

# Purchase Decision of Life Insurance Policies among Malaysians

Yiing Jia Loke and Yi Yuern Goh

**Abstract**—The research objective of this paper is to determine the socio-demographic and economic factors that have significant influence on the demand for life insurance in Malaysia. A hurdle count-data model is used to accommodate the separate decisions on the demand for life insurance which is divided into two parts: whether to purchase a life insurance policy and if so, how many policies to purchase. The results show that there are some slight differences in the factors that determine the decision to purchase life insurance and the quantity of life insurance policies that a consumer will purchase.

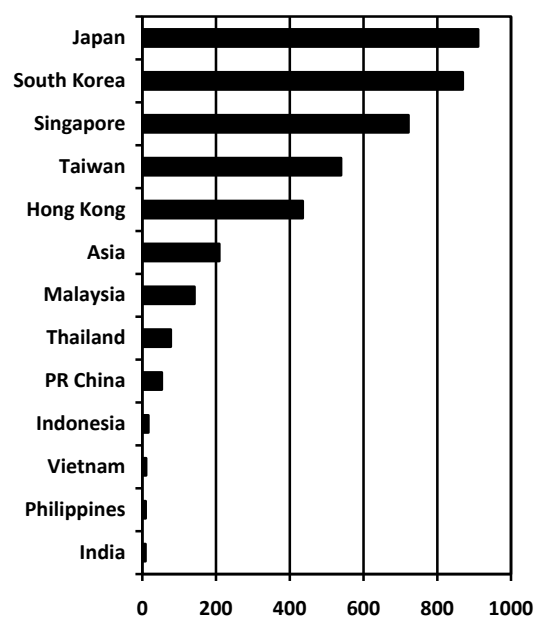
**Index Terms**—hurdle-count data model, life insurance, zero truncated poisson.

## I. INTRODUCTION

The idea of placing economic value on human life can be traced back to [1] and as such, a rational person should be covered by insurance. Given life uncertainties, it is reasonable to think that insurance is a product that individuals will consider purchasing to help cushion and minimize their loss in the event of unexpected circumstances. However, this is far from true especially in Asian society which is relatively conservative and finds it a taboo to plan or discuss about unfortunate circumstances such as death, disability or ill health. As such while insurance can be considered as one of the oldest financial product, yet it remains as a product that many will not take the initiative to purchase unless it is compelled by law such as auto insurance or the individual is approached by an insurance sales agent or a wealth planner.

Over the years, there has been a gradual growth in the insurance industry as the society becomes more educated and has a better understanding on the importance of insurance. the amount of per capita insurance expenditure in Malaysia has increased by 128% from RM338 in 2000 to RM771 in 2010. Further, the number of new life insurance policies has also increased by 21% from 1,174,517 policies in 2000 to 1,428,280 policies in 2010. In 1990, the number of new policies was a mere 496,338 and per capita insurance expenditure was only RM92 [2]. However, the insurance penetration and density rate in Malaysia is relatively low compared to other Asian countries. Figure 1 compares the insurance density in selected Asian countries. Insurance density is measured by the per capita premium income

derived from insurance policy. Figure 1 shows that the insurance density in Malaysia is at USD141 in the year 2010 compared to Japan (USD 910) which is the highest among the selected Asian countries. While the insurance density in Malaysia is slightly better than its ASEAN counterparts, it is still low compared to other Asian countries. In fact, Singapore has higher insurance density (USD722) than Malaysia.



Source: Swiss Sigma Re, 5/2011

Fig. 1. Insurance Density (per capita premium income, USD) in 2010

On the other hand, Figure 2 shows the insurance penetration rate which is measured by life insurance premium income as a percentage of gross national product (GNP). Among the selected Asian countries, Taiwan has the highest insurance penetration rate (15.48%) whereas the insurance penetration rate in Malaysia is only at 3.04%. From Figures 1 and 2, it is clear that there is a large untapped life insurance market in Malaysia.

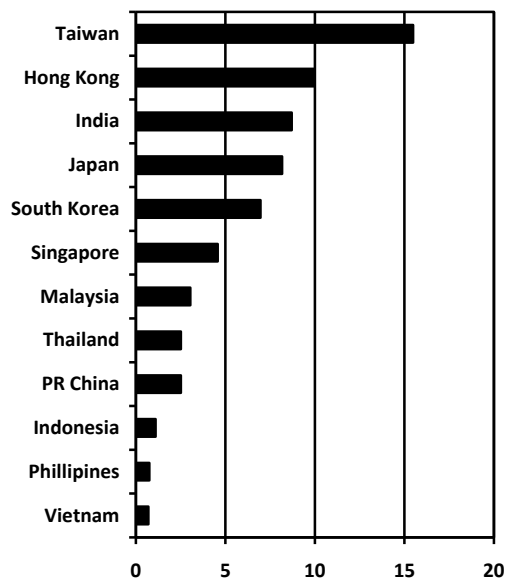
The importance of life insurance is well appreciated by consumers in the developed countries whereas, the demand for life insurance in the developing countries such as Malaysia remains low [3]. In light of the low penetration rate of insurance in Malaysia, the paper seeks to address a fundamental issue with regards to demand for life insurance. Instead of analyzing the amount of premium spent on life insurance as carried out by many of the existing studies on the demand for life insurance, this paper aims to explore the factors that affect the ownership of an insurance policy. The analysis on the demand for life insurance can be separated

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into two parts: whether to purchase insurance or not and if so, how many policies to purchase. The findings show that there are some slight differences in the factors that determine the decision to purchase life insurance and the quantity of life insurance policies that a consumer will purchase.



Source: Swiss Sigma Re, 5/2011

Fig. 2. Insurance penetration: Life insurance premium income as a % of GNP, in 2010

Given the different effects of socio-demographic and economic factors on the likelihood of purchasing life insurance and the quantity of life insurance policies, the insurers will have to strategize their market expansion and penetration plans differently.

The findings of this paper will help to accelerate the growth of the insurance market in Malaysia. A vibrant life insurance market helps to create sustainable economic and financial development.

## II. INSIGHTS FROM RELATED LITERATURE

The theoretical literature on life insurance begins with the concept that emphasizes the economic value of human life [1]. The concept supports the notion that a rational person should be covered by insurance [1]. Later, the economics of risk and uncertainties were added to the studies on insurance [4],[5]. In [5], individuals are postulated to have different risk preferences. Risk averse individuals will pay to avoid risk and hence will purchase insurance to cushion themselves against risk. Further, the degree of risk aversion can affect the maximum premium that an individual is willing to pay to avoid risk.

Subsequently, many empirical studies on the demand for life insurance fall back on the theoretical models for insurance by [6]-[8] and others. In [6], the demand for life insurance is considered within the context of the consumer's lifetime allocation process. On the other hand, in [7], the life cycle patterns of consumption, savings and insurance purchases are considered in a discrete time model in which the length of life is uncertain. The influence of dependents on the purchase of life insurance is introduced by [8]. In [8], the demand for life

insurance is viewed from the perspective of the beneficiaries whereby life insurance is chosen to maximize the beneficiaries' expected lifetime utility. This is a departure from [6] whereby in [6], a consumer purchases life insurance to maximize his expected lifetime utility and not the beneficiaries'.

In empirical studies on the demand for life insurance, life insurance premium is typically used to measure the demand for life insurance [9-14]. Factors that are typically included in the demand for life insurance are income, education, occupation, age of the head of household, number of dependents, ethnicity and risk aversion. An income change is found to result in changes in the amount of premium expenditures. It was found that higher income earners may feel a greater loss and hence, purchase of insurance can help to reduce the risk of loss resulting from unfortunate circumstances [9]. Further, income differences are found to contribute strongly to the variations in the amount of premium expenditure except for households in the low income category [9]. In [10], it was found that a household's need to prepare bequests increases with its level of risk aversion. In studies [3],[13],[14] that do cross country analysis using aggregate national data, factors such as expected inflation rate, average life expectancy, policy loading charge and social security benefits are added. According to [13], national income and wealth affect demand for life insurance positively, while inflationary expectations adversely affect demand for life insurance.

The selection of the variables for this study is drawn from the above mentioned studies. Apart from the socio-demographic variables, an individual's risk aversion is also added into the study. As insurance is a financial product that enables an individual to transfer risk in an environment of uncertainties, the demand for insurance may likely be influenced by the general nature of risk preferences of an individual.

## III. MODEL AND DATA

### A. Count-Data Hurdle Model

The decision to purchase insurance can be divided into two parts: whether to purchase insurance and if so, how many policies to purchase. To accommodate the two parts decision a count-data hurdle model is used. The first part decision involves a binary choice of yes or no where a value of "1" is given to denote "yes" and value "0" for otherwise. On the other hand, in the second part, there are values of "zeros" for those who do not purchase insurance and values of non-zeroes for those who purchase insurance. A hurdle model combines the binary model to predict zeros and a zero-truncated Poisson model to predict the non-zero counts in the second part of the purchase decision.

A logit model is used to model the binary choice outcome  $y=0$  versus  $y>0$ .

$$\Pr(y_i = 0) = \frac{e^{x_i\beta}}{1 + e^{x_i\beta}} = \pi_i \quad (1)$$

The positive counts are generated by a zero-truncated Poisson process as the data is truncated at 0. There are two equations where zero is viewed as a “hurdle” that one has to get past before reaching positive counts. The predicted rates and probabilities from the hurdle model are computed by mixing the results from the binary model and the zero-truncated model [15]. Positive counts are generated by a zero-truncated Poisson. The positive counts can only occur if the zero hurdle (which occurs with probability  $1-\pi_i$ ) is past. Hence, the probability of observing a specific value of  $y$  given that the count is non-zero is:

$$\Pr(y_i | y_i > 0) = \frac{\Pr(y_i)}{\Pr(y_i > 0)} = \frac{\left( \frac{e^{-\lambda_i} \lambda_i^{y_i}}{y_i!} \right)}{1 - e^{-\lambda_i}} \quad (2)$$

where  $\lambda_i = e^{x_i \beta}$ .

### B. Data

The data used in this study was obtained from a survey conducted from mid March 2011 to mid April 2011 in Penang, Malaysia. Penang is a northern state in Peninsular Malaysia. The respondent must be at least 21 years of age and resides in Penang. A total of 500 respondents participated in the survey. Self-administered questionnaires were randomly distributed to respondents in shopping malls and commercial areas and offices.

The questionnaire is divided into two main sections. The first section pertains to socio-demographic characteristics such as the age, gender, education level, occupation type, marital status and number of dependents. In the second section, questions about the respondent's insurance purchase decision and perception towards insurance were included. Table 1 details the definitions and sample statistics of variables in the statistical model.

### C. Characteristics of Survey Respondents

Of the total sample of 500 respondents, 69% (347) of the respondents have life insurance policy and 21% (153) of the respondents do not have a life insurance policy.

Among the 347 respondents who have life insurance policy, the majority (27.1%) hold three life insurance policies, followed by 79 respondents (22.8%) who hold two life insurance policies and 49 respondents (14.1%) who hold more than 6 life insurance policies (*see, fig.3*)

On average, life insurance policy holders have slightly higher number of dependents (1.72) compared to those without any life insurance policies (1.52). The majority of those who have life insurance policies (40%) are from the older age group (between 30 to 39 years old) compared to the majority of those who do not have life insurance policies (46%) who are in the 20s. There appears to be ethnic differences among those who have and those who do not have life insurance policies. 47% of those who have life insurance policies are Chinese while 60% of those who do not have life insurance policies are Malay. Among those who have life insurance policies, the majority, 63% of them are from the professional and white collar group.

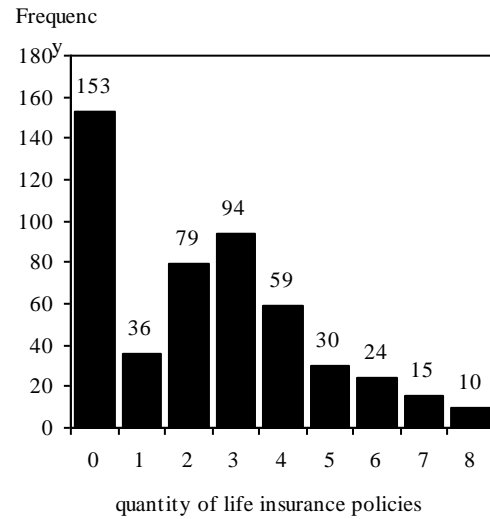


Fig. 3. Frequency of dependent variable: quantity of life insurance policies

TABLE I: VARIABLE DEFINITIONS AND SUMMARY STATISTICS

Variables	Definition	Mean		
		Life insurance holders	Non-life insurance holders	Full sample
Continuous variables				
Dependent	Number of dependents	1.76 (0.38)	1.52 (0.31)	1.77 (1.69)
Binary explanatory variables (yes = 1; no = 0)				
Age20	Age is 20 to 29 years old	0.28	0.46	0.34
Age30 <sup>+</sup>	Age is 30 to 39 years old	0.40	0.24	0.35
Age40	Age is 40 to 49 years old	0.21	0.12	0.19
Age50	Age is 50 to 59 years old	0.11	0.18	0.13
Male	Gender is male	0.50	0.47	0.49
Malay <sup>+</sup>	Ethnicity is Malay	0.33	0.60	0.41
Chinese	Ethnicity is Chinese	0.47	0.28	0.41
Indian	Ethnicity is Indian/others	0.20	0.11	0.17
Jobless	Unemployed/student/retired/ homemaker	0.10	0.27	0.15
White <sup>+</sup>	Professional/White collar	0.63	0.33	0.54
Blue	Blue collar	0.12	0.35	0.19
Self	Self employed	0.14	0.06	0.12
Single	Marital status is single	0.32	0.50	0.37
Married <sup>+</sup>	Marital status is married	0.65	0.42	0.58
Widow	Marital status is widow/separated/divorced	0.04	0.08	0.05 0.33
Lowinc	Household income is <RM2000	0.21	0.61	0.37
Lowmid	Household income is RM2000- RM4000	0.39	0.30	0.15
Highmid	Household income is RM4001-RM6000	0.18	0.08	0.16
High	Household income is >RM6000	0.22	0.01	0.50
Tertiary	Tertiary as highest level of education	0.41	0.70	0.72
Risk	Risk preferences is risk averse	0.63	0.93	0.17
Hhinc0	Do not allocate income for insurance	0.07	0.38	0.64
Hhinc5 <sup>+</sup>	Allocate 1% to 10% of income for insurance	0.67	0.57	
Hhinc11	Allocate 11% to 20% of income for insurance	0.22	0.03	0.16
Hhinc20	Allocate above 20% of income for insurance	0.04	0	0.03
Sample size		347	153	500

Notes: Standard deviations in parentheses. +denotes reference category

Those who are married are more likely to have insurance policies (65%) compared to the singles who are more likely not to have any insurance policies (50%). The low income group stands out as the majority (61%) among those who do not own a life insurance policy whereas only 1% of those who are non-life insurance holders are from the high income group. The majority of life insurance holders are from the lower middle income group (39%) followed by the high income group (22%).

It is interesting to note that the majority (70%) of those who are non-life insurance holders have tertiary education. Although *a priori*, it is assumed that those with tertiary education will appreciate and understand the importance of life insurance, the survey shows otherwise. The risk attitude of the respondents is inferred from the range of investment fluctuations that they are at ease with. Those who are comfortable with a general fluctuation between +/- 5% to +/- 10% to their value of investment are considered as risk averse. It is interesting to note that the majority of the respondents (72%) in this sample are classified as risk averse.

Finally, when the respondents were asked on the fraction of their income that they would feel comfortable to be allocated for insurance purposes (all types of insurance), it is found that the majority of the respondents (64%) feel comfortable to set aside 1% to 10% of their income for insurance purposes. It is worthy to note that among the non-life insurance holders, the majority of them (57%) are comfortable to allocate 1% to 10% of their income for insurance. This implies that the individuals prefer to channel their allocation of income for other types of instead of life insurance. Only 3% of the total respondents are comfortable to set aside above 20% of their income for insurance purposes.

#### IV. EMPIRICAL FINDINGS

Maximum likelihood estimates are presented in Table 2. Of the 17 explanatory variables in the equation for ownership of life insurance policy, 9 of the variables are significant. On the other hand, of the 20 explanatory variables in the quantity of life insurance policy equation, 9 variables are significant.

Column (1) of Table 2 gives estimates of the explanatory variable on the ownership of life insurance policies. The estimates from the logit model denote the log of the odds of explanatory variable on the ownership of life insurance policies. Exponentiating the estimates give the odds ratio of the explanatory variables on the likelihood of purchasing life insurance.

The results on ownership of life insurance policies show that a respondent aged between 20 to 29 (age20) are less likely to own an insurance policy compared to a respondent aged between 30 to 39 (age30). From column (1) of Table 2, it is shown that the log of odds for a respondent in his 20s to purchase life insurance decreases by 0.007 times as compared to a respondent who is in his 30s. In other words, the odds for a respondent in his 20s to purchase life insurance fall by 1% compared to a respondent who is in his 30s. However, there are no significant differences in the ownership of a life insurance policy between those in the 30s with the other age groups. Apart from being young, a respondent who is in the

20s may have just entered the workforce and may be struggling to manage his/her various financial commitments. Therefore, such respondent is less likely to purchase a life insurance policy compared to a respondent in the 30s who may have young family and have to plan for the family should unforeseen circumstances happen.

Ethnicity is found to have significant influence on the decision to purchase life insurance. It is interesting to note that compared to the Malays, both the Chinese and Indians are more likely to own a life insurance policy. Although the Chinese and Indians are relatively more conservative than the Malays in terms of discussing unfortunate circumstances such as death, the results seems to suggest that despite their reservations, the Chinese and Indians are more likely to purchase life insurance than the Malays. [4] found that predominantly Islamic countries consume less life insurance than non-Islamic countries. This perhaps explains the lower likelihood of the Malays purchasing life insurance compared to the other two major ethnic groups, namely the Chinese and Indians. All the Malays in Malaysia are Muslim.

TABLE II: MAXIMUM LIKELIHOOD ESTIMATES OF ZERO TRUNCATED POISSON HURDLE MODEL

Explanatory variables	Ownership of life insurance policy		Quantity of life insurance policy	
	Estimates (1)	Std. error (2)	Estimates (3)	Std. error (4)
Dependents	-0.007	0.09	0.061***	0.02
Age20	-0.703*	0.20	-0.117	0.10
Age40	-0.007	0.43	0.012	0.07
Age50	-0.616	0.25	-0.016	0.10
Male	0.073	0.29	-0.008	0.05
Chinese	1.162***	0.93	0.003	0.06
Indian	1.620***	1.91	0.103	0.08
Jobless	-1.126***	0.13	0.031	0.12
Blue	-1.218***	0.11	0.031	0.09
Self	-0.768	0.26	0.156**	0.07
Single	-1.057**	0.15	-0.063	0.08
Widow	-0.179	0.48	-0.154	0.16
Lowinc	-0.463	0.20	-0.208**	0.09
Highmid	0.441	0.70	0.203***	0.07
High	1.864**	5.29	0.279***	0.09
Tertiary	-0.926***	0.13	-0.116*	0.06
Risk	-1.613***	0.08	-0.177	0.06
Hhinc0			-0.001***	0.13
Hhinc11			0.200***	0.06
Hhinc20			0.388***	0.07
Log Likelihood	-206.809		-586.344	

Notes: \*\*\*, \*\* and \* indicate significance at the 1, 5 and 10% level, respectively.

In terms of occupation, the results show that an unemployed or a blue collar worker is less likely to purchase life insurance compared to a respondent who is a white collar worker or professional. Perhaps, a respondent who is unemployed or a blue collar worker has lower income and hence, less income capability to purchase insurance. Further, a professional or a white collar worker is more likely to understand and appreciate the importance of life insurance than a blue collar worker or a respondent who is unemployed.

In addition, a blue collar worker in Malaysia is most likely protected under the social security scheme (SOCSO) receives social insurance whereas a white collar worker or a professional is not eligible for the social security scheme.

A single respondent is less likely to purchase life insurance than a married respondent. Given that a married respondent is likely to have family members or dependents to care for, it is reasonable to expect that a married respondent is more likely to think and plan for his/her family members should an unfortunate circumstances fall upon him/her.

In terms of income, there are only significant differences between lower mid income earners and high income earners on the likelihood of the purchase of life insurance. The results show that the log of odds for a high income earner increases by 1.864 times to purchase life insurance compared to a lower mid income earner. In other words, the odds of high income earner to purchase life insurance are 6.45 times higher than than of a lower mid income earner.

Education is found to have significant influence on the decision to purchase life insurance. A respondent with tertiary education is found to be less likely to purchase life insurance than a respondent without tertiary education. In Given the availability of various innovative financial products, it is plausible that a respondent with tertiary education may be more interested in wealth management and wealth creation products than life insurance. The higher educated individuals may view the new wealth management products as a more appealing way of managing their finances and leaving bequests for their dependents than life insurance.

Column (3) of Table 2 gives the estimates of the explanatory variable on the quantity of life insurance policies. The coefficient estimates gives the difference in the logs of expected quantity that is expected to change by the respective regression coefficient, given the other explanatory variables are held constant. On the other hand, by exponentiating the coefficient estimates give the incidence rate ratios of the explanatory variables on the quantity of life insurance purchased.

For example, for an increase in a dependent, the rate ratio for quantity of insurance increases by the factor of 1.063 holding other factors in the model constant. Number of dependents is found to play a significant role in the quantity of insurance policies purchased but not in the ownership of life insurance policies. The results show that a respondent who has more dependents are more likely to purchase more life insurance policies.

A self employed respondent is found to purchase more life insurance policies than a professional or a white collar worker. Perhaps this is because a professional or a white collar worker may be covered by his/her company's group insurance while a self employed respondent does not enjoy such security benefits. Therefore, a self employed respondent may need to purchase more life insurance policies to mitigate any unforeseen circumstances.

Income is found to have significant influence on the quantity of life insurance purchased. Unlike the ownership of life insurance policy whereby significant differences is only noted between the lower mid income earners and high income earners, in terms of quantity of life insurance purchased there are significant differences in all income groups. The low

income earners are found to purchase less quantity of life insurance policies compared to the lower mid income earners but the upper mid income and high income earners are found to purchase more life insurance policies than the lower mid income earners. This clearly shows the significance of income constraints on the quantity of life insurance that an individual can afford to purchase. Higher income gives an individual better capability to purchase more life insurance policies than those with lower income.

Similar to the effects of tertiary education on the ownership of life insurance policies, a respondent with tertiary education is also found to purchase less quantity of life insurance policies. A respondent who has tertiary education is found to decrease the rate ratio of the quantity of life insurance policy purchased by a factor of 0.89 holding other factors in the model constant.

Although, risk aversion is found to have significant influence on the ownership of life insurance, it has no significant influence on the quantity of life insurance. The fraction of income that is allocated for insurance is found to have significant effect on the number of insurance policies purchase. A respondent who does not allocate any portion of his income to insurance is found to purchase fewer quantities of insurance policies than a respondent who allocates 1% to 10% of his income for insurance purposes. On the other hand, a respondent who allocated 11% to 20% and above 20% of his income for insurance is found to purchase more quantity of life insurance policies than a respondent who allocates only 1% to 10% of his income for insurance.

Overall, the results show that the decision to purchase a life insurance policy and the number of life insurance policy are affected by different factors. Age groups, ethnicity and risk aversion are found to have significant effect on the decision to purchase a life insurance policy but have no significant influence on the quantity of life insurance policies to be purchased. On the other hand, number of dependents is found to have significant effect on the number of life insurance policies to be purchased but not on the decision to purchase a life insurance policy.

## V. CONCLUSION

This paper draws out three important findings in the demand for life insurance in Malaysia. *Firstly*, given the different effects of socio-demographic and economic factors on the likelihood of purchasing life insurance and the quantity of life insurance policies, the insurers will have to strategize their market expansion and penetration plans differently.

*Secondly*, the findings indicate that affordability is an important criterion in the demand for life insurance. The results show that insurance appear to be affordable only for those who are economically more capable as those in the high income bracket, professional and white collar workers and those in the 30s compared to those in the 20s are more likely to demand life insurance. Those in the 20s are most likely to find it hard to cope with their various financial commitments and purchasing insurance may be the least of their priority. As lack of financial preparedness in the event of loss can have debilitating effects on the sustainability of an individual's

personal finances and the economy, an alternative social security scheme should be developed to provide a security cushion for individuals who cannot afford insurance.

Thirdly, higher education is not a driver in the demand for life insurance. Although the higher educated individuals may understand and appreciate insurance more than the lower educated individuals, they may be more interested in wealth management and wealth creation products than life insurance. The higher educated individuals may view the new wealth management products as a more appealing way of managing their finances and leaving bequests for their dependents than life insurance.

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