**CHAPTER THREE**

**CASH AND LIQUIDITY MANAGEMENT**

**Introduction**

Cash is the medium of exchange that clients will accept in transactions related and affected in business. Management of cash is of major importance in any business, because cash is the best means of acquiring desired goods and services. A careful scrutiny of cash operations is required because cash may be readily misappropriated. Cash is the important current asset used widely in the operations of the business. Every firm is expected to maintain sufficient cash balance required for its operations. Any surplus cash held will result as idleness of cash reducing the profitability of the firm, while cash shortage leads to the disruption of the manufacturing process. Thus, a major function of finance manager is to maintain a sound cash balance required for business operations.

The basic objective in cash management is to keep the investment in cash as low as possible while still keeping the firm operating efficiently and effectively. This goal usually reduces to the dictum “Collect early and pay late.” In addition, firms must invest temporarily idle cash in short-term marketable securities.

**Motives of Holding Cash**

Cash is pure liquid asset widely used in the day-to-day operations of business. Cash holding for the firm will serve ***three basic motives***. They are, the first being ***transaction motive***, the second being ***precautionary motive*** and the third being the ***speculative motive***.

***Transaction motive*** has an objective of holding cash to meet the day-to-day requirements to meet payments, such as purchases, wages, taxes, and dividends, arising in the ordinary course of business. Transaction-related needs come from normal disbursement and collection activities of the firm. The disbursement of cash includes the payment of wages and salaries, trade debts, taxes, and dividends. Cash is collected from sales from operations, sales of assets, and new financing. The cash inflows (*collections*) and outflows (*disbursements*) are not perfectly synchronized, and some level of cash holdings is necessary as a buffer. If the firm maintains too small a cash balance, it may run out of cash. If so, it must sell marketable securities or borrow. Selling marketable securities and borrowing involve *trading costs*.

***Speculative motive*** serve the objective of holding cash for investing in profit-making ventures. Such opportunities are unusual within the business operations; hence they may throw more options outside the business like, investment in the bank, purchase of shares and bonds with an intention to resale, and purchase of government bills.

***Precautionary motive*** of holding cash is to meet the unexpected business expenses. Cash is held to meet contingencies in future like emergencies. It is a motive to maintain a safety cushion or buffer to meet unexpected cash needs. The more predictable the inflows and outflows of cash for a firm, the less cash that needs to be held for precautionary needs. Ready borrowing power to meet emergency cash drains also reduces the need for this type of cash balance.

**Cash Management Objectives and Decisions**

**The Risk–Return Trade-Off** A company-wide cash management program must be concerned with minimizing the firm’s risk of insolvency. In the context of cash management, the term **insolvency** describes the *situation in which the firm is unable to meet its maturing* *liabilities on time*. In such a case the company is *technically insolvent* in that it lacks the necessary liquidity to make prompt payment on its current debt obligations. A firm could avoid this problem by carrying large cash balances to pay the bills that come due.

The financial manager must strike an acceptable balance between holding too much cash and too little cash. This is the focal point of the risk–return trade-off. A large cash investment minimizes the chances of insolvency, but it penalizes the company’s profitability.

A small cash investment frees up excess balances for investment in both marketable securities and longer-lived assets; this enhances profitability and the value of the firm’s common shares, but it also increases the chances of the firm running out of cash.

The risk–return trade-off can be reduced to two prime **objectives** for the firm’s cash management system.

1. Enough cash must be on hand to meet the disbursal needs that arise in the course of doing business.
2. Investment in idle cash balances must be reduced to a minimum.

Evaluating these objectives and meeting them gives rise to the need for some typical cash management decisions.

Two conditions or ideals would allow the firm to operate for extended periods with cash balances near or at zero:

* A completely accurate forecast of its net cash flows over the planning horizon and
* Perfect synchronization of its cash receipts and disbursements.

**Cash management cycle**

Cash is the form of money, which is involved, with all operations of business as inflows or outflows. Cash management can basically categorize into;

* Cash outflow like, purchases, payment to expenses and services;
* Cash inflows like, sales, other revenues; and
* Cash balance held at any point of time.

A cash management cycle is used to explain the basic function of cash management. It is defined as “ the process of identifying various cash inflows and making them available to business needs as cash outflows, maintaining the objective of liquidity and profitability”. The following diagram explains the basic process of cash management cycle.

**Cash management cycle**

Cash inflows

Increases

Business transaction (s)

Cash balance

Decreases

Cash outflows

Any firm can be successful with its cash management, when it is able to achieve the following objectives:

1. ***Cash Planning:*** the process of estimating cash inflows and outflows to project cash surplus or deficit for future planning period. A cash budget is used to serve this objective.
2. ***Managing cash flows:*** The cash flows should be properly managed to avoid the variance between planned events to actual event. Accelerating cash inflows and decelerating cash outflows can achieve this.
3. ***Optimum Cash Balance:*** It is always essential to determine appropriate cash balance. The cost of excess of cash holding and also the danger of cash deficiency should be matched to determine the optimum level of cash balance.
4. ***Investing supplies/Borrowing deficit:*** The surplus cash balance over and above the minimum balance should be always is invested in the ***profitable ventures***, while the deficit balance should be arranged from various financing sources.

Better cash management improving control over cash collection and disbursements can achieve this. The objective of Cash management can be achieved by ***accelerating cash collection and decelerating cash payments*** to the possible extent. Cash management should always aims to achieve the following objectives:

* ***Liquidity:*** Business units should satisfy the primary objective of cash availability for all business needs.
* ***Safety***: Cash availability will always imposes risk of loss; therefore the second objective of cash management is to avoid the risk of loss, or thefts.
* ***Profitability***: Secondary and final objective of cash management is earn a highest possible return after satisfying the above two objectives.

Cash budget always should the projects end result as surplus cash balance or deficit cash balance. Therefore, finance manager should carefully plan well in advance for arranging such balances with actual business situations. A surplus cash balance induces cash idleness to the business reducing the profitability; therefore surplus cash balances should be invested in the following alternatives:

1. Investment in the bank, as term deposits that earn higher return of interest.
2. Investment in money market instruments that provide a higher return compared to bank returns.
3. Investment in capital market instruments like shares and bonds that provide maximum returns.

In the same way a deficit cash balance leads to cash shortage and makes the business suffer from cash crisis. This may result as disruption of business activities, and financial distress among the stakeholders. It is necessary to avoid such financial problems, which can be done through successful borrowing techniques. The following are few events advised to avoid such chaotic conditions:

1. ***Bank overdrafts:*** Making an arrangement with the bankers to have overdraft facility, that is the most economical way of dealing with borrowing. Interest will be chargeable on the outstanding amount at any time, and the bank may also require payment of an overdraft at any time.
2. ***Bank loans:*** Represent the formal agreement between the bank and the borrower, that the bank will lend a specific sum for a specific period. Interest must be paid on the whole of the sum for the duration of the loan.
3. ***Disposal of investments:*** If the business unit has maintained any investments with the surplus cash balances, can be used in financing the deficit balance by disposing them.

**Cash management models/estimating cash balances**

The key purpose of cash management is to hold optimum balance of cash that is just enough to meet the demand for cash. Cash balance more than the optimum level will cost the firms profitability, where as cash balance that is bellow the optimum level will result in poor liquidity. Thus the crux of cash management is to determine the level of cash which will provide sufficient liquidity without adversely affecting profitability.

A number of cash management models have been developed for managing/estimating cash balances. Firms can use either ***subjective approaches or quantitative models*** to determine appropriate transactional cash balances.

1. **Subjective approach.**

Maintain transactional balances equal to 10 percent of the following month’s sales. If the forecast amount of sales for the following moth is, for example Br. 500, 000 the firm would maintain Br. 50, 000 transaction cash balance.

1. **Quantitative models**

Two quantitative models that management can use to determine the appropriate transactional cash balances are the ***Baumol model and the Miller-Orr model.***

All models assume that a business will have a certain amount of ready cash available, (in the current account) for day-to-day operations. An additional amount is made available in the form of bank deposits, marketable securities, as buffer cash balance.

1. **Baumol Model and Illustration**

This is based on the ***Economic Order Quantity*** (EOQ) model developed for inventory management. Applied to the management of cash, the EOQ model determines the amount of cash that minimizes the sum of the holding cost and transactions cost.

*The holding cost* includes the costs of administration (keeping track of the cash) and the opportunity cost of not investing the cash elsewhere. The ***transaction cost*** is the cost of getting more cash—either through selling marketable securities or through borrowing.

If cash resources are steadily used up by a constant daily demand for cash, the model suggests that the optimum regular cash injections say ‘a’ into the business can be determined as follows:

A = 

Where, Ad = Annual demand for the cash

Ct = Cost per transaction (purchase or sale or both of securities)

Ir = Interest rate for the said period/ opportunity cost of holding cash balance

A = Optimum cash injection

*The economic order quantity is the level of cash infusion (from selling marketable securities or borrowing) that minimizes the total cost associated with cash.*

**Holding cost  *Ir -*** opportunity cost of holding the cash

**A - Beginning cash balance**

**A/2-** the average cash balance over the period

*But each time we get cash, we have to make a transaction. If we demand a total of Ad dollars of cash each period, we end up making Ad/A transactions per period. If it costs K to make a transaction, the transactions cost for the period is:*

**Transactions cost= Ct**

**Total cost = Holding cost + Transaction cost**

***Illustration***: A firm anticipates Br. 240,000 cash outlays/ annual demand per annum. Investment earnings rate is given as 12 percent per annum and the cost per transaction of investment is Br.100 per sale/purchase. Calculate:

1. The optimum cash balance of the firm/ economic conversion quantity
2. The number of conversions
3. The total cost
4. **Optimum cash balance / conversion quantity:**

A =

Given Ad = Br. 240,000

Ct = Br. 100

Ir = 12 percent or 0.12

A = ?

A =

= **Br. 20,000**

1. The number of conversion

= Ad/ A

= Br. 240, 000/ 20, 000

**= 12 (should be an integer)**

1. Total cost of managing the cash:

= **Holding cost + Transaction cost**

= Ir (A/2) + Ct(Ad/A)

= 0.12(20, 000/2) + 100(240, 000/20, 000)

= 1, 200 + 1,200

**= Br. 2, 400**

**Limitation of the Baumol model**

* Unrealistic assumption of the constant cash demand: in practice the demand for cash usually is fluctuating.
* Overdraft is not considered
* There are uncertainties in the pattern of future cash flows.

**The Miller-Orr Model**

The Baumol Model assumes that cash is used uniformly throughout the period. The Miller-Orr Model recognizes that cash flows vary throughout the period in an unpredictable manner.

To see how the Miller-Orr model takes account of changes in the need for cash, consider the three key levels of inventory:

* The ***lower limit***, below which inventory does not fall
* The ***return point***, the level of inventory that is the target if either the lower or upper limit is reached
* The ***upper limit***, above which inventory does not rise

The lower limit is really a safety stock of cash—the cash on hand must never fall below this level. We need to apply experience and judgment in determining the lower level.

Based on (a) How much needs are expected to vary each day,

(b) The cost of a transaction, and

(c) The opportunity cost of cash expressed on a daily basis, this model tells us:

1. *The level of cash at which a new cash infusion is needed*. This level is referred to as the *return point* (not to be confused with the level of safety stock). Levels of cash below the safety stock cannot be tolerated; levels below the return point are tolerated—until they hit the safety stock level, of course.
2. *The upper limit of cash*. The amount of cash that would exceed this limit is invested in marketable securities.

The return point and the upper limit are determined by the model as the levels necessary to minimize costs of cash, considering (a) Daily swings in cash needs,

(b) The transactions cost, and

(c) The opportunity cost of cash.

*The Miller-Orr model provides us with a few decision rules:*

* Our cash balance can be any level between the upper and lower limit.
* There is a cash balance (the return point) that we aim for if our cash balance exceeds the upper limit or if our cash balance is below the lower limit:

If our cash balance *exceeds the upper limit*, any cash in excess of the return point is invested in marketable securities. If our cash balance is *below the lower limit*, any deficiency up to the return point is made up by selling marketable securities or borrowing.

**The return point is a function of:**

* The lower limit
* The cost per transactions
* The opportunity cost of holding cash (per day)
* The variability of daily cash flows, which we measure as the variance of daily cash flows

**Other Considerations**

The Baumol and Miller-Orr models both try to help us minimize the costs of cash. The Baumol model assumes a predictable, *steady use of cash*. The Miller-Orr model incorporates an estimate of the *variability of cash flows*.

*But there are other factors that affect cash management. One is the seasonality of our cash needs. If our sales and collections on sales are seasonal, we must factor the pattern of cash into our cash balance—the Baumol model does not consider changing cash needs.*

**Cash Management Techniques**

Cash management has very simple goals:

* Have enough cash on hand to meet immediate needs, but not too much.
* Get cash from those who owe it to you as soon as possible and pay it out to those you owe as late as possible.

The Baumol and Miller-Orr models help firms manage cash to satisfy the first goal. But the second goal requires methods that speed up in-coming cash and slow down outgoing cash. *Cash management is much more closely related to optimizing mechanisms for collecting and disbursing cash.*

**Understanding Float**

The amount of money you have according to your checkbook can be very different from the amount of money that your bank thinks you have. The reason is that some of the checks you have written haven’t yet been presented to the bank for payment. The same thing is true for a business. The cash balance that a firm shows on its books is called the firm’s *book,* or *ledger, balance.* The balance shown in its bank account as available to spend is called its *available*, or *collected, balance*. The difference between the available balance and the ledger balance is called the **float**, and it represents the net effect of checks in the process of *clearing* (moving through the banking system).

**Disbursement Float**

Checks written by a firm generate *disbursement float,* causing a decrease in the firm’s book balance but no change in its available balance. For example, suppose General Mechanics,

Inc. (GMI), currently has $100,000 on deposit with its bank. On June 8, it buys some raw materials and pays with a check for $100,000. The company’s book balance is immediately reduced by $100,000 as a result.

GMI’s bank, however, will not find out about this check until it is presented to GMI’s bank for payment on, say, June 14. Until the check is presented, the firm’s available balance is greater than its book balance by $100,000. In other words, before June 8, GMI has a zero float:

Float = Firm’s available balance - Firm’s book balance

= $100,000 - 100,000

= $0

GMI’s position from June 8 to June 14 is:

Disbursement float = Firm’s available balance - Firm’s book balance

= $100,000 \_ 0

= $100,000

During this period of time that the check is clearing, GMI has a balance with the bank of $100,000. It can obtain the benefit of this cash while the check is clearing. For example, the available balance could be temporarily invested in marketable securities and thus earn some interest.

**Collection Float and Net Float**

Checks received by the firm create *collection float.* Collection float increases book balances but does not immediately change available balances. For example, suppose GMI receives a check from a customer for $100,000 on October 8. Assume, as before, that the company has $100,000 deposited at its bank and a zero float. It deposits the check and increases its book balance by $100,000 to $200,000. However, the additional cash is not available to GMI until its bank has presented the check to the customer’s bank and received $100,000. This will occur on, say, October 14. In the meantime, the cash position at GMI will reflect a collection float of $100,000. We can summarize these events. Before October 8, GMI’s position is:

Float = Firm’s available balance - Firm’s book balance

= $100,000 - 100,000

= $0

GMI’s position from October 8 to October 14 is:

Collection float = Firm’s available balance - Firm’s book balance

= $100,000 - 200,000

= $100,000

In general, a firm’s payment (disbursement) activities generate disbursement float, and its collection activities generate collection float. The net effect, that is, the sum of the total collection and disbursement floats, is the net float. The net float at a point in time is simply the overall difference between the firm’s available balance and its book balance. If the net float is positive, then the firm’s disbursement float exceeds its collection float, and its available balance exceeds its book balance. If the available balance is less than the book balance, then the firm has a net collection float.

A firm should be concerned with its net float and available balance more than with its book balance. If a financial manager knows that a check written by the company will not clear for several days, that manager will be able to keep a lower cash balance at the bank than might be possible otherwise. This can generate a great deal of money.

**Float Management**

Float management involves controlling the collection and disbursement of cash. The objective in cash collection is to speed up collections and reduce the lag between the time customers pay their bills and the time the cash becomes available. The objective in cash disbursement is to control payments and minimize the firm’s costs associated with making payments.

Total collection or disbursement times can be broken down into three parts: mailing time, processing delay, and availability delay:

1. *Mailing time* is the part of the collection and disbursement process during which checks are trapped in the postal system.
2. *Processing delay* is the time it takes the receiver of a check to process the payment and deposit it in a bank for collection.
3. *Availability delay* refers to the time required to clear a check through the banking system.

Speeding up collections involves reducing one or more of these components. Slowing up disbursements involves increasing one of them. We will describe some procedures for managing collection and disbursement times later. First, we need to discuss how float is measured.

**Measuring Float** The size of the float depends on both the dollars and the time delay involved. For example, suppose you mail a check for $500 to another state each month. It takes five days in the mail for the check to reach its destination (the mailing time) and one day for the recipient to get over to the bank (the processing delay). The recipient’s bank holds out-of-state checks for three days (availability delay). The total delay is 5 + 1 + 3 = 9 days. In this case, what is your average daily disbursement float? There are two equivalent ways of calculating the answer.

First, you have a $500 float for nine days, so we say that the total float is 9 x $500 = $4,500. Assuming 30 days in the month, the average daily float is $4,500/30 = $150.

Alternatively, your disbursement float is $500 for 9 days out of the month and zero the other 21 days (again assuming 30 days in a month). Your average daily float is thus:

Average daily float = (9 x $500 + 21 x 0)/30

= 9/30 x $500 + 21/30 x 0

= $4,500/30

= $150

This means that, on an average day, your book balance is $150 less than your available balance, representing a $150 average disbursement float. Things are only a little more complicated when there are multiple disbursements or receipts.

To illustrate, suppose Concepts, Inc., receives two items each month as follows:

Processing and

Amount availability delay Total float

Item 1: $5,000,000 x 9 = $45,000,000

Item 2: $3,000,000 x 5 = $15,000,000

Total $8,000,000 $60,000,000

The average daily float is equal to:

Average daily float

So, on an average day, there is $2 million that is uncollected and not available.

Another way to see this is to calculate the average daily receipts and multiply by the weighted average delay. Average daily receipts are:

Average daily receipts

Of the $8 million total receipts, $5 million, or 5⁄8 of the total, is delayed for nine days. The other 3⁄8 is delayed for five days. The weighted average delay is thus:

Weighted average delay = (5/8) x 9 days + (3/8) x 5 days

= 5.625 + 1.875 = 7.50 days

The average daily float is thus:

Average daily float = Average daily receipts x Weighted average delay

= $266,666.67 x 7.50 days = $2 million

**Cash Collection and Concentration**

**Speeding Up Cash Receipts**

The various collection and disbursement methods that a firm employs to improve its cash management efficiency constitute two sides of the same coin. They exercise a joint impact on the overall efficiency of cash management. The general idea is that *the firm will benefit* *by “speeding up” cash receipts and “s-l-o-w-i-n-g d-o-w-n” cash payouts.* The firm wants to speed up the collection of accounts receivable so that it can have the use of money sooner. Conversely, it wants to pay accounts payable as late as is consistent with maintaining the firm’s credit standing with suppliers so that it can make the most use of the money it already has.

The amount of time cash spends in each part of the cash collection process depends on where the firm’s customers and banks are located and how efficient the firm is at collecting cash. Some of the techniques used to accelerate collections and reduce collection time are lockboxes, concentration banking, and wire transfers.

**Earlier Billing**: An obvious but easily overlooked way to speed up the collection of receivables is to get invoices to customers earlier. Customers have different payment habits. Some pay their bills on the discount date or the final due date (or later), and others pay immediately on receipt of an invoice. In any event, accelerated preparation and mailing of invoices will result in faster payment because of the earlier invoice receipt and resulting earlier discount and due dates. Computerized billing could be used to accomplish this.

Billing can be eliminated entirely through the use of a **preauthorized debit**. A customer signs an agreement with a firm allowing the firm to automatically debit the customer’s bank account on a specified date and transfer funds from the customer’s bank to the firm’s bank.

**Lockboxes System:** When a firm receives its payments by mail, it must decide where the checks will bemailed and how the checks will be picked up and deposited. Careful selection of thenumber and locations of collection points can greatly reduce collection times. Manyfirms use special post office boxes called **lockboxes** to intercept payments and speedcash collection.

A company rents a local post office box and authorizes its bank to pick up remittances in the box. Customers are billed with instructions to mail their remittances to the lockbox. The bank picks up the mail several times a day and deposits the checks directly into the company’s account. The checks are recorded and cleared for collection. The company receives a deposit slip and a list of payments, together with any material in the envelopes.

A lockbox system reduces mailing time because checks are received at a nearby post office instead of at corporate headquarters. Lockboxes also reduce the firm’s processing time because they reduce the time required for a corporation to physically handle receivables and to deposit checks for collection.

**Cash Concentration**

A firm will typically have a number of cash collection points, and, as a result, cash collections may end up in many different banks and bank accounts. From here, the firm needs procedures to move the cash into its main accounts. This is called **cash concentration**.

**Cash concentration** is the transfer of funds from diverse accounts into a central account to improve the efficiency of cash management. The consolidation of cash into a single account allows a company to maintain smaller cash balances overall, and to identify excess cash available for short term investments. The cash available in different bank accounts are pooled into a master account.

The process of **cash concentration** has several effects:

* It *improves control* over inflows and outflows of corporate cash.
* It *reduces idle balances* – that is, keeps deposit balances at regional banks no higher than necessary to meet transactions needs (or alternatively, minimum **compensating balance** requirements). Any excess funds would be moved to the concentration bank.
* It *allows for more effective investments.* Pooling excess balances provides the larger cash amounts needed for some of the higher yielding, short-term investment opportunities that require a larger minimum purchase.

**MANAGING CASH DISBURSEMENTS**

From the firm’s point of view, disbursement float is desirable, so the goal in managing disbursement float is to slow down disbursements. To do this, the firm may develop strategies to *increase* mail float, processing float, and availability float on the checks it writes. Beyond this, firms have developed procedures for minimizing cash held for payment purposes.

**Increasing Disbursement Float**

Slowing down payments comes from the time involved in mail delivery, check processing, and collection of funds. Tactics for maximizing disbursement float are debatable on both ethical and economic grounds. Disbursement float can be increased by:

* Write check on distant bank.
* Hold payment for several days after postmarked in office.
* Call supplier firm to verify statement accuracy for large amounts.
* Mail from distant post office.
* Mail from post office that requires a great deal of handling.

**Controlling Disbursements**

We have seen that maximizing disbursement float is probably poor business practice. However, a firm will still wish to tie up as little cash as possible in disbursements. Firms have therefore developed systems for efficiently managing the disbursement process.

**Zero-Balance Accounts:** With a **zero-balance account** system, the firm, in cooperation with its bank, maintains a master account and a set of subaccounts. When a check written on one of the subaccounts must be paid, the necessary funds are transferred in from the master account. The firm maintains two disbursement accounts, one for suppliers and one for payroll. If the firm does not use zero-balance accounts, then each of these accounts must have a safety stock of cash to meet unanticipated demands. If the firm does use zero-balance accounts, then it can keep one safety stock in a master account and transfer the funds to the two subsidiary accounts as needed. The key is that the total amount of cash held as a buffer is smaller under the zero-balance arrangement, which frees up cash to be used elsewhere.

**Investing Idle Cash**

If a firm has a temporary cash surplus, it can invest in short-term marketable securities. The market for short-term financial assets is called the *money market.* The maturity of short term financial assets that trade in the money market is one year or less.

Idle cash is often regarded as wasted funds due to the lack of appreciation. Idle cash can actually decrease in value in terms of purchasing power because it does not keep up with inflation. While it is frequently desirable to keep some funds liquid for use in paying regular bills, placing the money in a money market fund or other short-term investment vehicle can provide the desired availability to the funds while still increasing in value.

Firms have temporary cash surpluses for these reasons: to help finance seasonal or cyclical activities of the firm, to help finance planned expenditures of the firm, and to provide for unanticipated contingencies.