Overview of Zakat Collection in Malaysia: Regional Analysis

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Abstract

Zakat is the most appropriate methodology in Islamic concept to encounter the social issue such as poverty in society by sharing the percentage of wealth to relevant recipients as the obligation to the muslim who is affordable based on the syariah rules and guidelines. This study attempts to analyze the trend of Zakat collection from Pusat Zakat Melaka (PZM) by using Polynomial Model, Exponential Model and Discrete Malthusian Growth Model spanning the year 2000 - 2009. Based on the value from Sum of Squares errors (SSE), the best model will be identified and it helps to predict the total collection and distribution for the following years. As a result, Malthusian is the best model to be use due the smallest amount of SSE comparing to the other two models. It shows that the value and the model is more accurate to forecast the future trends in order to prepare the proper strategies and the future planning for the organization.

Keywords: Poverty, Growth, Trend, Forecasting, Development

1.0 Introduction

In general, Zakat is one of the five pillars of Islam, which has been made obligatory by Allah to each and every Muslim to carry out. According to the basic principles of zakat, the zakat institution has to be established first within Muslim society in a well-organized way (Shawal 2009). The zakat institution should be under the responsibility of the Muslim Government or it also can be under the special Muslim supervisory body that has been appointed by that Government. In addition, Zakat management in Malaysia is under the authority of state government.

The total of zakat collection has ncreased drastically yearly right now. It might be due to some factors like easy paying method for instance, we can pay zakat via online which is will increase the level of efficiency for zakat management, zakat institution privatization, escalation of zakat payers and their incomes and so on (Hairunnizam et. al 2008). In Malaysia, all aspects pertaining to the administration of zakat are under the jurisdiction of the states through the State Islamic Religious Counters (SIRCs). There are a total of fourteen SIRCs, one for each of the thirteen states and one for the federal territory.

Due to the demand of more efficient and effective collection and distribution of zakat funds in Malaysia, some of the Religious Councils have corporatized an institution that responsible on the matter of collection and distribution part of zakat in those particular states. Eight Religious Councils have so far corporatized, starting with *Pusat Pungutan Zakat* (PPZ), Wilayah Persekutuan in 1991, followed by *Pusat Zakat* Selangor, Pahang and Pulau Pinang in 1995, and lastly *Pusat Pungutan Zakat* Negeri Sembilan and Melaka in 2000 (Ahmad et. al 2006). It was followed by *Tabung Baitulmal* Sarawak in 2001 and the latest was *Pusat Zakat* Sabah that has been corporatized in 2007. Thus, the prime objective of this study is to analyze the zakat collection's and forecasting the trend from Pusat Zakat Melaka (PZM) using the most accurate mathematical approaches.

2.0 Literature Review

In general, Zakah is "that portion of a man's wealth is designated for the poor" according to Sayyid sabiq (1991). In addition, it is also defined as, " a compulsory levy imposed on Muslim so as to take surplus money or wealth from the comparatively well-to-do members of the Muslim Society and give it to the destitute and needy" (Zaim 1989). Moreover, again, economically, based on the study being done bay Ahmad (1997), Zakah in theory will result in economic prosperity as Zakah is paid from those who have surplus, to the poor. So that, this will improve and enhance the poor's purchasing power which may lead to a higher demand on goods.

The fact that the main objective of Zakah is the achievement of socio- economic justice is not disputed according to Metwally (1983) also stated that the Zakah disbursement has the ability to increase consumption since the marginal propensity to consume of the Zakah payer is lower than the Zakah recipient, so that increasing the purchasing power parity of the poor. Consequently, in Islam transfer payment, from the wealthy to the poor for the purpose of redistribution of wealth and income in the society has been taking a central principle in building the Ummah. Furthermore, redistribution concept is also established that the Quran and the Prophet act (Sunnah) do have overwhelming evidences which indicate that Islamic system do not recognize and like any form of concentration of wealth or income in a few hands.

Zakah has several meanings according to literary term; it means blessing, growth, development, purity, and neatness. The scholars of Islam (ulama) define Zakah as the part of property with certain requirement that Allah SWT requires to the owner to give to the proper person to have it with certain requirement (Anshori 2002).

According to Qardhawi (1999), which refer to Lisan al Arab, the term Zakah is pure, grow, and laudable, this term is used in Al Qur'an and Hadist. On the other hand, according to Chapra (2000), Zakah has literary meaning as purification (thaharah), growth (mana'), blessing (barokah), and praise (madh), in fact Zakah is a Moslem's financial obligation to pay their some net property or agricultural produces, if those properties exceed the nishab limit to certain degree which, it is paid as the part of religion obligation.

3.0 Methodology

This data was obtained from Corporate Relation and Marketing Department. After the data has been collected, the data will be analyze using MS Excel Trend line to fit the curve for Polynomial, Exponential and Malthusian Model to all graphs and show the equation for each model. The reasons why the three models are chosen will be explained in the Presenting Data section. Pusat Zakat Melaka (PZM) has a target to achieve which is to get about RM 40 million for the following year.

Three types of models, which are the Polynomial Model, Sngle Exponential Model and Malthusian Model, evaluated the data. The sum of square error was also calculated. Using Microsoft Excel did all the calculation and evaluation. In order to achieve the objectives of this study, the curve-fitting model is used from the Microsoft Excel Trend line and the Sum Squares of Error for comparing the three models:

i) Polynomial Model

The general form of the Polynomial Model is:

$$y = ax^2 + bx + c \qquad (3.1)$$

where:

y = dependent variable (collection/distribution)

x = independent variable (year)
a, b, c = constant

ii) Single Exponential Model

The general form of the Single Exponential Model is:

$$y = Ae^{kx} \tag{3.2}$$

where:

y = dependent variable
x = independent variable
k = change in y with respect to x
A = initial value of y

In this model, it is assumed that the k growth to be constant and there is an exponent relationship between x and y.

iii) Discrete Malthusian Growth Model

$$P_{n+1} = P_n + rP_n = (1+r)P_n \tag{3.3}$$

where :

r = constant growth rate
n = number of year
P_n = revenue collection/distribution for year-n
P_{n+1} = Total revenue collection/distribution for year $n+1$
r = collection/distribution growth rate per year

iv) Sum of Squares Error (SSE)

SSE is a line on a graph that best summarizes the relationship between two variables is the one that ensures that there is the least value of the sum of the squares of the deviation between the fitted curve and each of the original data points. The general form of the SSE is:

$$\text{SSE} = \sum (Y_{actual} - Y_{estimate})^2 = \sum e^2 \quad \text{where } e = \text{error} \tag{3.4}$$

We use the smallest SSE to determine the best model.

v) Coefficient of Determination (R^2)

R^2 is simply the square of the sample correlation coefficient between the outcomes and their predicted values, or in the case of simple linear regression, between the outcome and the values being used for prediction. In such cases, the values vary from 0 to 1.

The equation will be established after the graph was plotted. From the equation, SSE will be calculated from the equation. The smallest SSE is used to identify the best model. The other method to determine the best method is by using the formula R^2. If the value of R^2 is near to 1, so it is the best model. However identifying by using SSE is more accurate and better than evaluating by using R^2.

The application of the best model is to predict the data. From the calculation and formula of the best model, the result can predict data for the next year or years ahead. However, the prediction data is not exactly same with the actual data. This is because the actual data depending on the situation which is influenced by several factors at that time, while the prediction data is just for forecasting in the future without count any factor that can taking into consideration.

4.0 Analysis

Mathematical modeling is an activity of translating a real problem into mathematics for subsequent analysis. Mathematical Modeling is used because it saves cost and time. There are three Mathematical models being used in order to analyzed the zakat collection in Melaka from year 2000 to year 2009 are Polynomial model, Single Exponential model and Malthusian model.

4.1 Polynomial Model

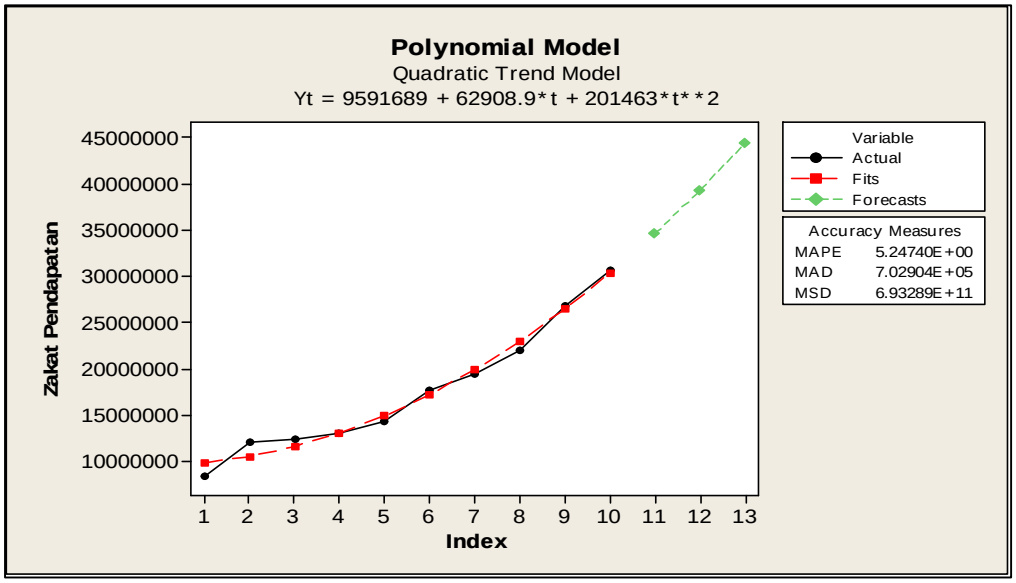

Figure 1: Graph of Polynomial Model for zakat collection from year 2000 to year 2009

Figure 1 shows the graph of zakat collection versus year by using Polynomial model in equation (3.1). From the graph, zakat collection data is represented by black line meanwhile Polynomial model is represented by red line. As a conclusion, the trend of zakat collection is increasing annually. The equation of the model is:

$$Y = 20{,}1463x^2 + 62{,}908.9x + 9{,}591{,}689 \qquad (4.1)$$

where

Y = zakat contribution
x = year

Sum of Square Error (SSE) for Polynomial Model

Table 1: SSE of Polynomial Model for zakat collection

Year(x)	Year	Actual Data	Polynomial	SSE
1	2000	8,435,467.90	9,856,060.90	2,018,084,471,649.00
2	2001	12,034,520.43	10,523,358.80	2,283,609,471,984.25
3	2002	12,342,303.17	11,593,582.70	560,582,342,197.02
4	2003	13,037,830.48	13,066,732.60	835,332,540.49
5	2004	14,238,492.58	14,942,808.50	496,060,915,165.45
6	2005	17,692,093.97	17,221,810.40	221,166,636,211.95
7	2006	19,464,653.26	19,903,738.30	192,795,672,351.80
8	2007	22,067,022.30	22,988,592.20	849,291,080,586.01
9	2008	26,905,934.29	26,476,372.10	184,523,675,077.59
10	2009	30,721,955.12	30,367,078.00	125,937,770,299.50
			TOTAL	$\sum SSE = 6{,}932{,}887{,}368{,}063.06$ $Log\left(\sum SSE\right) = 12.84$

Table 1 shows zakat collection data and estimated data of zakat collection. From the Polynomial model formula, the calculation for this model is applied in Minitab application. Using the Mathematical Modeling produced the estimated data. There are some errors between actual data and estimated data. The Sum of Squares Error (SSE) is used to show whether the model is suitable to predict the data or not. The calculation for the Polynomial model is using the equation obtained from the graph and then the SSE has been calculated. The usage of logarithm (Log_{10}) is main purpose to minimize the total value of SSE. The result of SSE value for Polynomial model is 12.84.

4.2 Single Exponential Model

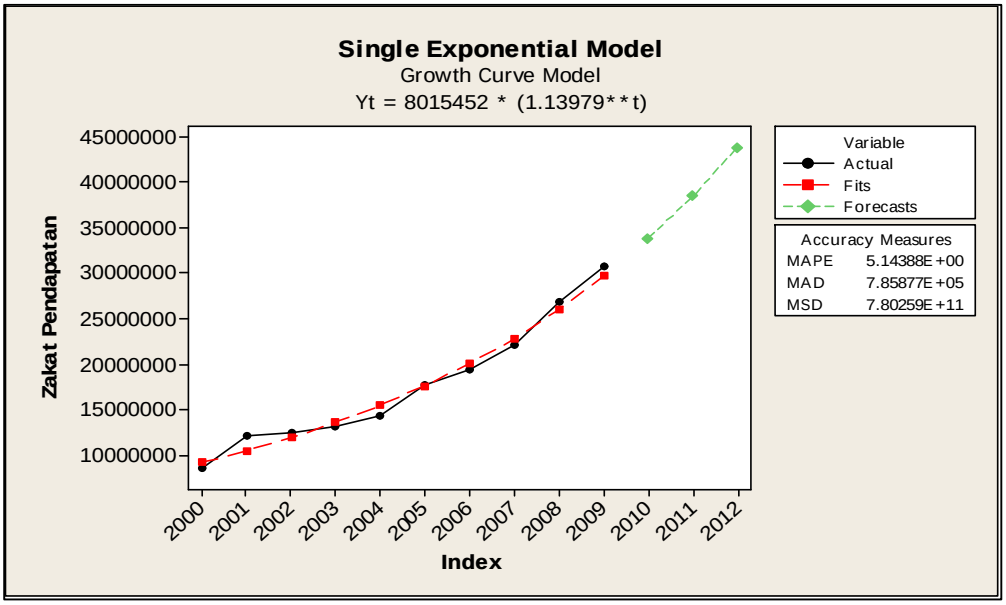

Figure 2: Graph of Single Exponential Model for zakat collection from year 2000 to year 2009

In Figure 2, the graph of zakat collection versus year by using Single exponential model in equation (3.1). From the graph, zakat collection data is represented by black line meanwhile Single Exponential model is represented by red line. As a conclusion, the trend of zakat collection is increasing yearly. Based on the graph, the equation constructed as follow:

$$Y = 8{,}015{,}452e^{1.13979x} \quad (4.2)$$

where;

Y = zakat collection
x = year

The power of 1.13979 can be summarized that each of every year the RM1.13979 million increased in zakat collection.

Sum of Square Error (SSE) for Single Exponential Model

Table 2: SSE of Single Exponential Model for zakat collection

Year(x)	Year	Actual Data	Exponential	SSE
0	2000	8,435,467.90	9,135,932.04	490,650,004,533.37
1	2001	12,034,520.43	10,413,043.97	2,629,185,896,506.72
2	2002	12,342,303.17	11,868,683.39	224,315,694,656.32
3	2003	13,037,830.48	13,527,806.64	240,076,640,027.59
4	2004	14,238,492.58	15,418,858.73	1,393,264,255,852.90
5	2005	17,692,093.97	17,574,261.00	13,884,609,849.73
6	2006	19,464,653.26	20,030,966.94	320,711,184,387.34
7	2007	22,067,022.30	22,831,095.81	583,808,326,813.69
8	2008	26,905,934.29	26,022,654.69	780,182,848,446.00
9	2009	30,721,955.12	29,660,361.59	1,126,980,820,254.72
			TOTAL	$\sum SSE = 7{,}803{,}060{,}281{,}328.37$ $Log\left(\sum SSE\right) = 12.89$

Table 2 shows zakat collection data and estimated data of zakat collection. From the Single Exponential model formula, the calculation for this model is applied in Minitab application. Using the Single Exponential model produced the estimated data. There are some errors between actual data and estimated data. The Sum of Squares Error (SSE) is used to show whether the model is suitable to predict the data or not. The calculation for the Single Exponential model is using the equation obtained from the graph and then the SSE has been calculated. The usage of logarithm (Log_{10}) is main purpose to minimize the total value of SSE. The result of SSE value for Single Exponential model is 12.89.

4.3 Malthusian Model

The Malthusian model shows that it is easy to produce stagnation in living standards in an economic model. Only two assumptions are needed. First, there have to be decreasing aggregate returns to the size of the population. Second, there has to be a positive relationship between income per capita and population growth.

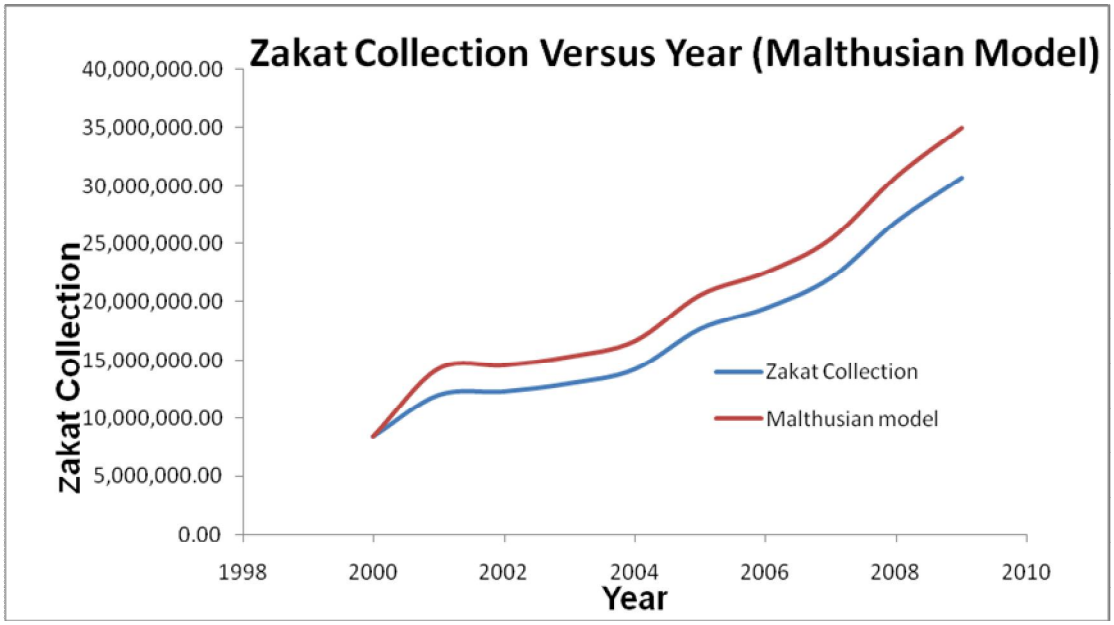

Figure 3: Graph of Malthusian Model for zakat collection from year 2000 to year 2009

Figure 3 shows the graph of zakat collection versus year by using Malthusian Model in equation (3.3). From the graph, zakat collection data is represented by red line meanwhile Malthusian model is represented by blue line. As a conclusion, the trend of zakat collection is increasing from year 2000 to year 2009. The equation constructed as follow:

$$P_{n+1} = 1.14382 P_n \qquad (4.3)$$

where;

P_{n+1} = total revenue collection in the next year

P_n = revenue collection for n^{th} after first year

$r = 0.14382$ (for every one year increase there is an expected to increase in the revenue of zakat collection by 0.14382 average growth rate.)

Sum of Square Error for Malthusian Model for zakat collection

Table 3: SSE of Malthusian Model for zakat collection

Year	Actual Data	Growth Rate, *r*	Malthusian	SSE
2000	8,435,467.90	0.42666	8,435,467.90	0
2001	12,034,520.43	0.02557	14,272,941.23	5,010,527,677,783.10
2002	12,342,303.17	0.05635	14,563,917.74	4,935,571,300,302.22
2003	13,037,830.48	0.09209	15,306,412.98	5,146,466,575,277.07
2004	14,238,492.58	0.24255	16,630,559.33	5,721,983,352,912.97
2005	17,692,093.97	0.10019	20,558,213.19	8,214,639,401,252.62
2006	19,464,653.26	0.13370	22,501,139.17	9,220,246,672,883.45
2007	22,067,022.30	0.21928	25,377,075.65	10,956,453,146,745.70
2008	26,905,934.29	0.14183	30,780,388.83	15,011,397,965,169.10
2009	30,721,955.12		34,961,584.93	17,974,460,896,672.00
		1.4382	**TOTAL**	$\sum SSE = 82,191,746,988,998.20$ $Log\left(\sum SSE\right) = 13.91$

Average of *r* (Growth rate) $r = 0.14382$

Table 3 shows the actual and estimated data of zakat collection by using the Malthusian Model in equation (3.3). From the Malthusian Model formula, the calculation for this model is applied in Microsoft Excel application. Then the SSE also has been calculated. The usage of logarithm (Log_{10}) is main purpose to minimize the total value of SSE. The result of SSE value for Malthusian model is 13.91.

5.0 Discussion

After the comparison between three models that has been used to predict the data, the results are as shown in the table as below:

Table 4: The comparison of SSE between three models for both collection and distribution

Model	Collection(SSE)
Polynomial	**12.84**
Exponential	**12.89**
Malthusian	**13.91**

Table 4 shows the comparison of SSE between three models for zakat collection. In this case, the most suitable model to be used in this project is Ploynomial Model. From the comparison table above, it shows clearly that the Polynomial model is the best model to predict the amount of zakat collection in the next five years. This is because from the Sum of Squares Error (SSE) for Polynomial is obtained the smallest value. Therefore, Polynomial Model is the best model in prediction zakat collection data.

Table 5: The prediction data for zakat collection for the next five years

Year	Actual Data	Polynomial Model	SSE
2000	7,459,315.86	9,856,060.90	2,018,084,471,649.00
2001	8,286,102.00	10,523,358.80	2,283,609,471,984.25
2002	12,211,781.82	11,593,582.70	560,582,342,197.02
2003	9,729,257.44	13,066,732.60	835,332,540.49
2004	13,076,881.72	14,942,808.50	496,060,915,165.45
2005	13,618,782.38	17,221,810.40	221,166,636,211.95
2006	15,401,243.12	19,903,738.30	192,795,672,351.80
2007	17,031,461.68	22,988,592.20	849,291,080,586.01
2008	20,723,735.56	26,476,372.10	184,523,675,077.59
2009	32,157,924.08	30,367,078.00	125,937,770,299.50
2010		34,660,709.90	
2011		39,357,267.80	
2012		44,456,751.70	
2013		49,959,161.60	
2014		55,864,497.50	

Table 5 shows the prediction of zakat distribution starting for thr year 2010 to the year 2014. Zakat collection also gives the good result with RM34,660,709.90 for the estimation in 2010 and for the estimation in 2014 it probably will increase up to RM55,864,497.50. As a conclusion, the trend showed that the zakat collection for the state of Melaka increase gradually per year.

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