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Energy Consumption of Thai Elderly Households

Ratchapan Choiejit [1]
Ratiporn Teungfung [2]

Abstract

This paper aims to indicate the household energy consumption expenditure and the inequality of household energy consumption expenditure among households, especially Thai elderly household. Secondary data from the “Household Socio-Economic Survey” in 2006 and 2011 compiled by the National Statistical Office were employed. Descriptive statistics, gini co-efficient and the energy gap were applied to this paper. Households were categorized into four groups, which were (1) ageing household, (2) household with ageing, (3) household without ageing and (4) total households. Sources of energy that household consumed also grouped in two groups, which were domestic and transportation consumptions. Results showed that ageing household relatively had quite low on percentage proportion on energy consumption expenditure to their total household consumption expenditure compared to other types of households. Moreover, results also indicated that there was a difference among themselves on Thai elderly household in terms of energy consumption expenditure.

Keywords : household energy consumption expenditure, elderly energy consumption expenditure

[1] School of Economics and Public Policy, Srinakharinwirot University, Bangkok, Thailand

[2] Faculty of Social Development and Environment, National Institute of Development Administration, Bangkok, Thailand.

Introduction

Thailand becomes an ageing society within five decades of economic and social development. Percentage of ageing population has been increasing nearly to 14 percent of total population in 2013. Impacts of ageing population on Thai economy and social development has been explored and evaluated. Many fields of researches have been conducted to find out the short term and long term policy implication to tangles the impacts of demographic changing in Thailand. This paper is one of any attempts to find out the impacts of ageing population especially on energy consumption expenditure in Thailand where the energy demand has been rising rapidly and the energy supply are still constraint. Information of the elderly energy demand and their spending are beneficially data for energy policy maker to create proper policy implication.

Methods

This paper was employed the secondary data “Household Socio-Economic Survey” complied by the Nation Statistical Office (NSO) in 2006 and 2011. The 2006 survey had 44,814 private households and the 2011 survey had 41,902 private households. This paper defined the private household into four categories which were, (1) ageing household, which household had only person aged 60 years old and over (2) household with ageing, which household were the multi-generation of household member lived together (3) household without ageing, which there was no elderly living in household and (4) total household, summation of all types household. Descriptive statistics, gini co-efficient and the energy gap, were also adopted and applied to this study to present an inequality of the energy consumption expenditure among various types of household. (Kosalakon P. Choompunut and Choiejit Ratchapan, 2014)

Results

Table 1 showed the average household total consumption and household energy consumption expenditure in 2006 and 2011. Results indicated that ageing household paid approximately 355 baht monthly per head for all energy consumption in 2006 but in the next 5 years, ageing household paid 499 baht per head for all energy consumption monthly. Not only the ageing household had to pay more for energy consumption than ever they did in last five years, but household with ageing and household without ageing had also to pay more as well.

Unfortunately, the Household Socio-Economic Survey (SES) did not provide the quantity of energy which households consumed, they provide only money terms which household paid for energy consumption. In terms of percent of household energy consumption to their total consumption expenditure, table 1 also showed that ageing household had the least proportion on energy consumption to total household consumption expenditure approximately 7.5 percent in 2006 and increasing to 7.7 percent in 2011. Household with ageing had the highest percent of household energy consumption to total household consumption expenditure approximately 11.4 percent in 2006 and increasing to 11.8 percent in 2011.

Table 2 showed the proportion on household energy consumption expenditure to their total consumption expenditure. This paper divided types of energy that household consumed into two groups, firstly, domestic purposes and secondly, transportation purposes. Results showed that ageing household had spent their money relatively higher proportion on domestic purposes than transportation purposes. For overall cases, ageing household spent their money approximately 83.1 and 76.4 percent for domestic purposes in 2006 and 2011 respectively. On the other hand, ageing household spent their money approximately 16.9 and 23.6 percent on transportation purposes in 2006 and 2011 respectively. Contrast to household without ageing, they were more likely to spent their money relatively higher on transportation purposes than domestic purposes. They spent their money on energy consumption expenditure related to domestic purposes approximately 45.7 and 40.6 percent in 2006 and 2011, respectively. For transportation purposes, they spent their money approximately 54.3 and 59.4 percent in 2006 and 2011, respectively. In case of the poor or the first quintile household, Table 2 showed that ageing household in the first quintile relatively had spent their money heavily on domestic purpose more than transportation purposes. Percentage of energy consumption expenditure on domestic uses of ageing household in the first quintile were about 91.1 percent and 86.3 percent in 2006 and 2011. Percentage of energy consumption expenditure on transportation purposes for ageing household were about 8.9 percent in 2006 and 13.7 percent in 2011.

Table 1 : Average Monthly Household Consumption and Household Energy Consumption Expenditures Per Capita and Percentage of Energy to Consumption Expenditures classified by Types of household and Quintiles between 2006 and 2011 for the Whole Kingdom of Thailand.

Quintiles	2006				2011			
	All	Only Ageing	Ageing& Others	Without Ageing	All	Only Ageing	Ageing& Others	Without Ageing
	Average Monthly Household Consumption Expenditures Per Capita							
Q_1	1,456	1,482	1,242	1,590	2,111	2,294	1,852	2,277
Q_2	2,411	2,389	1,958	2,649	3,271	3,442	2,739	3,577
Q_3	3,489	3.344	2,760	3,858	4,498	4,613	3,652	4,952
Q_4	5,252	4,880	4,011	5,788	6,417	6,392	5,098	7,000
Q_5	12,114	11,287	9,482	13,029	13,434	13,485	10,674	14,496
All	4,944	4,674	3,891	5,382	5,946	6,044	4,803	6,460
	Average Monthly Household Energy Consumption Expenditures Per Capita							
Q_1	155	107	130	176	221	159	194	249
Q_2	263	171	213	296	356	244	300	405
Q_3	381	244	320	420	508	347	431	575
Q_4	564	367	480	611	747	509	654	820
Q_5	1,260	889	1,073	1,366	1,571	1,236	1,320	1,734
All	524	355	443	574	681	499	580	757
	Percentage of Energy to Consumption Expenditures							
Q_1	10.5	7.2	10.4	11.0	10.4	6.8	10.4	10.9
Q_2	10.9	7.2	10.9	11.2	10.9	7.1	10.9	11.3
Q_3	10.9	7.3	11.6	10.9	11.3	7.5	11.8	11.6
Q_4	10.7	7.5	11.9	10.6	11.6	7.9	12.8	11.7
Q_5	10.8	8.2	12.0	10.9	12.1	9.4	13.1	12.3
All	10.8	7.5	11.4	10.9	11.3	7.7	11.8	11.6

Source, Socio-Economic Survey 2006 and 2011, National Statistics Office, Thailand.

Table 2 : Percentage Distribution of Energy Consumption Expenditures classified by Types of household, Selected Quintiles and Types of Energy between 2006 and 2011 for the Whole Kingdom of Thailand.

Quintiles	2006				2011			
	All	Only Ageing	Ageing& Others	Without Ageing	All	Only Ageing	Ageing& Others	Without Ageing
				First Quintile				
Domestics	59.3	91.1	61.9	53.7	52.9	86.3	53.5	47.2
Electricity	39.2	60.2	41.2	35.3	39.2	64.2	39.1	35.7
Cooking Gas	3.8	2.5	3.4	4.1	3.5	2.8	3.2	3.6
Other	16.3	28.4	17.3	14.3	10.2	19.3	11.2	7.9
Fuels	40.7	8.9	38.1	46.3	47.1	13.7	46.5	52.8
Gasoline	38.5	8.3	36.1	43.9	43.4	13.6	42.7	48.8
Diesel	2.2	0.6	2.0	2.4	3.5	0.1	3.6	3.9
Other	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.1
All Energy	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
				Third Quintile				
Domestics	50.6	85.4	52.0	46.7	46.6	78.4	45.5	41.8
Electricity	39.8	67.6	38.5	37.8	38.6	66.1	35.8	35.5
Cooking Gas	6.9	7.1	7.9	6.2	4.9	5.0	5.6	4.2
Other	3.9	10.7	5.6	2.7	3.1	7.3	4.1	2.1
Fuels	49.4	14.6	48.0	53.3	53.4	21.6	54.5	58.2
Gasoline	38.3	12.2	38.1	40.7	39.8	18.3	40.8	42.7
Diesel	11.0	2.4	9.8	12.5	13.2	3.2	13.4	15.0
Other	0.1	0.0	0.1	0.1	0.4	0.1	0.3	0.5
All Energy	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Quintiles	2006				2011			
	All	Only Ageing	Ageing& Others	Without Ageing	All	Only Ageing	Ageing& Others	Without Ageing
				Fifth Quintile				
Domestics	38.8	70.4	41.0	35.3	35.6	62.6	36.2	31.2
Electricity	34.8	60.0	34.7	32.1	32.6	57.0	31.7	28.9
Cooking Gas	3.4	7.7	5.2	2.8	2.5	4.3	3.8	2.0
Other	0.6	2.7	1.1	0.4	0.5	1.3	0.7	0.3
Fuels	61.2	29.6	59.0	64.7	64.4	37.4	63.8	68.8
Gasoline	38.2	20.4	36.6	39.8	39.0	25.0	38.1	41.2
Diesel	22.8	9.1	22.3	24.7	23.3	11.4	23.4	25.3
Other	0.2	0.1	0.1	0.2	2.1	1.0	2.3	2.3
All Energy	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 2 : (continue)

	Overall							
Domestics	49.9	83.1	51.7	45.7	45.5	76.4	45.3	40.6
Electricity	38.5	63.6	38.4	35.9	37.4	63.2	35.6	34.0
Cooking Gas	5.3	5.9	6.0	4.9	3.9	4.2	4.6	3.5
Other	6.1	13.6	7.3	4.9	4.2	9.0	5.1	3.1
Fuels	50.1	16.9	48.3	54.3	54.5	23.6	54.7	59.4
Gasoline	38.4	13.4	37.2	41.5	40.6	19.0	40.7	43.9
Diesel	11.6	3.4	11.0	12.7	13.2	4.3	13.2	14.6
Other	0.1	0.1	0.1	0.1	0.7	0.3	0.8	0.9
All Energy	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source, Socio-Economic Survey 2006 and 2011, National Statistics Office, Thailand.

For household without ageing, they relatively also had higher proportion on domestic purposes than transportation purposes. Percentage of energy consumption expenditure on domestic purposes for household without ageing in the first quintile were about 53.7 and 47.2 percent in 2006 and 2011, respectively, while percentage of energy consumption expenditure on transportation purposes were 46.3 and 52.8 percent in 2006 and 2011, respectively. (Table 2)

Results indicated that for the first quintile household, even the percentage of household energy consumption for domestic purposes were more likely higher than transportation purposes in all types of household, however the percentage of household energy consumption for domestic purposes was declined ranging from ageing household to household without ageing. On the other hand, the percentage of household energy consumption for transportation purposes was increased ranging from ageing household to household without ageing. This means that household with more elderly had to pay more on energy for domestic purposes and pay less on transportation purposes.

In terms of types of energy that household consumed, table 2 also indicated that for overall cases, ageing household relatively had spent their money heavily on electricity followed by, gasoline and other energy sources for domestic consumption. Percentage distribution for electricity, gasoline and other energy sources for domestic consumption to their total consumption expenditure were about 63.2, 19.0 and 9.0 percent in 2011, respectively. On the other hand, for overall cases household without ageing spent their money heavily on gasoline followed by, electricity and diesel. Percentage distribution for gasoline, electricity and diesel consumption to their total consumption expenditure were about 43.9, 34.0 and 14.6 percent in 2011, respectively. This means that the elderly had relatively travel less than non-elderly

person, therefore they relatively spent on fuels consumption less likely than those who were non-elderly person. Because of the elderly were more likely spent their time in their residence, therefore, they had to pay more money for electricity bill. For household without ageing, they spent their money heavily on gasoline, electricity and diesel consumption. Percentage distribution for gasoline, electricity and diesel consumption to their total consumption expenditure were about 43.9, 34.0 and 14.6 percent in 2011, respectively (Table 2).

Table 3 presented gini co-efficient and the energy gap among groups of household in 2006 and 2011, results showed that for overall cases, gini co-efficient calculated by household consumption expenditure were relatively lower than gini-co-efficient calculated by household energy consumption expenditure both in 2006 and 2011.

Table 3 : Shares of Monthly Household Consumption and Household Energy Consumption Expenditures Per Capita, Gini Co-efficient and Energy Gap classified by Types of household and Quintiles between 2006 and 2011 for the Whole Kingdom of Thailand.

Quintiles	2006				2011			
	All	Only Ageing	Ageing& Others	Without Ageing	All	Only Ageing	Ageing& Others	Without Ageing
	Shares of Monthly Household Consumption Expenditures Per Capita							
Q_1	5.90	6.34	6.40	5.92	7.10	7.59	7.71	7.05
Q_2	9.77	10.22	10.09	9.86	11.00	11.38	11.41	11.07
Q_3	14.15	14.29	14.22	14.36	15.13	15.28	15.21	15.33
Q_4	21.30	20.87	20.67	21.54	21.59	21.15	21.23	21.67
Q_5	48.88	48.27	48.61	48.31	45.18	44.61	44.45	44.88
All	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Gini	0.3899	0.3780	0.3800	0.3859	0.3470	0.3352	0.3332	0.3450
Energy Gap	8.28	7.61	7.60	8.16	6.36	5.88	5.76	6.37
	Shares of Monthly Household Energy Consumption Expenditures Per Capita							
Q_1	3.59	2.82	3.79	3.77	3.90	3.10	4.29	4.15
Q_2	7.52	6.64	7.84	7.67	8.00	6.52	8.47	8.21
Q_3	11.91	11.01	12.05	12.06	12.73	11.13	13.09	12.97
Q_4	20.13	18.54	20.27	20.20	21.29	19.08	21.70	21.31
Q_5	56.85	60.99	56.05	56.30	54.07	60.18	52.46	53.36
All	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Gini	0.4765	0.5130	0.4678	0.4703	0.4545	0.5069	0.4383	0.4461
Energy Gap	15.84	21.63	14.79	14.93	13.86	19.43	12.24	12.86

Source, Socio-Economic Survey 2006 and 2011, National Statistics Office, Thailand.

Gini co-efficient calculated by household consumption expenditure represents an income inequality among groups of household, but gini coefficient calculated by household energy consumption expenditure represents an inequality of energy consumption expenditure among groups of household. Results indicated that household income inequality were relatively lower than the inequality of household energy consumption expenditure. Table 3 also showed that ageing household relatively had higher gini co-efficient on energy consumption than gini co-efficient on total household consumption expenditure both in 2006 and 2011. Gini co-efficient on energy consumption expenditure for ageing household were about 0.5130 and 0.5069 in 2006 and 2011 respectively. While their gini co-efficient on total household consumption expenditure were about 0.3780 and 0.3352 in 2006 and 2011, respectively. On the other hand, household without ageing, whose had the highest gini co-efficient on total household consumption expenditure both in 2006 and 2011. But in terms of gini co-efficient on energy consumption expenditure, they relatively had moderate gini co-efficient on energy consumption expenditure behind ageing household both in 2006 and 2011. This confirmed that ageing household relatively had higher inequality of energy consumption expenditure among themselves.

In terms of the energy gap, which was a ratio of the energy consumption expenditure share between the fifth quintile households and the first quintile households. Table 3 showed that ageing household relatively had the highest energy gap, while household with ageing had the lowest energy gap both in 2006 and 2011. Fortunately, table 3 also indicated that the energy gap was gradually decreased since 2006. This means that an inequality of energy consumption expenditure among groups of household have been declined. Table 4 presented gini co-efficient and the energy gap among two major groups of energy household consumed, which were domestic and fuels consumptions. Domestic energy consumption was energy that household consumed for domestic uses including electricity, cooking gas and other sources of energy, like charcoal or bio-gas for examples. Fuels consumption was energy that household consumed for transportation purposes including gasoline, diesel and other sources of energy, like liquid petroleum gas (LPG) or natural gas for vehicle(NGV) for examples. Table 4 showed that for overall cases, gini co-efficient and the energy gap of fuels consumption expenditure were relatively higher than gini co-efficient and the energy gap of domestic consumption expenditure both in 2006 and 2011.

Table 4 : Shares of Monthly Household Domestic Energy Consumption and Household Fuels Consumption Expenditures Per Capita, Gini Co-efficient and Energy Gap classified by Types of household and Quintiles between 2006 and 2011 for the Whole Kingdom of Thailand.

Quintiles	2006				2011			
	All	Only Ageing	Ageing& Others	Without Ageing	All	Only Ageing	Ageing& Others	Without Ageing
Shares of Monthly Household Domestic Energy Consumption Expenditures Per Capita								
Q_1	5.31	4.30	5.19	5.51	5.60	5.12	5.57	5.77
Q_2	9.91	9.26	9.67	10.12	10.09	9.25	10.01	10.35
Q_3	14.57	14.40	14.25	14.75	14.74	14.18	14.68	14.99
Q_4	21.37	21.99	21.03	21.47	21.77	22.11	21.60	21.87
Q_5	48.84	50.05	49.86	48.13	47.80	49.34	48.14	47.03
All	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Gini	0.3941	0.4169	0.4028	0.3864	0.3844	0.4052	0.3869	0.3762
Energy Gap	9.19	11.63	9.61	8.73	8.54	9.64	8.64	8.15
Shares of Monthly Household Fuels Consumption Expenditures Per Capita								
Q_1	3.06	2.90	3.20	3.09	3.52	3.45	3.72	3.56
Q_2	6.05	5.51	6.26	6.15	6.87	6.46	7.17	6.94
Q_3	10.41	9.23	10.38	10.50	11.62	10.33	11.75	11.81
Q_4	19.70	19.17	20.26	19.60	21.04	19.63	21.86	20.90
Q_5	60.78	63.19	59.90	60.66	56.95	60.13	55.50	56.79
All	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Gini	0.5164	0.5370	0.5096	0.5144	0.4842	0.5062	0.4730	0.4817
Energy Gap	19.86	21.81	18.70	19.64	16.19	17.44	14.94	15.96

Source, Socio-Economic Survey 2006 and 2011, National Statistics Office, Thailand.

Ageing household had the highest gini co-efficient and the energy gap on domestic consumption expenditure both in 2006 and 2011. On the other hand, household without ageing relatively had the lowest gini co-efficient and energy gap on domestic consumption expenditure both in 2006 and 2011.

For transportation purposes, table 4 indicated that ageing household also relatively had the highest gini co-efficient and the energy gap on fuels consumption both in 2006 and 2011, while household with ageing relatively had the lowest both gini co-efficient and energy gap in 2006 and 2011. This also demonstrated that there was quite difference within groups of

ageing household on fuels consumption expenditure, the first quintile of ageing household had relatively quite low on fuels consumption expenditure share, but the fifth quintile of ageing household had relatively quite high on fuels consumption expenditure share. Results indicated that the fifth quintile of ageing household had relatively quite high on percentage of energy consumption expenditure both on domestic and transportation purposes, compared to those in the first quintile who had relatively quite low on the percentage of energy consumption expenditure both on domestic and transportation purposes.

Table 5 : Shares of Monthly Household Electricity Consumption Expenditures Per Capita, Gini Co-efficient and Energy Gap classified by Types of household and Quintiles between 2006 and 2011 for the Whole Kingdom of Thailand.

Quintiles	2006				2011			
	All	Only Ageing	Ageing& Others	Without Ageing	All	Only Ageing	Ageing& Others	Without Ageing
	Shares of Monthly Household Electricity Consumption Expenditures Per Capita							
Q_1	4.43	3.44	4.23	4.66	4.67	4.49	4.49	4.90
Q_2	8.79	8.31	8.32	9.11	9.11	8.47	8.63	9.43
Q_3	13.28	13.41	12.60	13.59	13.65	13.12	13.23	14.04
Q_4	20.46	20.98	19.52	20.67	21.16	20.95	20.71	21.40
Q_5	53.05	53.86	55.34	51.96	51.42	52.98	52.95	50.23
All	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Gini	0.4356	0.4540	0.4537	0.4247	0.4222	0.4378	0.4359	0.4106
Energy Gap	11.97	15.65	13.09	11.16	11.01	11.80	11.78	10.26

Table 5 showed that ageing household relatively had the highest gini co-efficient and the energy gap on electricity consumption expenditure, their gini co-efficient on electricity consumption were about 0.4540 and 0.4378 respectively and their energy gap were about 15.65 and 11.80 times in 2006 and 2011, respectively. Household with ageing relatively had the second highest level of gini co-efficient and the energy gap behind ageing household, their gini co-efficient on electricity consumption expenditure were about 0.4537 and 0.4359 respectively and their energy gap were 13.09 and 11.78 in 2006 and 2011, respectively. On the other hand, household without ageing had the lowest gini co-efficient and the energy gap on electricity consumption expenditure both in 2006 and 2011. Their gini co-efficient on electricity

consumption expenditure were about 0.4222 and 0.4106 respectively and their energy gap on electricity consumption expenditure were about 11.16 and 10.26 in 2006 and 2011 respectively. There was a remarkable difference within groups of ageing household, the first quintile of ageing household relatively had quite low on electricity consumption expenditure share, while the fifth quintile of them relatively had quite high on that share. Table 6 represented the shares of monthly household cooking gas consumption expenditure per capita, it showed that household without ageing had the highest gini co-efficient and the energy gap on cooking gas consumption expenditure followed by household with ageing and ageing household respectively. Only 2011, gini co-efficient on cooking gas consumption expenditure for household without ageing, household with ageing and ageing household were about 0.2601, 0.2302 and 0.2158 and their the energy gap in 2011 were 4.14, 3.42 and 3.10 respectively. Results in table 6 indicated that both gini co-efficient and the energy gap on cooking gas consumption expenditure were relatively quite low compared to the other sources of energy which household consumed. Because of cooking gas was a substantive source of energy for cooking, household had to depend more on them. However, results also indicated that the poor household those who categorized into the first quintile group had paid for cooking gas nearly about 10 percent, which relatively quite high compared to the other sources of energy they consumed.

Table 6 : Shares of Monthly Household Cooking Gas Consumption Expenditures Per Capita, Gini Co-efficient and Energy Gap classified by Types of household and Quintiles between 2006 and 2011 for the Whole Kingdom of Thailand.

Quintiles	2006				2011			
	All	Only Ageing	Ageing& Others	Without Ageing	All	Only Ageing	Ageing& Others	Without Ageing
	Shares of Monthly Household Cooking Gas Consumption Expenditures Per Capita							
Q_1	8.88	9.44	9.93	9.08	8.98	10.67	10.08	9.10
Q_2	13.67	15.91	14.34	14.21	13.47	15.42	14.35	13.84
Q_3	16.87	16.77	17.72	17.08	17.24	16.31	17.94	17.66
Q_4	21.82	23.76	23.24	21.46	22.25	24.47	23.18	21.74
Q_5	38.76	34.12	34.77	38.18	38.06	33.13	34.45	37.66
All	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Gini	0.2716	0.2289	0.2344	0.2618	0.2678	0.2158	0.2302	0.2601
Energy Gap	4.36	3.62	3.50	4.21	4.24	3.10	3.42	4.14

Table 7 : Shares of Monthly Household Gasoline Expenditures Per Capita, Gini Co-efficient and Energy Gap classified by Types of household and Quintiles between 2006 and 2011 for the Whole Kingdom of Thailand.

Quintiles	2006				2011			
	All	Only Ageing	Ageing& Others	Without Ageing	All	Only Ageing	Ageing& Others	Without Ageing
	Shares of Monthly Household Gasoline Consumption Expenditures Per Capita							
Q_1	3.84	3.58	4.11	3.87	4.41	4.37	4.82	4.45
Q_2	7.14	6.52	7.48	7.24	7.87	8.39	8.17	7.93
Q_3	10.85	10.28	10.94	10.99	11.70	11.35	12.03	11.61
Q_4	17.48	16.08	17.30	17.50	18.44	18.51	18.41	18.63
Q_5	60.69	63.54	60.16	60.40	57.58	57.37	56.57	57.37
All	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Gini	0.4962	0.5179	0.4877	0.4933	0.4676	0.4644	0.4550	0.4661
Energy Gap	15.79	17.76	14.63	15.59	13.06	13.12	11.74	12.88

Table 7 showed that both in 2006 and 2011, ageing household had the highest gini co-efficient and the energy gap on gasoline consumption expenditure, followed by household without ageing and household with elderly, respectively. It indicated that there was a massive difference within groups of ageing household, especially, the first quintile of ageing household, which relatively had quite low on gasoline consumption expenditure share, about 4 percent in 2006, but the fifth quintile of ageing household relatively had more than about 63 percent on that share in 2006. Even the difference between rich and poor of ageing household had been narrowed in 2011, though such difference was still high. Gasoline consumption affordability, vehicle ownership and travelling behavior on the rich elderly were major causes of the relatively high proportion on gasoline consumption expenditure share compared to the other elderly. (Choiejit, 2005)

Table 8 : Shares of Monthly Household Diesel Expenditures Per Capita, Gini Co-efficient and Energy Gap classified by Types of household and Quintiles between 2006 and 2011 for the Whole Kingdom of Thailand.

Quintiles	2006				2011			
	All	Only Ageing	Ageing& Others	Without Ageing	All	Only Ageing	Ageing& Others	Without Ageing
	Shares of Monthly Household Diesel Consumption Expenditures Per Capita							
Q_1	3.89	4.91	4.21	3.94	4.71	4.70	5.13	4.78
Q_2	8.42	9.76	9.12	8.34	9.15	9.80	9.91	9.24
Q_3	13.95	14.06	14.81	13.62	14.27	14.78	15.45	14.35
Q_4	21.36	22.03	23.30	21.67	22.48	20.41	22.94	22.33
Q_5	52.38	49.25	48.55	52.44	49.38	50.31	46.56	49.31
All	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Gini	0.4397	0.4038	0.4114	0.4413	0.4107	0.4072	0.3835	0.4086
Energy Gap	13.48	10.04	11.53	13.32	10.49	10.70	9.07	10.32

Table 8 showed that in 2006 the ageing household relatively had the lowest gini co-efficient and the energy gap on diesel consumption expenditure, while the household without ageing relatively had the highest gini co-efficient and the energy gap, In 2011, results showed that ageing household was not in the third places on diesel consumption expenditure as they did in the last five years, their gini co-efficient had climbed up to the second ranked behind household without ageing and their energy gap had dramatically climbed up to the top ranking in 2011. This means that the difference within groups of ageing household had been increased, especially the fifth quintile of ageing household, they relatively paid more on diesel consumption than ever they did in 2006. An increasing of diesel price, switching on patrol usage from gasoline to diesel for transportation purposes and changing on their travelling behavior causes an increasing diesel consumption expenditure nearly about 50 percent of overall gasoline consumption expenditure share among ageing household themselves in 2011.

Conclusion

This paper intended to indicate the household energy consumption expenditure and the inequality of household energy consumption expenditure among households, especially ageing household in Thailand. Secondary data from the “Household Socio-Economic Survey” in 2006

and 2011 compiled by the National Statistical Office were employed to this paper. Descriptive statistics were applied to demonstrate the average monthly household energy consumption expenditure per capita and its percentage to total household consumption expenditure. Gini co-efficient and the energy gap were also applied to show the inequality of energy consumption expenditure among various types of household. Households in this paper were definded into four groups, which (1) ageing household, (2) household with ageing, (3) household without ageing and (4) total households. Sources of energy that household consumed also were grouped in two major groups, which were domestic and fuels consumptions. Sources of energy that household consumed for domestic purposes were electricity, cooking gas, while sources of energy that household consumed for transportation purposes were gasoline and diesel.

Results showed that ageing household relatively had the least percentage proportion on energy consumption to total household consumption expenditure, approximately 7.5-7.7 percent during 2006 and 2011, respectively. On the other hand, household with ageing relatively had the highest percentage proportion on energy consumption to total household consumption expenditure, approximately 11.4-11.6 percent during 2006 and 2011, respectively. Ageing household were more likely to consumed energy for domestic purposes than for transportation purposes. They relatively spent about 76.4 percent of their energy consumption expenditure for domestic purposes, while ageing household relatively spent about 23.6 percent of their energy consumption expenditure for fuels consumption in 2011. Elderly person were more likely to stay home than traveling outside their residence, therefore, they were more likely paid on electricity bills rather than fuels bills for instances. This paper also indicated that there was an inequality of energy consumption expenditure among households, especially ageing household. Even ageing household had relatively low on the percentage proportion on energy consumption expenditure compared to other household types, though, ageing household also relatively had quite difference among themselves. The fifth quintile of ageing household relatively had the higher percentage proportion on energy consumption expenditure than those ageing household who were grouped in the first quintile.

Recommendations

1) According the results showed that the cooking gas was an substantive source of energy for household cooking, most of households had to relatively depend on them, especially for the

poor, they had to spent more money for cooking gas, Therefore, cooking gas subsidiarity for the poor schemes should be launched practically.

2) The results showed that gini co-efficient calculated by total household consumption expenditure were less likely than gini co-efficient calculated by household energy consumption expenditure, this mean that energy consumption expenditure was a burden to the household especially the poor. Therefore, energy cost reduction program should be extended.

3) Results showed that ageing household paid more on energy consumption for domestic purposes, then domestic energy saving program and domestic energy cost subsidiarity program for the poor of ageing household should be initiated and implemented.

4) Results showed that the rich had spent money more on energy consumption for transportation purposes; therefore, public transport should be improve for friendly use for elderly in all modes of transport. Moreover, driving capability for elderly should be revised.

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