

# Seasonal Factors Affecting Currency Demand in the Maldives

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## Introduction

The demand for currency<sup>1</sup> in an economy is influenced by both short- and long-run factors. Over a short period of time, the currency demand shows a clear seasonal pattern influenced by payroll dates, weekends and holidays. It is important to understand and monitor these fluctuations as changes in currency demand<sup>2</sup> affects the banks' liquidity position which in turn would affect the open market operations (OMOs) of the Maldives Monetary Authority (MMA).<sup>3</sup> Moreover, currency demand and its daily breakdown is a very important component that affects the forecasting of liquidity. Thus, a suitable method of estimating the currency demand would help improve the efficiency of forecasting.

1 This refers to Currency in circulation (CIC) which is the total amount of notes and coins issued by the Maldives Monetary Authority (MMA) and held by the public (consumers and businesses) and the banking system. For the purpose of this study, currency and CIC is referred interchangeably.

2 Currency in circulation is close to 30% of Monetary Base (Mo) of Maldives.

3 MMA conducts weekly OMOs to either inject or mop-up excess liquidity in the banking system.

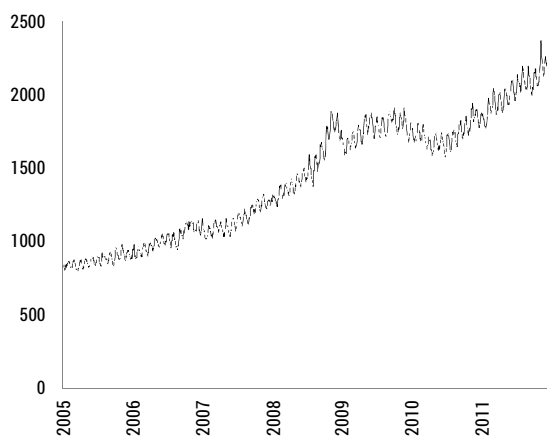
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This article examines the seasonal factors affecting currency demand in the Maldives. The rest of the article is organised as follows. Section 2 provides some stylised facts of the movements in currency during recent months and weeks. In the next section, two main factors which affect this seasonal pattern of currency are discussed. In Section 3, the payroll effect is analysed while Section 4 looks into the holiday effect together with festive holidays in which holiday dates change each year. The final section of the article deals with the conclusion.

## Stylised Facts of Currency Demand

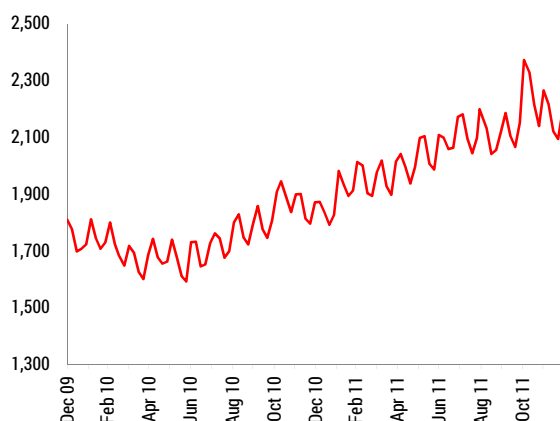
Figure 1 depicts the daily outstanding amount of currency over the period 2005–2011. Figure 2 shows the weekly movement in currency from 2009 to 2011. They clearly show the presence of *seasonality* in the data. Both figures also show that over the longer horizon, there is a general linear trend in the currency with a threefold increase in the amount of currency during 2005–2011. This can largely be explained by long-term factors such as growth of the economy, demographic changes and development of the financial sector.

**Figure 1: Daily Movements in Currency, 2005–2011**  
(in millions of rufiyaa)



Source: Maldives Monetary Authority

**Figure 2: Weekly Movements in Currency, 2009–2011**  
(in millions of rufiyaa)



Source: Maldives Monetary Authority

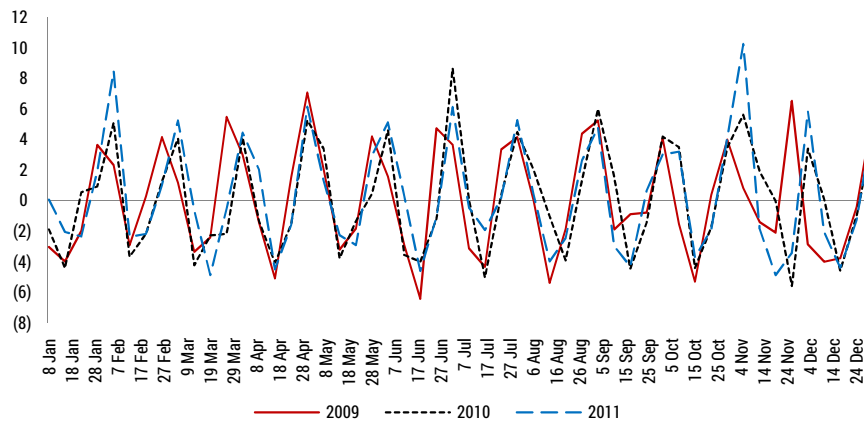
The seasonality can be further analysed by the growth rates of currency during the weeks<sup>4</sup> of the month as shown in Figure 3. The figure shows a clear inverted V-pattern and there are 12 peaks corresponding to each month of the year. This monthly pattern looks similar to an *inverted V* or “saw tooth” as depicted by the *inventory theory of money demand of Baumol–Tobin Model* (Baumol, 1952; Tobin, 1956). The Baumol–Tobin model is a model which explains the *transactions demand for money* and is based on the fact that income which an individual receives can be retained for a period and may be held either in the form of cash, bearing no return (interest rate); or bonds, bearing high interest rates. In addition, it states that an individual who receives an income at the beginning of a period spends it evenly throughout that period. As such, the demand for currency is affected by the dates at which salaries are paid and the spending pattern of consumers which is referred to as the *intra-month effect*. In addition, the demand for cash is seasonally affected by holidays and weekends. These two factors would be discussed in the next section.

## Intra-month Effect

The *demand for currency* from the public is mostly met via the commercial banks; thereby they act as the intermediary in the distribution of currency. The public normally obtains cash from banks by withdrawing cash from automated teller machines or by cashing cheques. Since MMA is the sole supplier of currency, banks get the required currency from MMA. However, currency is not “free” and banks which request cash from MMA pays for it through their reserve accounts which they have in MMA. When a bank buys a currency from MMA, their account is debited by the amount of the currency bought. On the contrary, if the demand for currency decreases, the banks return the currency to the MMA and their accounts at MMA will be credited.

<sup>4</sup> In order to remove the uneven weekly fluctuations of the dates, the average of the corresponding period has been taken.

**Figure 3: Weekly Growth Rate of Currency, 2009–2011**  
(percentage change)



Source: Maldives Monetary Authority

As depicted in Figure 3, this monthly inverted V-shape shows how the demand for currency behaves in Maldives. This pattern can be explained by how the monthly salaries are paid and how the spending of households takes place. As such, it shows the presence of a pronounced *intra-month* or *intra-week* effect.

The salaries are normally paid during the last two working days of the month which is normally on the 30<sup>th</sup> or the 31<sup>st</sup> of the month. Consequently, within each month, the weekly growth rates of currency tend to increase at the beginning of the month (normally during the first week of the month) and the saw tooth is at its peak in each month. After receiving their salaries, most of the households would start to spend their income to make their normal payments for the bills such as electricity, water and rent; these are normally due on or before 10<sup>th</sup> to 15<sup>th</sup> of each month. As the payments are made, their incomes are drawn around the third week of the month and the money flows back to the banking system. As a result, the currency demand decreases and reaches its bottom.

The spending pattern of the households also create the so-called “*day-of-the-month effect*”

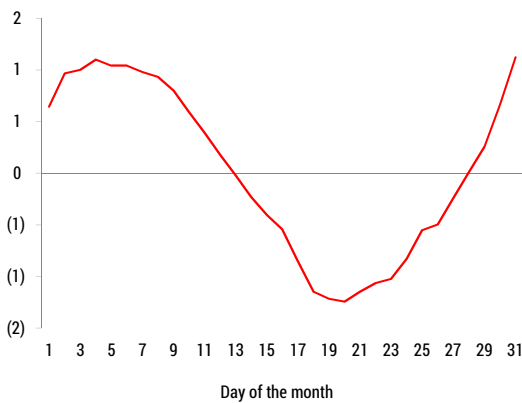
as can be seen in Figure 4,<sup>5</sup> which shows the same pattern as in Figure 3. It can be seen that that the currency in circulation (CIC) on average reaches its peak on the 4<sup>th</sup> of the month when the salaries have been paid. However, after some time, once households begin to make their regular payments and the money flows back into the banking system, the CIC reaches its lowest point on average on the 20<sup>th</sup> day of the month. In most countries such as India, the demand for CIC thereafter remains low until the salary period falls again, which is normally at the end of the month. However, in Maldives, CIC starts to gradually increase again in the third week even before the salary is received. This is largely due to the behaviour of the banks, especially Bank of Maldives plc (BML) which starts to increase their stock of currency in anticipation of the public needs as they distribute cash across Maldives via their extensive network of branches in the island. For instance, on average, in 2010 almost 60% of the withdrawals from MMA had taken place from 19<sup>th</sup> to 30<sup>th</sup> of each month by BML.

In addition, there is also a *month effect* seen from Figure 3. Although the broad pattern of the currency for each month is similar and the growth

<sup>5</sup> To plot the graph, data has been normalised where normalised value = (CIC end of period — mean)/ Standard deviation

rate generally fluctuates between +4% and -4%, there are some months which show significant differences. For example, during November and December, currency demand becomes somewhat more volatile, perhaps due to uneven spacing of holidays coinciding with the festive periods. In addition, it can be also noticed that currency demand reached its highest level in July during 2009 to 2011, largely reflecting the holidays which fall during these months.

Figure 4: Normalised Average Currency for Each Month, 2005–2011



Source: Maldives Monetary Authority

## Holiday Effect

Maldives faces many holidays throughout the year. That being the case, currency demand is affected to a considerable extent by these holidays. Some of these holidays include the Independence Day, New Year, Victory day, and academic year-end holidays and so on. CIC also increases during weekends, boosting it up more if it is followed by other holidays. These holidays are known with certainty and thus enable us to implement seasonal adjustments. However, the major holidays include the Fit'r Eid and Al'h'aa Eid holidays in Maldives.

Moving holidays refer to those holidays where their dates change from year to year. These holidays do not follow the Gregorian calendar as they are based on the festivals and Islamic calendar periods. In such cases, interpreting CIC would be rather difficult because these effects cannot be removed by the standard seasonal adjustment methods. In the Maldives, Fit'r Eid and Al'h'aa Eid are two moving holidays that have a considerable impact on CIC. The demand for currency is usually low before a holiday which then keeps increasing as the holiday comes closer, reaches its peak during the holiday and gradually returns to normal afterwards.

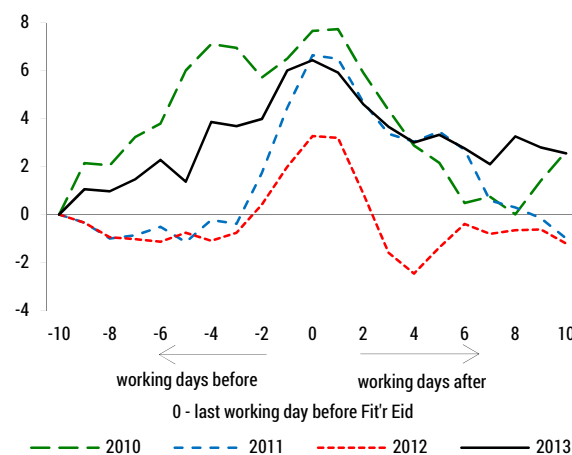
### Impact of Fit'r Eid

Figure 5 shows the percentage changes in CIC<sup>6</sup> taking into consideration ten working days prior to and after the last working day before Fit'r Eid. It is seen that the CIC grew by a range of 3% to 8% ahead of the holidays over the period 2010–2013. It can be noted that in 2010 and 2013 there was an increase in CIC throughout the days until the holiday. This is because the days prior to the holidays coincided with the salary week, thereby leading the way to a higher spending ability and higher peak points. However, in 2012 and 2011, the period coincided with the second week of the month where people would have paid their monthly bills. *Thus, a holiday period combined with the beginning of a month leads to more CIC in the economy.*

The impact of Fit'r Eid over a normal time period is shown more clearly in Figure 6.<sup>7</sup> The August month of 2005–2013 was observed to see the Fit'r Eid holiday impact. This month is taken because no other holiday fell into this month for the past eight years.

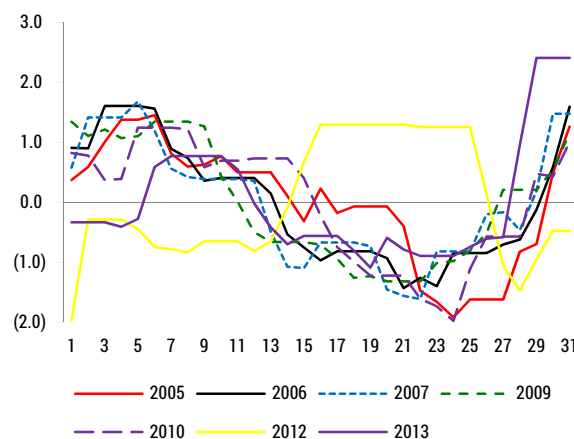
CIC for the years 2005–2010 and 2013 shows a clear seasonal pattern, where CIC increases during the last and the first week of the month with the payment of salaries and wages, while it declines during the second and the third week of the month as the currency flows back to the banking system after payments are made to the bills. During 2012, Fit'r Eid holiday period was 17<sup>th</sup> to 25<sup>th</sup> August. Unlike the other years where CIC declined, it increased during the second and the third weeks of the month due to the Eid holiday and currency started to flow back to the banking system soon after the holiday. Commercial banks withdraw cash from MMA on the last working day

Figure 5: Percentage Change in Currency during Fit'r Eid, 2010–2013



Source: Maldives Monetary Authority

Figure 6: Fit'r Eid Holiday Impact for the Month of August for Selected Years during 2005–2013 (normalised value)



Source: Maldives Monetary Authority

6 The percentage change in currency is calculated using the data of the 10<sup>th</sup> day before the last working day prior to Fit'r Eid as the base.

7 2008 is excluded due to unusual patterns in August due to the elections held in October that year. Further, 2011 is also excluded since the beginning of Ramadan fell during August, thus the spending patterns of people differ.

prior to the holiday to cater for the customers' demand during this period.

### Impact of Al'h'aa Eid

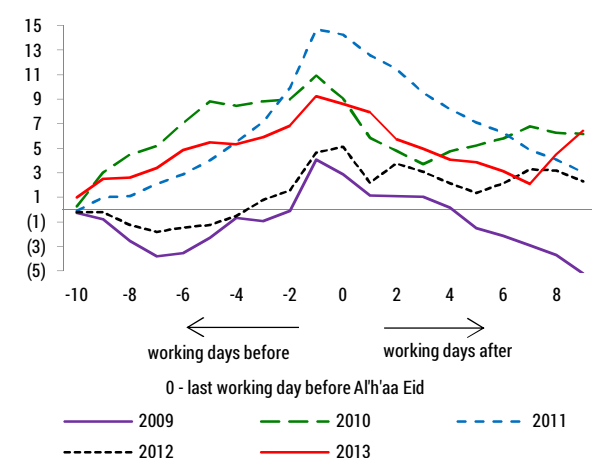
Figure 7 depicts the impact on CIC during Al'h'aa Eid for the period 2009–2013. It can be observed that CIC grew by a range of 4% to 15% ahead of the holiday. Further, it can also be noted that these peak values are much higher than those that occurred during Fit'r Eid. The main reason for this can be the fact that Maldivians spend more on consumption and food during Al'h'aa Eid.<sup>8</sup> Another reason could be the spending habits of the people during and just prior to Ramadan.<sup>9</sup> The steep increase in the change in CIC in 2011 is again associated with it perfectly coinciding with a salary week, thus contributing to the highest peak of 15%. Therefore the impact on CIC is much higher during Al'h'aa Eid than on Fit'r Eid.

A similar holiday impact can also be observed during November in 2011<sup>10</sup> (Refer to Figure 7) in which the growth of CIC reached its peak for the year. In November 2011, there were fourteen holidays including the weekends, Al'h'aa Eid, Islamic New Year, Victory Day, and Republic Day. Thus, it supports the fact that 2011 had the highest peak. Hence, it can be concluded that the monthly peak and trough of CIC growth is largely affected by these holidays.

## Conclusion

Over the recent years, CIC has been on the rise. Each year, more and more currency is demanded by the public owing to the improvement in the standard of living and increasing inflation levels. In Maldives, Al'h'aa Eid is known to have a more prominent effect than Fit'r Eid with regard to currency demand. The intra-month

Figure 7: Percentage Change in CIC during Al'h'aa Eid, 2009–2013



Source: Maldives Monetary Authority

<sup>8</sup> Consumption increases especially for the feast of sacrifice.

<sup>9</sup> CIC increases because consumption increases rapidly with preparation of Ramadan and also during Ramadan. Thus, CIC does not rise as much in Fit'r Eid when compared to Al'h'aa Eid.

<sup>10</sup> Al'h'aa Eid in 2011 was in November.

and the day-of-the-month effects are further heightened if it is associated with a weekend or another holiday. These intra-month effects and the day-of-the-month effects can be dealt with using a simple seasonally-adjusted series. The behaviour of the CIC also depends on the timing of the holidays<sup>11</sup> and the type of holidays, making it difficult to assess and can cause major fluctuations even in the forecasting analysis. Therefore, it is important to keep a track of them while forecasting. A possible solution could be the introduction of a dummy variable series which is the next step to work on. A successful econometric model as mentioned could help improve the efficiency of the liquidity forecasting and thus the OMOs of MMA.

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<sup>11</sup> It refers to a holiday coinciding with another holiday, weekends or intra-month effects.

