AN ACCURATE ISLAMIC CALENDAR FOR A FLAWLESS ISLAMIC CAPITAL MARKET

TONO SAKSONO

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ISLAMIC CAPITAL MARKET

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Abstract

At-Taubah 36-37 in the Qur'an is a clear guidance for any Muslim to use the Islamic Calendar for his/her mundane and spiritual lives. However, Muslims all over the world tend to use the Gregorian calendar in lieu of the Islamic calendar due to the latter's high degree of uncertainty. As an Islamic calendar falls short roughly by 11.53 days per annum with respect to the Gregorian calendar, every 30 years of its operation of any Muslim enterprise also falls short by about one year in the payment of the corresponding tithe (zakat) if it uses the Gregorian calendar as its time base management system. As Islam has existed about 1,400 years, Muslims all over the world are now burdened by at least 40 years of unsettled zakat of the older generation if their zakat was calculated based on the Gregorian calendar. Rough calculation gives an estimated hypothetical amount of US$ 10 trillion of debt. Sadly, the burden is going on endlessly from one generation to the next. This paper shows that unless a drastic action is taken to apply an accurate Islamic calendar now, the next generation of Muslims will inherit the unsettled zakat of the current generation.

A simulation using General Electric (GE) and Microsoft stock price for twenty years (1990-2009) is addressed in this paper. If ten million of their shares are owned by a group of Muslims, they hence fall short to pay the corresponding zakat that ranges between US 150,000 and US$ 5 million (depending on its statistical annual price being used). In addition to that, in order to oversee the potential loss of zakat of the possession of precious metal, history price of gold for about twenty years is also used. A simulation of the possession of 1 million oz\(^1\) of gold shows that, the potential loss of compliant zakat according to shariah roughly stands at US$ 40 million. This brief simulation therefore demonstrates that the aforementioned hypothetical debt of US$ 10 trillion of the Islamic civilization might not be too away off. The use of an accurate Islamic calendar in shariah economy is therefore mandatory; otherwise the developed shariah economy is substantially flawed.

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\[^1\] 1 ounce = 28.35 grams
1 Introduction

Muslims all over the world has drained their energy unnecessarily when they argue about the method in determining the beginning of an Islamic month (i.e. Islamic calendar). One group of Muslims supports the use of an astronomical calculation whilst the other is persistently in favor of the use of direct moon sighting method. The problem of the matter is the fact that the latter group is even persistent in objecting the beginning of an Islamic month to be calculated even when the crescent (hilal) is not visible for any possible reason (obstructed by haze, cloud, pollution), or even when the location of the observer on the earth’s surface is overexposed by sun’s light which makes them unable to see the crescent. This group tends to extent the current month to have a maximum number of days of thirty because a lunar month has either 29 or 30 days. This long controversy has inevitably caused reluctance among Muslims to use their own Islamic calendar.

What we might not be able to perceive correctly is the fact that by neglecting the use of an accurate Islamic calendar, Islam has been unnecessarily prevented from becoming the prime driver of human’s civilization development. One of the consequences caused by inexistency of the Islamic calendar, Muslims all over the world are then using the Gregorian calendar for their worldly life. Wages of a Muslim are paid according to the Gregorian calendar giving a consequence that a Muslim pays the corresponding alms and tithe also according to the Gregorian calendar. Likewise, an accounting system of a Muslim owned enterprise also uses the Gregorian calendar, although At-Taubah 39-40 clearly defines that Islam only recognizes an Islamic calendar. This pragmatic approach has unconsciously caused Muslims indebted deeply accumulatively from one generation to the other.

What we might not be able to see further an even bigger picture so far is the fact that an Islamic calendar actually falls short by 11.53 days per annum with respect the Gregorian calendar. Accordingly, for about thirty years of its business, a Muslim enterprise has unconsciously neglected one year of its prescribed tithe according to shariah accounting system. This paper demonstrates a simulated potential of unsettled zakat of a Muslim (or a group of Muslims) who owns ten million stocks of General Electric (GE) and Microsoft available through the stock market. One should bear in mind that the use of GE and Microsoft stock market in this study is solely just for the purpose of academic analysis. In addition to that, a simulation of a potential loss of the payable zakat of the collective possession of as much as one million oz of gold by Muslim all over the world is also shown in this paper.

2 Reliability of Current Islamic Calendar

A low reliability of Islamic calendar that has caused high reluctances among Muslims to use it is demonstrated in Table 1, which was accessed from three reputable Islamic organizations in the world. Islamic Finder claims to provide the prayer times for six million cities worldwide, and the most used software in any personal computer nowadays. Search Truth is also a reputable provider of prayer times for mobile phones worldwide. Accurate Times provides more comprehensive information related to Islamic calendar including prayer times, of course. All the above software are downloadable free of charge for public use.
Table 1: Differences of Islamic calendars according to well reputable organizations

Table 1 provides information of the dates of the related Islamic months converted from the corresponding Gregorian calendar from January to August 2009. The first column shows the dates of the Gregorian calendar when the access to the software was carried out. Agreement between two complying software is highlighted. The table shows clearly that there is always disagreement between Islamic Finder and Search Truth, whilst Accurate Times has always agreement with either Islamic Finder or Search Truth. Putting aside which software is more reliable, one immediately will be able to conclude that the reluctance of Muslims to use their Islamic calendar is very obvious. The degree of uncertainty of the existing Islamic calendar is very high, and that is because there is something to do with the prerequisite that the crescent to mark the beginning of an Islamic month should be visible to the eye. One should bear in mind that this everlasting controversy is actually the main cause that makes Muslims reluctant to use their own calendar. Unfortunately, this has cost Muslims very dearly as will be shown in this paper.

3 Precise benchmarking of Islamic and Gregorian calendars

Saksono (2, 2009) shows that some verses in the Al-Qur'an especially Ya-Sin 39-40 have actually given a clear guidance to mark the beginning of an Islamic month. In addition to that, some prophetic sayings (hadiths) also convey sophisticated astronomical messages to mark the beginning of an Islamic month. Hence, the use of an astronomical calculation is actually an ultimate answer to regain Muslims confidence in the use of their own Islamic calendar. In order to analyze the potential anomaly of zakat calculated based on the Gregorian calendar with respect to the one prescribed according to shariah, a corresponding precise benchmarking of the Gregorian calendar with the Islamic calendar was calculated astronomically using astronomical software available in the public domain. However, in order to ensure bias free and highest accuracy obtained, different astronomical software were used for verification purpose. The benchmarking result is given in Table 2.
Table 2: Benchmarking of Gregorian & Hijri Calendars and hilal characteristics in 1990–2010

(Geographical base for computation: Kuala Lumpur, Malaysia)

Characteristics of crescent during the twenty-year period are also given in the table, although their detailed information is too technical to be discussed in such a meeting. For the sake of practicality, some basic assumptions are given:

1. The agreed Islamic accounting system is coincident with 1-Muharram to mark the first day of an Islamic accounting year;
2. The number of shares involved for the study is ten million shares. This, by all means, is a moderate assumption as the transaction of GE and Microsoft stocks once reached more than 750 million shares in a single day. Bear in mind that, the 10 million shares in the study is actually an assumption of collective ownership by all Muslims in the world;
3. The collective possession of gold is one million oz (1 ounce = 28.35 grams). This is also considered to be a moderate assumption, whilst a nisab (minimum possession of gold for a Muslim during certain period of time (haul) which is subject to zakat equates to some 80 grams);
4. Prescribed zakat is 2.5% per annum of the asset value;
5. Until a statistical measure of the share price over an accounting system that complies with shariah is agreed in the future, various statistical measures are used namely: the average, the median, the maximum, the minimum and the price at a closing date of the corresponding year.

4 Case study I: GE stock market

Earlier this year, a well-known business & financial magazine, Forbes, ranked the General Electric Company as the largest company in the world. This multinational technology and service company was initially set up by Thomas Edison by bringing together his businesses under a business flag of Edison General Electric back in the late nineteenth century. A few
years later, he merged this company with Thomson-Houston Company under a new business entity called the General Electric in 1892. In 1896, GE was one of the first twelve companies listed at Dow Jones stock market that was established by the Wall Street.

GE price history can be accessed from GE’s websites providing the volatility information of its shares. However, this study only uses twenty years of its history stock price from 1999-2009 as shown in Figure 1. Pricewise, the lowest occurred on October 26, 1990 at adjusted close price of US$ 4.21 with the transaction volume reached 23,842,800 shares, whilst the highest happened on August 28, 2000 with a transaction volume of 12,556,000 shares and the share price of US$ 60.00. In the mean time, based on its volume of transaction, the lowest occurred on May 17, 2007 with only 4,700 shares at the price closed at US$ 36.53. The transaction peak occurred on March 4, 2009 with transaction volume of 752,584,806 shares at the price of US$ 6.69 (see Table 3, Figures 1 and 2).

<table>
<thead>
<tr>
<th>Date</th>
<th>Trans Volume</th>
<th>Adj Close (US$)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/26/1990</td>
<td>23,842,800</td>
<td>4.21</td>
<td>lowest &amp; highest price</td>
</tr>
<tr>
<td>8/28/2000</td>
<td>12,556,000</td>
<td>60.00</td>
<td>lowest &amp; highest price</td>
</tr>
<tr>
<td>5/17/2007</td>
<td>4,700</td>
<td>36.53</td>
<td>lowest &amp; highest transaction volume</td>
</tr>
<tr>
<td>3/4/2009</td>
<td>752,584,806</td>
<td>6.69</td>
<td>lowest &amp; highest transaction volume</td>
</tr>
</tbody>
</table>

Table 3: Extreme prices and transaction volumes of General Electric (GE) stocks 1990-2009

Figure 1: General Electric stock market price (1990 – 2009) 
(data source: http://www.ge.com)
Figure 2: Transaction volume of GE stocks (1990-2009)  
(data source: http://www.ge.com)

4.1 Anomaly of calculated zakat based on the Gregorian calendar

Based on the benchmark and the abovementioned basic assumptions, the zakat for the assets is then calculated for both calendar systems, and the results are given in Table 4. The left part of the table (columns 1-6) is calculated zakat based on the Gregorian calendar, whilst the right part (columns 8-13) is calculated zakat based on the Islamic calendar. For verification purpose, columns 7 and 14 show the number transaction days in each year just to show that we are conducting apple to apple comparison for the calculated zakat.

Anomaly of paid zakat based on Gregorian calendar from the shariah compliance according to the Islamic calendar is given in Table 4. The table demonstrates the fact that irrespective of the volatility of the share price along the period of twenty years, and whatever statistical measure we are using for the calculation base, the calculated zakat based the Gregorian calendar is consistently less than the payable zakat when it is calculated based on the Islamic calendar. The table shows that if we are using the annual average price, Muslims then fall short to pay their shariah compliant zakat some two million US dollars along their twenty years of the possession of the assets.

Table 4: Anomaly of payable tithe of GE stocks calculated based on Gregorian calendars 1990 – 2009
Case study II: Microsoft stock market

Listed under the market name of MSFT with NASDAC (National Association of Securities Dealers Automated Quotations), Microsoft is a multinational computer technology tycoon, and is the proprietor of world's most popular operating systems Microsoft Windows and application software Microsoft Office. It was established in the mid-1980s but was skyrocketing to become a giant corporation in short period of time. The launch of its stocks for the first time to the public at an initial public offering (IPO) in 1986, has changed its CEO and other three top management to become billionaires, and as many as 12,000 of its employees turned to be millionaires.

Yahoo Finance shows that Microsoft stock market for about twenty years from early 1990 up to July 21, 2009 is less volatile than the GE (see Figure 3). Volume-wise, the largest transaction happened on June 6, 1994 with a transaction volume of 764,504,000 stocks at an adjusted close price of $2.82/stock. In the mean time, the lowest transaction volume of 3,705,600 stocks occurred on August 8, 1992 at an adjusted close price of $1.84. Price-wise, for the aforesaid period, Microsoft stock was closed lowest on January 15, 1990 at adjusted price of $0.49 involving a transaction volume of 62,467,200. The highest price occurred on December 27, 1999 at an adjusted close price of $49.17 involving a transaction volume of 32,202,200. Historical chart of stock price volatility of Microsoft is shown in the following figure (see Table 5, Figure 3 and Figure 4).

<table>
<thead>
<tr>
<th>Date</th>
<th>Trans Volume</th>
<th>Adj Close</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/15/1990</td>
<td>62,467,200</td>
<td>0.49</td>
<td>Lowest &amp; highest prices</td>
</tr>
<tr>
<td>12/27/1999</td>
<td>32,202,200</td>
<td>49.17</td>
<td>Lowest &amp; highest transaction volume</td>
</tr>
<tr>
<td>8/6/1992</td>
<td>3,705,600</td>
<td>1.84</td>
<td>Lowest &amp; highest transaction volume</td>
</tr>
<tr>
<td>6/6/1994</td>
<td>764,504,000</td>
<td>2.81</td>
<td></td>
</tr>
</tbody>
</table>

Table 5: Extreme prices and transaction volumes of Microsoft stocks 1990-2009

![Figure 3: Microsoft stock market price (1990 – 2009)](data source: Yahoo Finance)
Anomaly of paid zakat based on Gregorian calendar from the shariah compliance according to the Islamic calendar is also given in this table. The table demonstrates the fact that irrespective of the volatility of the share price along the period of twenty years, and whatever statistical measure we are using for the calculation base, the calculated zakat based the Gregorian calendar is consistently less than the payable zakat when it is calculated based on the Islamic calendar. If we are using the annual average price as the basis for the calculation, the paid zakat is then less about US$ 2.8 million than the shariah compliant one. If we are using the minimum annual price, the unsettled zakat is skyrocketing to the tune of US$ 5 million!

Anomaly of paid zakat based on Gregorian calendar from the shariah compliance according to the Islamic calendar is also given in this table. The table demonstrates the fact that irrespective of the volatility of the share price along the period of twenty years, and whatever statistical measure we are using for the calculation base, the calculated zakat based the Gregorian calendar is consistently less than the payable zakat when it is calculated based on the Islamic calendar. If we are using the annual average price as the basis for the calculation, the paid zakat is then less about US$ 2.8 million than the shariah compliant one. If we are using the minimum annual price, the unsettled zakat is skyrocketing to the tune of US$ 5 million!

Table 6: Anomaly of payable zakat of Microsoft stocks calculated based on Gregorian calendars 1990 – 2009
6 Case Study III: Gold price in twenty years

Gold has not only been a symbol of luxury of worldly life, but also in eternity life in the hereafter. However, Allah also warns us as gold might become a potential idol which will distract one from his/her ultimate devotion to Allah. Antagonistic symbol of this precious metal is so important so that Allah immortalizes it as the name of a chapter in the Qur'an (Az-Zukhruf or ornament of gold). In order to prevent one from excessive love to this symbol of luxury, possession of gold in excess of certain amount (nisab) for a certain period (haul) is subject to a corresponding zakat payable to the poor.

In order to have a comprehensive picture of potential loss of the payable zakat, precious metal price is also used in the study. History of gold price since 1970 can be accessed and is available from http://www.usagold.com/, although this study truncated the simulation using the gold price only from 1990 to 2009. Price-wise, the lowest occurred on July 20, 1999 at the bottom price of $252.80/oz, whilst the highest happened on March 17, 2008 at amazing price of $1,011.25/oz. Daily volatility of the gold price is given in Figure 5. However, there is no information regarding history of its sales available from USA Gold Reference Library.

A simulation of a potential loss of the payable zakat is conducted with an assumption that as much as one million oz of gold is collectively owned by Muslim all over the world. Again different statistical measures (average, median, maximum, minimum, and close) are used. Benchmarking of the Islamic and Gregorian calendars is the same as what has been used for previous stock price study (see Table 7).

![Figure 5: History of gold prices 1970-2009](http://www.usagold.com)
development of a proleptic Islamic calendar.

The author acknowledges the use of astronomical software available in public domain for astronomical calculation required in the study. The author gratefully acknowledges the full support of the University Tun Hussein Onn Malaysia in Johor for the preliminary study in the development of a proleptic Islamic calendar.

### Table 7: Anomaly of payable zakat of the possession of 1 million oz of gold 1990 - 2009

<table>
<thead>
<tr>
<th>Year</th>
<th>Average</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Year</th>
<th>Average</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Year</th>
<th>Average</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>7,701,945</td>
<td>1,650,090</td>
<td>9,911,900</td>
<td>1994</td>
<td>6,877,705</td>
<td>1,626,090</td>
<td>9,995,090</td>
<td>1998</td>
<td>8,422,605</td>
<td>1,626,090</td>
<td>9,995,090</td>
</tr>
<tr>
<td>1991</td>
<td>7,984,205</td>
<td>1,700,090</td>
<td>9,911,900</td>
<td>1995</td>
<td>6,922,605</td>
<td>1,626,090</td>
<td>9,995,090</td>
<td>1999</td>
<td>8,422,605</td>
<td>1,626,090</td>
<td>9,995,090</td>
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<tr>
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<td>1,700,090</td>
<td>9,911,900</td>
<td>1996</td>
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<td>1,626,090</td>
<td>9,995,090</td>
<td>2000</td>
<td>8,322,605</td>
<td>1,626,090</td>
<td>9,995,090</td>
</tr>
<tr>
<td>1993</td>
<td>8,217,305</td>
<td>1,700,090</td>
<td>9,911,900</td>
<td>1997</td>
<td>6,922,605</td>
<td>1,626,090</td>
<td>9,995,090</td>
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<td>1,626,090</td>
<td>9,995,090</td>
<td>2004</td>
<td>8,322,605</td>
<td>1,626,090</td>
<td>9,995,090</td>
</tr>
</tbody>
</table>

The table shows clearly that the use of Gregorian calendar has created a potential loss of the payable zakat according to shariah. The table also gives a consistent potential loss in the order of US$ 10 millions regardless of any statistical measures being used as the base of the calculation.

### 7 Conclusions

This paper briefly demonstrates that the use of an Islamic calendar is mandatory for a flawless Islamic capital market, especially if it corresponds with the obligation according to shariah. On top of that, the use of an accurate Islamic calendar is mandatory for any spiritual and worldly lives of any Muslim. Further hesitation to use an accurate Islamic calendar will drag the next generation of Muslim to bear the unsettled zakat committed by the previous generation. Unless Muslims all over the world take a drastic action to use the Islamic calendar for the developed shariah economy and capital market, there appears a shariah consequence that the future generation of Muslims will inherit unsettled zakat of the previous generation. This will be accumulatively carried over from one generation to the other endlessly unless Muslims are firm to act swiftly to change the currently Gregorian calendar with the Islamic calendar as the basis of its time base management.

Despite it seems to be too early to come to a conclusive hypothetical figure of US$ 10 trillion potential loss of the unpaid zakat during Muslims’ 1400 civilization, this study has demonstrated that the actual loss is actually huge. Therefore, the above hypothetical potential loss might not be too away off. This amount is about one third of the total revenues of some 2000 world’s largest companies (worth US$ 32 trillion), or one tenth of their assets (worth US$ 125 trillion) according to Forbes.

### Acknowledgement

The author acknowledges the use of astronomical software available in public domain for astronomical calculation required in the study. The author gratefully acknowledges the full support of the University Tun Hussein Onn Malaysia in Johor for the preliminary study in the development of a proleptic Islamic calendar.
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3. USA Gold Reference Library: http://www.usagold.com/reference/prices/history.html (date of access: August 8, 2009);

4. Yahoo Finance: http://finance.yahoo.com/echarts?s=MSFT#symbol=MSFT;range=1y;compare= (date of access: July 13, 2009);

5. Yahoo Finance: http://finance.yahoo.com/echarts?s=GE#symbol=GE;range=1y;compare (date of access: June 17, 2009).