
Location of house (χ_7)	-0.0075	-0.48	0.0004	0.10
House condition(χ_8)	-0.7426	-1.10	0.2184	1.24
Household income (χ_9)	0.0000	1.56	0.0000	0.70
Exposure to idiosyncratic shocks (χ_{10})	1.8634***	3.15	1.8088***	8.99
Exposure to covariate shocks (χ_{11})	0.8325*	1.82	0.2654**	1.99
Log likelihood	-59.678		-58.323	
Number of observations	236		236	
LR chi^2 (11)	53.52		215.75	
Prob> chi^2	0.0000***		0.0000***	
Pseudo R-squared	0.3096		0.6491	

Sources: Author's calculation from survey data, 2013.

Note: ***, denotes coefficient is significance at 1 percent level, **, at 5 percent level, *, at 10 percent level.

involved in accident. Others are theft, destruction of crops or death of livestock. All these will directly affect the household because of decrease in their income and other assets like crops or livestockbecause of their destructionsas well. Similarly, impact is experienced if the shock is covariate in nature. Exposure to covariate shocks on households' asset and income may be due to result of the occurrence of different kinds of shocks such as flooding, drought, storm or landslide. The consequence is devastating to households' asset as their valuables and critical asset like houses, crops and livestock are destroyed as well as loss of income to the households.

Beyond the providing data on the impact of exposure to idiosyncratic and covariate shocks, the results also give insights on other factor that determine the impact of exposure to idiosyncratic and covariate shocks on households' asset and income. As demonstrated in Table 2 the variables *Impact on Asset* model i.egender of household head (with negative) and the age of household head (with positive) have significant impact.The negative impact of gender of household head is an indication that a household that is headed by afemale is more likely to be exposed to shocks and is more likely to have its asset affected than a household headed by a male. This suggests that female-headed households, given their socio-economic and demographic characteristics, are more prone to the vagaries of exposure to shocks. However, the positiveimpact of age of household head, points to vulnerability of households with older heads are more

likely to be in poor health condition. This is because their ability to do more work decreases over the year so that when they are exposed to any sudden shocks or shocks that may affect their asset; they are less likely to be able to withstand it.

At the level of the *Impact on Income* model, the analysis reveals that there is positive impact on household income attributed to the gender of household head specifically where the maleis the household head. In other words, where the head of the household is male there is more likelihood thatthe income of the household affected. The reason for this relationship between male gender as the household head and income is because the male person is the one that fend for the family; hence their income is depended on the male person. This perhaps also explains why there will be decrease in the income of the household whose male head encountered shock due to job loss or similar unfavorable economic fortune.

CONCLUSION

Theattempt of this paper is to demonstrate the significant impact of exposure to idiosyncratic and covariate shocks would have on the economic condition of rural households. The population of interest is the rural households in the Southern and EasternPattani province of Thailand. The results of the data collected from the households have made this paper to conclude that exposure to idiosyncratic and covariate shocks have an

impact on the households' economic conditionin terms of their asset and income in the studyarea. In addition to this finding, the study also discovered that certain characteristics of the householdssuch as gender of households head, the age of households head have influence their livelihood will be impacted by shocks.

The findings and implication of this study offer government and development agencies a better and in depth understanding of the nature and impact of exposure to idiosyncratic and covariate shocks on the households' economic condition. The outcome will benefit policy designsthat are meant to tackle or alleviate the suffering of households from the negative effects of exposure to shocks on their livelihood.Therefore, government and other development agencies are expected to identify poor households with low-income capacity and devise policy and programme that will engage them productively. Such programme and policies must target job creation and widen employment opportunities for the poor household with low income capacity among the rural households.

This study was conducted using cross-sectional survey data. A longitudinal data is recommended for further investigation of the phenomenon of exposure to idiosyncratic and covariate shocks. This is because cross sectional data may be quite inadequate especially when it comes to generalising the analysis of the impact of shocks on households income or asset. Therefore, this study acknowledges this limitation and recommends that future researcher should consider longitudinal design that can explore the impact of shocks on livelihood of the households over a period of time. Such approach will further provide better understanding and insight into the phenomenon.

REFERENCES

1. Tongruksawattana, T., E. Schmidt and H. Waibel, 2008. Understanding Vulnerability to Poverty of Rural Agricultural Households in Northeastern Thailand.Paper presented at the conference on International Research on Food Security, Natural Resource Management and Rural Development. Tropentag, Hohenheim.

2. Asiimwe, J.B. and P. Mpuga, 2007. Implications of Rainfall Shocks for Household Income and Consumption in Uganda.AERC Research Paper, 168.

3. Pandey, S., H. Bhandari, Sh. Ding, P. Prapertchob, R. Sharan, D. Naik and A. Sastri, 2007. Coping with Drought in Rice Farming in Asia: Insights from a Cross-country Comparative Study.Agricultural Economics, 37: 213-224.

4. Jalan, J. and M. Ravallion, 1999. Are the poor less well-insured? Evidence on vulnerability to income risk in rural China.Journal of Development Economics. 58: 61-81.

5. Kochar, A., 1995. Explaining Household Vulnerability to Idiosyncratic Income Shocks.The American Economic Review, 85: 159-164.

6. Chaudhuri, S., J. Jalan and A. Suryahadi, 2002. Assessing household vulnerability to poverty from cross-sectional data: a methodology and estimates from Indonesia. Discussion Paper, 0102-52.

7. Dercon, S., 2002. Income Risks, Coping Strategies and Safety Nets.WIDER Discussion Paper, 2002/22.

8. Harrower, S. and J. Hoddinott, 2004. Consumption Smoothing and Vulnerability in the Zone Lacustre, MalL International Food Policy Research Institute (IFPRI).FCND Discussion Paper, I75.

9. Maleika, M. and A.T. Kuriakose, 2008. Microinsurance: Extending Pro-Poor Risk Management through the Social Fund Platform. The World Bank: Social Funds Innovation Notes, 5.

10. World Bank, 2000. Word Development Report 2000/01 - Attacking Poverty. The World Bank: Washington, DC, USA.

11. Tongruksawattana, S., H. Waibel and E. Schmidt, 2010. Shocks and Coping Actions of Rural Households: Empirical Evidence from Northeast Thailand. Paper prepared for the CPRC International Conference 2010: Ten Years of War against Poverty hosted by the Brooks World Poverty Institute (BWPI). University of Manchester.

12. Rungruxsirivorn, O., 2007. Household Risk Management in Rural and Urban Thailand. Institute for Money and International Finance, Leibniz Universities Hannover.

13. Leekoi, P., A.Z. Abdul Jalil and M. Harun, 2014. An Empirical Study on Risk Assessment and Household Characteristics in Thailand. Middle-East Journal of Scientific Research, 21: 962-967.

14. United Nations Development Programme (UNDP), 2010. Thailand Human Development Report: Human security, today and tomorrow. Bangkok: UNDP.

15. Carter, M., 1997. Environment, technology and the social articulation of risks in West Africa agriculture.Economic Development and Cultural Change, 45.

16. Holzmann, R. and S.L. Jorgensen, 2000. Social Risk Management: A New Conceptual Framework for Social Protection and Beyond. Social Protection Discussion Paper, 0006.

17. Bliss, C. and N. Stern, 1982. Palanpur: The Economy of an Indian Village.Oxford University Press Catalogue.

18. Kinsey, B., K. Burger and J.W. Gunning, 1998. Coping with Drought in Zimbabwe: Survey Evidence on Responses of Rural Households to Risk. World Development, 26: 89-110.

19. Alderman, H., 1998. Saving and Economic Shocks in Rural Pakistan. Journal of Development Economics, 51: 343-366.

20. Foster, A.D., 1995. Prices, Credit Markets and Child Growth in Low-Income Rural Areas. The Economic Journal, 105: 551-570.

21. Behrman, J., 1988. Intrahousehold Allocation of Nutrients in Rural India: Are Boys Favored? Do Parents Exhibit Inequality Aversion. Oxford Economic Papers, 40: 32-54.

22. Jacoby, H. and E. Skoufias, 1997. Risk, Financial Markets and Human Capital in a Developing Country. Review of Economic Studies, 64: 311-336.

23. Behrman, J.andA. Deolalikar, 1990. The Intrahousehold Demand for Nutrients in Rural South India: Individual Estimates, Fixed Effects and Permanent Income. Journal of Human Resources, 25: 665-696.

24. Gertler, P. and J. Gruber, 1997. Insuring Consumption against Illness. National Bureau of Economic Research Working Paper, 6035.

25. Sherina, M.S., A. Razali, M.S. Shiran and AA. Sam, 2004. The Association of Nutritional Risk with Physical and Mental Health Problems among Elderly in a semi-urban area of MukimKajang, Selangor, Malaysia. Malaysian Journal of Nutrition, 10: 149-158.

26. Fischer, I. and G. Buchenrieder, 2010. Risk Management of Vulnerable Rural in Southeast Asia. Contributed paper at the 9th European IFSA Symposium, Austria.

27. Tobin, J., 1958. Estimation of relationship for limited dependent variables. Econometrica (The Econometric Society), 26: 26-36.

28. Parsad, R. and Sanju, 2009. Tobit Analysis. I.A.S.R.I., Library Avenue, New Delhi, India.

29. Wen, S., I. Kimiko and T. Yuki, 2002. Analysis of food consumption behaviour by Japanese household. FAO Repository Document.ESA Working Paper, 4: 30-34.

30. Haddad, L. and A. Ahmed, 2003. Chronic and transitory poverty: Evidence from Egypt, 1997-99. World Development, 31: 71-85.

31. Omonona, B.T., 2001. The determinants of poverty among farming households in Kogi State, Nigeria, Unpublished doctoral dissertation, Department of Agricultural Economics, University of Ibadan, Ibadan, Nigeria.