

# Testing Baumol-Tobin Model Toward Millennials in Palembang City

1<sup>st</sup> Sri Andaiyani

*Department of Economic Development  
Universitas Sriwijaya  
Inderalaya, Indonesia  
sriandaiyani@fe.unsri.ac.id*

2<sup>nd</sup> Saadah Yuliana

*Department of Economic Development  
Universitas Sriwijaya  
Inderalaya, Indonesia  
saadah\_yuliana@yahoo.com*

3<sup>rd</sup> Fida Muthia

*Department of Management  
Universitas Sriwijaya  
Inderalaya, Indonesia  
f.muthia@unsri.ac.id*

**Abstract**—Financial innovations can affect extensive and intensive money demand margins. A wide margin proportion of total expenditure is made using cash. To what extent financial innovation changes the behavior of individual money demand is the question. This research will test Baumol-Tobin hypothesis by using individual data. The aim of this study is to analyze millennials' behavior in Palembang city in distributing their income based on the motives of holding cash from Baumol-Tobin, proving the Baumol-Tobin hypothesis regarding the factors that influence demand for cash. The population in this study is millennials living in Palembang. The method used is Ordinary Least Square (OLS). The result shows that the Baumol-Tobin model does not apply to millennials in Palembang city. Ownership of financial assets does not significantly influence the money demand for millennials. While the education, marital status, and income affect the money demand in Palembang City.

**Keywords:** *Baumol-Tobin model, demand for money, millennials*

## I. INTRODUCTION

To what extent financial innovation changes the behavior of individual money demand is one of the fundamental questions that is widely debated among economists. It is because the accurate specification of money demand function plays an important rule for evaluating monetary policy. The use of credit and debit cards as a type of financial innovation attracts academician's attention. Economists expect that users will change the way of consumers and companies make retail transaction. If so, it will change the demand for traditional banknotes and checks. Some empirical researchs found that the use of transaction services can reduce the demand for cash [8]. Another research by [1] found that the distribution of debit cards and automatic teller machine (ATM) reduce demand for cash in 13 countries.

This would be interesting if the demand for cash is linked to the millennials because they grow up in an era with easy access to financial institutions. They are the first generation to grow with computers and the internet, and it will be easier for them to learn the financial sector quickly and apply it to life (Frey, 2018). To invest, millennials only need to access everything they need through the internet on their gadgets. However, a dynamic lifestyle plus a lack of financial management knowledge makes them feel difficult to manage their finances. Some of them also still has difficulty in managing their finances according to the priority scale.

Based on a report from discussion forum of Canadian, Public Policy Forum (2018), millennials are not a homogeneous group; there is a great diversity in the demographics of this generation. For example, millennials aged 30 to 34 years tend to have a different financial goal from those aged 15 to 19 years. This supports the notion that there is a large regional and socio-economic diversity in various regions.

Generally, millennials have strong financial planning. The motive for their money demand is dominated for saving or investing purposes [13]. However, this added value is far more severe than the challenges they face. Many millennials who are trapped in low-paying jobs make them difficult to focus on long-term financial goals and then they are burdened by debt and credit card. Even, there is more crucial difference between millenniums and previous generation. The increase in house price and stock market is one of the factors that affect the money demand for that generation [4]. Besides, the uncertainty faced by millennials is compounded by poor financial literacy. A survey by TD Bank found that nearly a third of Canadians aged between 18 and 33 "had absolutely no idea" about retirement savings plan. More than 40% of respondents claimed to postpone learning about investment because their finances were not too good. Another 28% of them said they were saving for other purposes. TD study noted that many Millennials realize that they must save their finances for retirement, yet this knowledge does not encourage them to act for savings.

There is a problem in study of money demand that financial innovations affect extensive and intensive money demand margins. A wide margin proportion of total expenditure is made using cash. With this cash, the household determines the cash supply to finance it (i.e intensive margin). According to [9] aggregate data does not allow for these two options to be analyzed separately, and even most micro databases do not contain information about household expenditure made using cash.

This research modifies the money demand theory of Baumol-Tobin model by introducing the role of banks and ATMs in holding cash. The main difference with the classic Baumol-Tobin framework is, in which all withdrawals are considered expensive but there is a chance of free withdrawals or no charge using ATM terminal. The level of money demand and interest elasticity decreases as the frequency of free withdrawal opportunities increases in this

economic process. Thus, this theory shows that the level of money demand and curvature varies with the development of transaction technology. This hypothesis was tested on a panel of household data in Columbia, first used by [2], including information about household access to transaction services (for example: Do they have an ATM card?) and diffusion of bank branches and ATM terminals.

This research is important to prove the money demand theory of Baumol-Tobin with a few modifications. Generally, some previous literature has tested Baumol-Tobin hypothesis with aggregate macro data. However, this study will test Baumol-Tobin hypothesis by using individual data. Then, conventional estimation strategy using OLS will provide data-based estimate.

## II. LITERATURE REVIEW

Money demand theory of Baumol-Tobin is a development of Keynes's money demand theory. According to Baumol-Tobin, the demand for money is based on three motives, namely motives of transaction, precaution and speculation. For transaction motive, the amount of money held for motives is sensitive to interest rates [10]. In developing his model, Baumol-Tobin assumes that an individual receives payment once in a period and consumes it in that period. Besides, in Baumol-Tobin model, money that gives zero interest income is held only because it is used to make transactions.

For speculation motive, the basic idea is that people do not only care about the estimated rate of return on one asset when deciding what should be held in their portfolio, but also about the risk of return rate obtained from each asset. Specifically, Tobin assumes that most people are risk averse. Tobin's analysis also shows that people can reduce the total amount of risk in a portfolio by diversifying. Therefore, this model shows that individuals will hold bonds and money simultaneously as a store of wealth [11].

The conclusion of Baumol-Tobin theory can be stated as follows: When interest rates increase, the amount of cash held for transactions will go down, which means the acceleration will go up with the increase in interest rates. In other words, the transaction component of money demand is negatively related to the interest rate [11].

Baumol and Tobin's inventory approach explains that the demand for money in community is same as the demand for supplies (stock) used to meet needs, but to manage it requires costs. Therefore, an optimum amount of inventory is needed (minimum cost). Money demand for transactions has benefits, but holding money also has its own costs: 1) Transaction costs of exchange between bond and cash 2) Opportunity cost of money, i.e. the interest rate of bond ( $r$ ).

There are some implications of Baumol theory as follows:

- The interest rate affects the demand for money as the purpose of transaction, because there is opportunity cost when someone holds money.
- There is economic of scale in the use of money,

meaning that if there is an increase in income (transaction value /  $T$ ) then the presentation of the increase in money ( $M_d$ ) is smaller than the increase in transaction.

- The demand for money as the purpose of transaction depends on the existing interest rate and the costs of intermediary (Keynes's theory: the money demand for transactions is only influenced by income).
- The development of technology can result in lower costs of transactions and decrease in cash held by someone.

The precautionary motive for money demand in community arises due to the uncertainty of income earned. People will buy more securities and consequently the demand for cash is getting smaller. While, if the interest rate is below normal, people will expect the interest rate to rise again to normal interest rate. The price of securities is expected to fall (because interest rates rise). People will sell securities and the desire to hold cash rises. Further development of money demand transaction theory is the Baumol-Tobin money demand model (the inventory approach to money demand), the portfolio theory of money demand from James Tobin (the portfolio approach to money demand) and Friedman's modern quantity theory. The Baumol-Tobin Cash Management Model also emphasizes the importance of using money for transaction purposes. This model theory also views the existence of direct and indirect costs of holding money for transaction purposes and how changes in these two costs will affect the demand for money (Jansen: 2002). Direct costs are travel costs or costs of transferring non-monetary assets into monetary assets, while indirect costs are the amount of interest lost.

Baumol-Tobin states that the theoretical approach of determining the supply of goods is commonly used in the business to analyze the behavior of individuals and assumes that their income is received once a month. However, individuals must spend it in one month as a simplification of income spent in one month. The problem is determining the amount of cash that must be held at all times with the lowest costs. Individuals' wealth can be realized in the form of cash and bond. Cash does not produce anything, while bond can generate income in the form of interest and changes in interest rates.

The need for money stock will be held with consideration of costs by choosing the amount and pattern of time for the right stock to make the minimal costs minimal. The Baumol-Tobin model analyzes the costs and benefits of holding money. The benefits are convenience; money holders do not have to go to the bank every time for buying something. Variation of technology, across households and periods, is important for getting theoretically consistent estimates of currency demand [8].

The life cycle model presumes that young individuals save more while other individuals reduce their savings to pay for consumption [7]. The newest generation of workforce is the Millennials, which is an individual born between 1980 and 2000 [5]. Based on Bernard and Sin's research (2017), interest rate does not significantly influence money demand,

the exchange rate affects money demand positively in the short run and negatively in the long run. The price rate has a significant and negative effect on money demand. Whereas real income only has positive and significant long-term effects.

According to William (1990), the price rate has a positive effect on money demand, while real income has a positive effect on interest rate. Besides, based on research by George and Paul (2018), interest rate has a negative and significant effect on money demand. The return on foreign currency bonds is negative. The exchange rate variable has a positive and significant effect.

**III. METHODOLOGY**

The population in this study is millennial living in Palembang. The Millennials or sometimes also referred to as Generation Y is a group of people born after Generation X, i.e people born in the range 1980 to 2000. They were young people aged 19–39 when this research was conducted. They are better educated than the previous generation, competent users of information and communication technology (ICT), and accustomed to social media [12].

The data used in this study are primary data obtained through field survey on the millennials in Palembang city. The survey method was carried out by interview and questionnaire. Data are individuals (non-household) to avoid measurement errors in which respondents themselves respond to their own behavior, not the aggregate behavior of other household members.

The sample was taken by using Quota Sampling technique with a tolerance of error (margin of error) of ± 3.43% at a 95% confidence level. The number of respondents in this survey is 204 people.

The empirical model of this research is based on the Baumol-Tobin model of transaction for money demand. The education, marital status and ownership of financial assets are dummy variabel.

$$\text{Log } m = \alpha + \beta_1 \text{educ} + \beta_2 \text{log\_income} + \beta_1 \text{maritalstatus} + \beta_1 \text{financialasset} + \varepsilon$$

**IV. RESULTS AND DISCUSSION**

The respondents for this research are millennials who live in Palembang city. The number of respondents is 204 millennials. The results of study with sample generation were 204 generations with male with a frequency of 86 generations (42.2%) and female with a total frequency of 118 generations (57.8%). They have university education with a frequency of 137 and with a percentage of 67.2%, high school education with a total frequency of 64 and with a percentage of 31.4%, junior high school education with a frequency of 2 and with a percentage of 1%, and elementary education with a frequency of 1 and a percentage of 0.5%. The average respondent is already working.

**TABLE I. OWNERSHIP of BANK ACCOUNT**

Bankaccount	Freq	Percent	Cum
0	12	5.88	5.88
1	192	94.12	100.00
Total	204	100.00	

The percentage of bank account ownership is 94.12%. For the respondents with other assets, the frequency is 77 millennials with a percentage of 37.7%. While the generation with no other assets has a frequency of 127 millennials with a percentage of 62.3%.

**TABLE II. Ownership of Financial Assets**

Financialasset	Freq	Percent	Cum
0	109	53.43	53.43
1	95	46.57	100.00
Total	204	100.00	

The Millennials is faced with a problem of what proportion of his portfolio of financial assets he should keep in the form of money (which earns no interest) and interest-bearing bonds. The portfolio of millennials may also consist of more risky assets such as shares. 46 % of millennials in Palembang City have financial asset. Millennials’s behaviour shows risk aversion. That is, they prefer less risk to more risk at a given rate of return.

This research model has fulfilled the classical assumption test and is free from problems of normality test, the multicollinearity Test , heteroscedasticity test, and autocorrelation test.

**TABLE III. RESULT ESTIMATION**

Log_M1	Coef	t	Prob
Educ	.2486505	-1.90	0.059
Financialasset	-.0017336	-0.01	0.988
Maritalstatus	.5251927	4.07	0.000
Log_income	.3802775	5.53	0.000
_cons	7.994198	8.39	0.000

Education variable has significant and negative effects on money demand. In this case, the higher the millennial education in Palembang, the lower the amount of cash needed. This is supported by millennial knowledge in which the more educated and the higher the level of financial

technology knowledge. Therefore, this generation tends to use non-cash transaction tools.

Income variable has positive and significant effects on money demand. This proves the classical and Keynesian money demand theory which states that the higher a person's income, the more the amount of money needed. Millennials who are married have a greater need for money. If someone is married, then the amount of money needed for the transaction will also increase. The coefficient of marital status is also significant and positive. Married people hold more than do those of other marital status. But at each given level of income, married people with children tend to consume more and hold less than those who are married and have no children. As postulated by Keynes, this is probably due to the differences in the subjective factors affecting their propensities to save and hold financial asset

The variable of financial assets has a negative effect on money demand, but it is not significant. Millennials who have financial assets such as stocks, bonds, deposits and others tend to reduce the amount of cash. However, statistically this has not proven to be significant as influencing the money demand for millennials in Palembang city. But, according to Tobin, individuals are uncertain about future rate of interest. If a wealth holder chooses to hold a greater proportion of risky assets such as bonds in his portfolio, he will be earning a high average return but will bear a higher degree of risk. Tobin argues that a risk averter will not opt for such a portfolio with all risky bonds or a greater proportion of them.

## V. CONCLUSIONS

The millennials in Palembang will be unwilling to hold all risky assets such as bonds unless he obtains a higher average return on them. In view of the desire of millennials to have both safety and reasonable return, they strike a balance between them. The Baumol Tobin model does not prove in this paper. Demand for money is affected by income, education and marital status. Findings in this study indicate that demand for money by millennials in Palembang city is a predictable function of income and demographic variables. While the financial asset by millennials does not affect to money demand, the life cycle behavior of consumption and saving are significantly related to money demand as reflected in the signs and magnitudes of the demographic variables

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