Consumption Insurance against the Chronic Illness: Evidence from Thailand

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Abstract—This paper studies consumption insurance against the chronic illness in Thailand. The study estimates the impact of household consumption in the chronic illness on consumption growth. Chronic illness is the health care costs of a person or a household's decision in treatment for the long term; the causes and effects of the household's ability for smooth consumption. The chronic illnesses are measured in health status when at least one member within the household faces the chronic illness. The data used is from the Household Social Economic Panel Survey conducted during 2007 and 2012. The survey collected data from approximately 6,000 households from every province, both inside and outside municipal areas in Thailand. The study estimates the change in household consumption by using an ordinary least squares (OLS) regression model. The result shows that the members within the household facing the chronic illness would reduce the consumption by around 4%. This case indicates that consumption insurance in Thailand is quite sufficient against chronic illness.

Keywords—Consumption insurance, chronic illness, health care, Thailand.

I. INTRODUCTION

MANY developing countries face uncertainties from idiosyncratic shocks that impact individual or household to consumption. These uncertain shocks are varying in nature e.g. weather fluctuations, failures in agriculture, unemployment and illness. This study will investigate the health shocks which focus on a chronic illness. Consequently, chronic illness is the health care costs of a person or a household's decision for treatment for long term, which affects the household's ability for smooth consumption. Addressing this issue, this study analyzes consumption insurance against the chronic illness. In particular, this paper estimates the impact of household consumption on consumption growth from those facing the chronic illnesses. For testing, the chronic illnesses are measured in health status when at least one member within the household faces the chronic illness. The representative data used is from the Household Social-Economic Panel Survey (SEPS) conducted during 2007 and 2012 by the National Statistical Office. The survey collected data from approximately 6,000 households that contain detailed information regarding the characteristics of households from every province, both inside and outside municipal areas in Thailand.

Many empirical analyses estimated the impact of household consumption due to health shocks by using various methods to measure the variable of health shocks, e.g. [1]-[11]. Many of these have considered the health shocks and how individuals and households respond to changes in consumption.

Reference [1] studied consumption insurance across individuals with idiosyncratic shocks that consisted of number of days of illness, involuntary job loss, as well as weeks spent looking for employment and number of work days lost through strikes. The result showed that where number of days of illness is more than 100 days, measured as a dummy variable, that consumption growth dropped approximately 11% to 14%. Additionally, there were studies using various methods to measure the variable of health shocks. For instance, reference [2] and [8] tested the physical ability to perform activities of the daily living (ADL) index as a method to measure the change in health status in Indonesia. They found that illness shocks were associated with increasing consumption, but that the ADL index rejected full consumption insurance. Reference [6] conducted a study in Vietnam by using the death of a working-age member and any working and non-working member of the household who had been treated at service providers for seven days or more as the variable of health shocks. Reference [9] showed malaria was the variable of health shocks that impacted on household consumption in rural Tanzania. References [7] and [10] focused on their studies to identify that HIV/AIDS affected household's consumption smoothing. Similarly, most of the existing empirical literature focused on consumption insurance (see, e.g., [3]-[5], [11]). These studies were based on variables of health shocks and analyzed aspects of consumption insurance with several shocks. Therefore, the limitation of data are important conditions to construct a model in the various methods for estimating consumption insurance against health shocks According to the data set for health shocks, this paper uses chronic illness as a proxy for the estimations.

II. ECONOMETRIC SPECIFICATIONS

This section presents a simple model for the empirical specification employed in this study. This model is mainly taken from [1] who tested with full consumption insurance. Specifically, the estimation can be written as a linear function as:

$$\log\left(\frac{C_{t+1}^i}{C_t^i}\right) = \beta_1 H_{t+1}^i + \log\left(\frac{Y_{t+1}^i}{Y_t^i}\right) + \beta_N X_{t+1}^i + \mu^i \tag{1}$$

where C_{t+1}^i/C_t^i is the household consumption growth in per capita of the household i in time $t+1$ and t. H_{t+1}^i is the health

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shocks of a member within the household *i* at t+1. This estimation measures the health shocks as a dummy variable defined by 1 if at least one member within the household was the chronic illness and 0 if no member within the household was the chronic illness. If $\beta_1 = 0$, then there will be fully smooth consumption in facing the chronic illness. Y_{t+1}^i / Y_t^i is denoted the household income growth in per capita of the household *i* in time *t*+1 and *t*. X_{t+1}^i shows a vector of household socio-economic characteristics mostly measured at time *t*+1. This vector includes the control variables for a leader of household *i*'s characteristics, consisting of age, gender, education, work and area. In an empirical study, the list of all variables is used for estimates in an OLS regression.

III. Data Source

This paper uses the nationally representative Household SEPS gathered by the National Statistical Office (NSO) of Thailand. The survey collected data from approximately 6,000 households, or 24,000 individuals, from every province, both inside and outside the municipal areas in Thailand. This SEPS survey was conducted during the month of May of each survey year. The survey gathered information on the demographic characteristics of household by the interview. Questions regarding consumption expenditures per month, personal health care, average monthly individual income, employment status, education and financial status have been available in 2007 and 2012.

The primary data of consumption expenditure are classified according to 11 categories that consist of expenditures on food, drinks and tobacco; medical care; transport; housing; major equipment; education; entertainment and religious activities; personal; social; transferring money to other people outside the household; and other expenditures.

Considering the health shocks, this paper measures when at least one member within the household has chronic illness, and for estimation, this variable is a dummy variable that is defined by 1 if at least one of the members within the household is treated as the chronic illness, and by 0 if none of the members within the household is treated as the chronic illness. This study expects that the coefficient of the chronic illness variable decreases on household consumption. In addition, the study includes household income per capita that is expected that household consumption increases with higher income. Household socio-economic characteristics consist of the age variable, which is the age of the head of the household. The gender of the household head is equal to 1 if the gender is male, while the education level equals to 1 if education is less than a bachelor's degree and 0 otherwise. The leader's work in the agricultural sector is reflected by a dummy measure equal to 1. Finally, area variable is the dummy variable of urban area if the household lives in an urban area.

Table I presents summary statistics of the key variables. For instance, the mean of household consumption per capita is approximately 3,222 baht in 2007 and 4,375 baht in 2012. The mean of health status is 50% when at least one of member within the household is the chronic illness. The average of

household income per capita in 2007 is about 12,000 baht and increases to 21,000 baht in 2012. The sample is middle-aged, with the average age of the household heads being 53 years. The level of education of the household head, measured by the highest level achieved, shows around 90% had less than a bachelor's degree. The average of head workers is around 39% in the agricultural sector. The ratio of living in urban areas is nearly 45%.

TABLE I
SUMMARY STATISTICS OF THE SEPS DATA

Variables	Mean	S.D.	Number of Households
Log total household consumption growth	0.27	0.72	6,044
Total household consumption in 2007	3,222.31	3,201.92	6,084
Total household consumption in 2012	4,375.72	5,402.40	6,755
Log household income growth	0.46	1.08	5,970
Household income in 2007	12,042.81	2,1219.67	6,084
Household income in 2012	21,507.86	5,6103.79	6,755
Health status as chronic illness in 2012	0.50	0.50	6,755
Age of household leader in 2012	53.15	16.96	6,755
Male of household leader in 2012	0.59	0.49	6,755
Education of household leader in 2012	0.90	0.29	6,099
Work of household leader in 2012	0.39	0.49	4,777
Area of household in 2012	0.44	0.50	6,755

Note: the units of total consumption and household income are shown in units of baht.

IV. Empirical Results

Table II presents the estimated results of total consumption against chronic illness using all data for the entire nation. Of special interest, this table shows that the estimated effect of the chronic illness on total household consumption growth is statistically significant and the coefficient is −0.04. This value drops significantly after the socio-economic characteristics (*X*) are added to the estimation (see the last column of Table II). The result shows that the members within the household facing as the chronic illness would reduce around 4% of total household consumption growth. In addition, to considering the *t-test*, the test on full insurance implication of $\beta_1 = 0$ is rejected for total household consumption growth. Hence, this suggests that the effect on total household consumption against the chronic illness is not fully insured in the case of Thailand. Household income growth per capita is positive and statistically significant on total household consumption growth. The coefficient implies that a 1% increase in household income growth would raise 0.18% of total household consumption growth. The gender (male), work (agricultural sector) and area (urban) negatively affect total household consumption growth.

Table III presents the estimated results of food consumption insurance against chronic illness. The coefficients for the chronic illness range significantly from −0.04 to −0.06 after adding the socio-economic characteristics (*X*). The results indicate that the estimated household food consumption insurance decreases higher than total household consumption. That is, the household would reduce around 4% to 6% of household food consumption growth since facing the chronic

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illness. Household income growth per capita is 0.11 and statistically significant on total household consumption growth. The (average) age effect of the household leader is statistically significant for household food consumption growth. This coefficient is positive that indicates growing older would increase on household food consumption growth. The gender (male) and area (urban) negatively effect household food consumption growth. On the contrary, Table IV presents the estimated results of medical consumption against the chronic illness. This variable expects that the coefficient of the chronic illness variable increases on

household medical consumption. The estimation coefficients of the chronic illness are statistically significant and positive in all columns. The result shows that the members within the household facing as the chronic illness would increase approximately 17% of household medical consumption growth in last column. Household income growth per capita and age of household head are statistically significant and would rise on household medical consumption growth, while work negatively to effect household medical consumption growth.

TABLE II
THE ESTIMATED RESULTS OF TOTAL CONSUMPTION INSURANCE AGAINST THE CHRONIC ILLNESS

Variables	Log total household consumption growth						
Chronic illness	-0.0339*	-0.0249	-0.0243	-0.0255	-0.0402**	-0.0501**	-0.0445**
	(0.0185)	(0.0177)	(0.0182)	(0.0182)	(0.0193)	(0.0214)	(0.0215)
Log household- income growth		0.211***	0.210***	0.211***	0.209***	0.189***	0.188***
		(0.00823)	(0.00824)	(0.00823)	(0.00863)	(0.0103)	(0.0103)
Age			-8.03E-05	-0.000154	0.000729	0.00130	0.00135
			(0.000562)	(0.000563)	(0.000669)	(0.000907)	(0.000906)
Male				-0.0481***	-0.0377**	-0.0547**	-0.0561**
				(0.0180)	(0.0192)	(0.0224)	(0.0224)
Education					0.0834**	0.0697**	0.0557
					(0.0325)	(0.0353)	(0.0355)
Work						-0.0207	-0.0427*
						(0.0230)	(0.0240)
Area							-0.0699***
							(0.0227)
Constant	0.291***	0.187***	0.191***	0.224***	0.0907**	0.118**	0.165***
	(0.0133)	(0.0134)	(0.0317)	(0.0341)	(0.0458)	(0.0527)	(0.0549)
Observations	6,044	5,943	5,943	5,943	5,410	4,050	4,050
R-squared	0.001	0.100	0.100	0.101	0.100	0.083	0.085

Note: Standard errors in parentheses *** P<0.01, ** P<0.05, * P<0.1

TABLE III
THE ESTIMATED RESULTS OF FOOD CONSUMPTION INSURANCE AGAINST THE CHRONIC ILLNESS

Variables	Log household food consumption growth						
Chronic illness	-0.0277	-0.0289	-0.0382*	-0.0393*	-0.0539**	-0.0640***	-0.0567**
	(0.0203)	(0.0202)	(0.0207)	(0.0207)	(0.0221)	(0.0246)	(0.0247)
Log household- income growth		0.117***	0.118***	0.118***	0.118***	0.109***	0.108***
		(0.00946)	(0.00947)	(0.00946)	(0.00994)	(0.0119)	(0.0118)
Age			0.00127**	0.00120*	0.00181**	0.00307***	0.00315***
			(0.000644)	(0.000644)	(0.000767)	(0.00104)	(0.00104)
Male				-0.0468**	-0.0424*	-0.0493*	-0.0513**
				(0.0206)	(0.0220)	(0.0257)	(0.0257)
Education					0.118***	0.0512	0.0334
					(0.0372)	(0.0407)	(0.0410)
Work						0.0310	0.00280
						(0.0264)	(0.0276)
Area							-0.0903***
							(0.0261)
Constant	0.346***	0.290***	0.225***	0.257***	0.115**	0.127**	0.188***
	(0.0147)	(0.0153)	(0.0363)	(0.0389)	(0.0525)	(0.0607)	(0.0631)
Observations	5,951	5,850	5,850	5,850	5,329	4,005	4,005
R-squared	0.000	0.026	0.027	0.028	0.030	0.029	0.032

Note: Standard errors in parentheses *** P<0.01, ** P<0.05, * P<0.1

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TABLE IV
THE ESTIMATED RESULTS OF MEDICAL CONSUMPTION AGAINST THE CHRONIC ILLNESS

Variables	Log household medical consumption growth						
Chronic illness	0.183**	0.194**	0.157*	0.151*	0.182**	0.167*	0.171*
	(0.0783)	(0.0783)	(0.0801)	(0.0803)	(0.0855)	(0.0957)	(0.0959)
Log household income growth		0.167***	0.168***	0.170***	0.182***	0.167***	0.166***
		(0.0387)	(0.0387)	(0.0387)	(0.0410)	(0.0486)	(0.0486)
Age			0.00521**	0.00515**	0.00447	0.00756*	0.00761*
			(0.00238)	(0.00239)	(0.00287)	(0.00389)	(0.00389)
Male				-0.0765	-0.0869	-0.100	-0.103
				(0.0792)	(0.0847)	(0.102)	(0.103)
Education					0.0913	0.220	0.207
					(0.150)	(0.171)	(0.173)
Work						-0.389***	-0.411***
						(0.102)	(0.108)
Area							-0.0644
							(0.102)
Constant	0.151**	0.0677	-0.191	-0.138	-0.197	-0.263	-0.216
	(0.0608)	(0.0644)	(0.135)	(0.145)	(0.206)	(0.245)	(0.256)
Observations	1,941	1,909	1,909	1,909	1,731	1,329	1,329
R-squared	0.003	0.012	0.015	0.015	0.017	0.023	0.023

Note: Standard errors in parentheses *** $p<0.01$, ** $p<0.05$, * $p<0.1$

V. CONCLUSION

This paper studies the consumption insurance against the chronic illness of Thai household. The study finds that at least one of the members within the household facing as the chronic illness would reduce around 4% of total household consumption growth. The finding indicates that the effect on household consumption against the chronic illness is not fully insured in the evidence of Thailand. According to the results, the impact of reducing of total household consumption is quite less. This implies that consumption insurance in Thailand is fine. Thai households are very well insured against the chronic illness. That is, individuals are able to smooth consumption by borrowing informal insurance or exchanging goods and services among kinship, neighborhood and social networks in their health cares. In addition, this study finds that household would decrease approximately 4-6% of food consumption and increase approximately 17% of medical consumption.

One limitation of this study is that the measurement of health shocks is only in health status when at least one member within the household is treated at as the chronic illness. Further research should add more impact of variable for health shocks, e.g. death or accident of household leader, HIV/AIDS illness to estimate consumption insurance in Thailand.

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