

CHAPTER FIVE

Working Capital and Current Asset Management

“The airline industry confronts some of the most challenging economic and operating conditions it has ever known. More than ever, airlines must reduce costs, maximize asset utilization, and enhance the customer experience so that they can retain and grow their customer base in an intensely competitive environment.”

- Oracle Corporation

In order to operate effectively, airlines must be aware of the short-term financial decision-making process. Concepts such as managing cash and working capital, short-term financing, current assets and liabilities management, and managing inventory are all important to the everyday operation of an airline. In order for an airline or any business to operate, the business must be able to pay their liabilities as they come due. Current assets, in particular cash, are used to pay current liabilities. It is important to have enough cash on hand to pay liabilities, but how much cash is enough? Can there be such a problem as having too much cash? We answer these questions and discuss other issues surrounding current assets and liabilities in this chapter.

The following topics are covered in this chapter:

- Working Capital Policy
- Cash Management
 - Cash Shortages
 - Cash Surpluses
 - Liquidity (Cash) Management Models
 - Fluctuations in Cash Flow
 - Foreign Exchange
 - Operating Cycle
- Accounts Receivable
- Current Liabilities Management
 - Terms of Credit
- Inventory Control Models
 - Inventory Carrying (Holding) Costs
 - Economic Ordering Quantity (EOQ)
 - Just-In-Time (JIT)
 - ABC Inventory Control

Working Capital Policy

"We believe that we currently have adequate cash on hand to meet our operating needs."

*-Chief Executive Sean Menke,
Frontier Airlines, the day Frontier filed for bankruptcy*

Before discussing the management of current assets, the concept of working capital must be explained. Working capital (WC) is defined as the difference between current assets and current liabilities. Therefore, WC is the amount of current assets left over after subtracting current liabilities. It is also the amount of current assets that is being financed by long-term liabilities or equity. Without a working capital margin an airline is likely to have problems paying its short-term liabilities which may include fuel bills, wages, or current rent for facilities. A company that is unable to pay its bills in a timely manner is likely to not be able to receive credit from other companies. There have even been occasions in history where airlines been refused refueling due to issues with credit (Serling, 2008) or the airline's company credit card, causing pilots and/or passengers to pay for the fuel on their own credit cards or with their own cash (The Ottawa Citizen, 1988, September 12). Maintaining working capital is so crucial for a company that many companies develop a working capital policy.

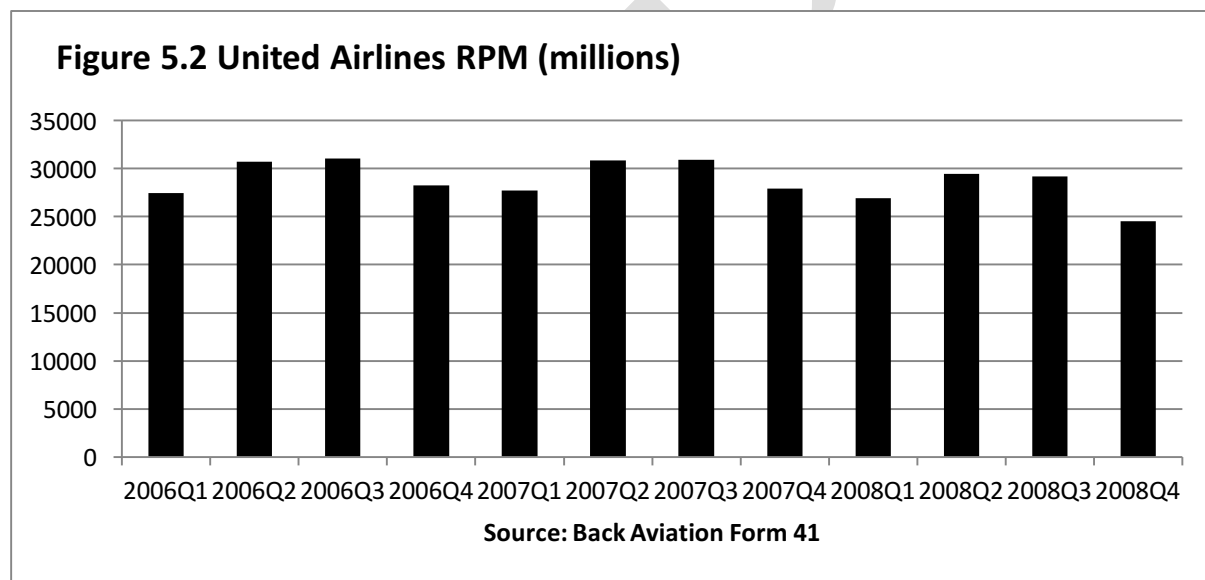
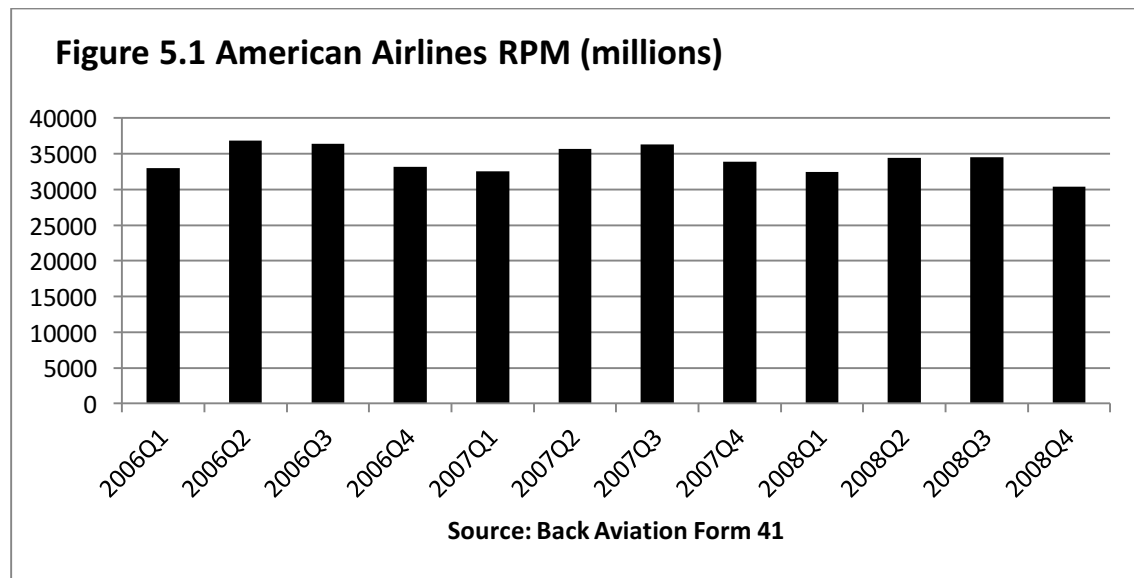
Developing a working capital policy is crucial to maintaining adequate reserves of current assets in order to pay current liabilities.

Current Assets include:

- Cash
- Marketable Securities
- Accounts Receivable
- Inventory

The airline industry is a good example of companies with seasonal and fluctuating demand. By the nature of the travel industry, demand is strong during holiday periods. In addition, certain seasons of the year experience heavier traffic than others. For example, heavy travel occurs in the spring and summer seasons. In figures 5.1 and 5.2 we see the seasonality that occurs in the

airline industry by examining the revenue passenger miles (RPM) data over a three-year period for two different airlines.



We can see from figures 5.1 and 5.2 that the passenger demand typically falls off during the fall and winter months (Quarter 4 and Quarter 1) compared to the previous spring and summer (Quarter 2 and Quarter 3). The seasonality in passenger travel means that there will also be seasonality in the collection of revenue from that travel. Seasonality in the airline industry can make the management of current assets and liabilities a more difficult task.

Airlines must decide the necessary monetary safeguard between current assets and current liabilities and can do so in one of two methods. The first of these is a working capital policy that is based on the current ratio of assets to liabilities. For example, a company may have policy that the current ratio should be greater than or equal to 1.5 to 1. A working capital policy that states that the current ratio must be greater than or equal to 1.5 means that for every \$1 in current liabilities there must be \$1.50 in current assets.

$$\text{Current Ratio} \geq 1.5$$

$$\text{Current Liabilities} = \$1,000,000$$

$$\text{Current Assets} \geq \$1,500,000$$

The other method of developing a working capital policy is to develop a flat amount that must be maintained as a margin. For instance a working capital policy may state that working capital will always be at least \$1,000,000.

While maintaining working capital is necessary for airlines and other businesses, it can create other problems. For example, airlines may need to increase long-term debt by borrowing cash to maintain the necessary working capital margin. Additional long-term debt creates additional interest expense. Assume, for the purpose of a concrete example, that an airline has a capital expenditure project where it wants to spend \$100 million in information technology (IT) upgrades. With the upgrades the airline expects to improve its website and supporting infrastructure, and it believes that this will lead to increased revenues over a five-year period. We examine the cost of the capital project with a policy of maintaining working capital of \$2,000,000 throughout the length of the project and the cost without such a policy. The net present value (NPV), assuming a discount rate of 10%, and the internal rate of return (IRR) for the project are shown in table 5.1 and 5.2.

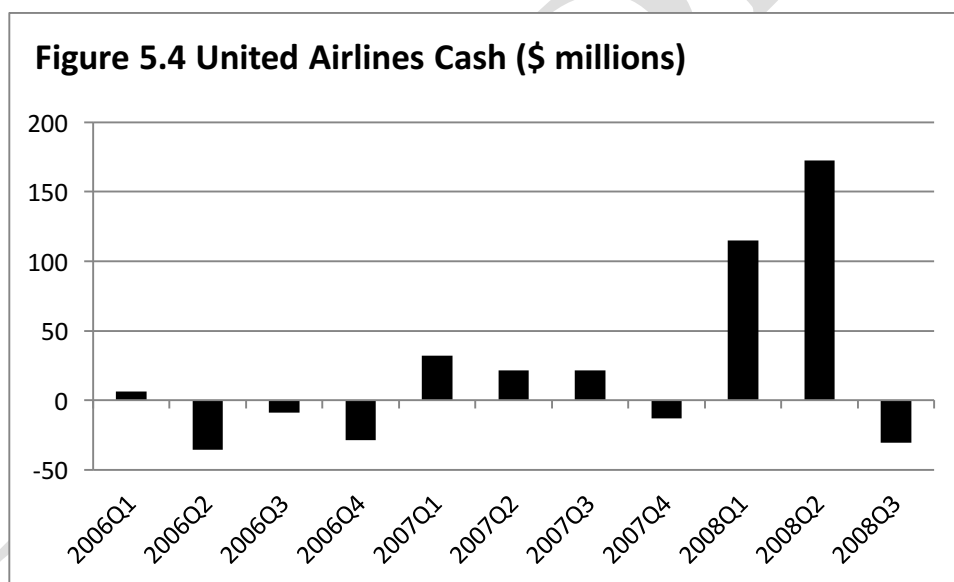
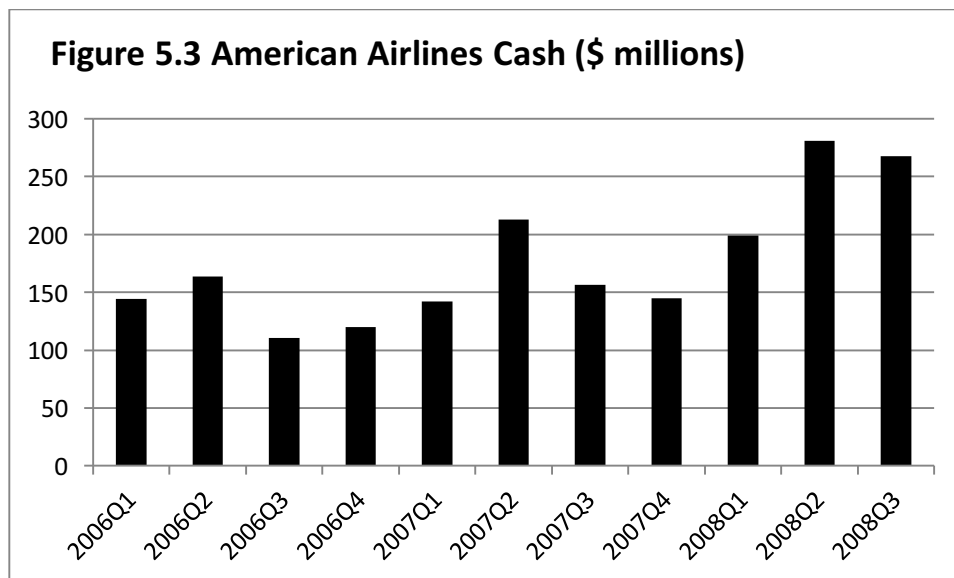
Table 5.1	Capital Expenditure Project, No Working Capital					
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Capital Outlay	\$ (100,000,000)					
Revenues		\$ 60,000,000	\$ 80,000,000	\$ 100,000,000	\$ 100,000,000	\$ 100,000,000
Expenses		\$(39,000,000)	\$(52,000,000)	\$(65,000,000)	\$(65,000,000)	\$(65,000,000)
Cash Flow	\$ (100,000,000)	\$ 21,000,000	\$ 28,000,000	\$ 35,000,000	\$ 35,000,000	\$ 35,000,000
NPV	\$ 14,165,140					
IRR	14.95%					

Table 5.2	Capital Expenditure Project, Working Capital = \$2,000,000					
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Capital Outlay	\$(100,000,000)					
Revenues		\$ 60,000,000	\$ 80,000,000	\$100,000,000	\$100,000,000	\$100,000,000
Expenses		\$(39,000,000)	\$(52,000,000)	\$ (65,000,000)	\$ (65,000,000)	\$ (65,000,000)
Δ in working capital	\$ 2,000,000	\$ -	\$ -	\$ -	\$ -	\$ (2,000,000)
Working Capital	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	0
Cash Flow	\$(102,000,000)	\$ 21,000,000	\$ 28,000,000	\$ 35,000,000	\$ 35,000,000	\$ 37,000,000
NPV	\$ 13,406,983					
IRR	14.57%					

By instituting a working capital policy of \$2,000,000 of working capital on hand for the duration of the project, the NPV is reduced from approximately \$14.2 million to \$13.4 million. While this may not be a large change in NPV, the fact that working capital decisions affect capital budgeting decisions needs to be considered when a company lays out their capital budgeting strategy.

Managing Cash

Cash is the most liquid of any current asset and must be available to pay liabilities as they come due. Since it is such an important asset, cash must be managed properly to ensure that there is neither too little, nor too much, cash on hand at any given time. Airlines' treasurers face challenges in effectively managing their corporate cash flows. There are three reasons for holding cash and these are: the *transaction motive*, the *speculative motive* and the *precautionary motive*. For airlines, the transaction motive concerns the use of cash to pay for pilots, flight attendants, mechanics, fuel or other business expenses. An airline also holds cash for precautionary reasons in case management wants cash during seasonal or cyclical downturn and emergency cases. Generally, airlines shore up their cash positions before their slow travel seasons. Recall that revenue passenger miles fall in the first and fourth quarters of the year compared to the peak travel period during the second and third quarters. How does this effect an airline's cash position during these quarters? To answer this question we look at the quarterly cash position of the same two airlines we examined earlier, American and United.



Figures 5.3 and 5.4 show that the cash position of an airline does not always follow the demand pattern. American Airlines appears to be in the best cash position during the 2nd Quarter of each year, followed by a drop off in the 3rd Quarter. This is in spite of the fact that the 3rd Quarter tends to be just as strong demand wise as the 2nd Quarter (as seen in figure 5.1). This may indicate that revenue is not always collected in the period in which the demand occurs. United Airlines on the other hand seems to experience no distinguishable pattern for their cash position. Rather they seem to experience cash management problems at various times throughout the year, as shown by their multiple quarters of negative cash positions.

A slowing economy and high fuel prices forced many airlines such as Aloha Airlines, ATA, and Champion Air out of business (International Herald Tribune, 2008, April 8).

Therefore, airlines hold precautionary motive cash balances as a financial reserve in the event of unanticipated change in cash outflows or cash inflows. A healthy precautionary cash balance may keep an airline from bankruptcy in more difficult financial times. Finally, airlines hold cash to be in the right position to take advantage of attractive investment opportunities that might arise. For example, if some carriers go out of business, then the **remaining** airlines may be able to take advantage of market opportunities if they have cash available for expansion. After the failure of Aloha and ATA, Southwest Airlines took out additional cash reserves both as a precautionary measure and for the speculative motive that other carriers might fail. If this occurred then the strong cash reserves could leave Southwest with an opportunity to expand quickly (SmartBrief, 2008).

There are four basic problems that companies can experience with cash management:

- Shortage of Cash
- Surplus of Cash
- Fluctuations in Cash Flow
- Foreign Exchange

Cash Shortages:

Generally, cash deposits do not produce any great returns, but many airlines view the cash as a buffer against potential future insolvency. An airline with little cash may face potential insolvency if current liabilities outweigh the airline's ability to pay. The aim of cash management is to allow airlines to have enough cash to pay the interest on their debt, as well as other current liabilities, and at the same time make investments in short term interest bearing assets (Besley and Brigham, 2000).

Companies can end up short on cash for a number of reasons. The first reason that a shortage of cash could occur is if somebody either within or outside the organization is pilfering (stealing) cash. Therefore, management generally places strong restrictions over who has access to cash and checks. Cash is usually locked in a safe or put in a bank or other secure location. Checks normally require two signatures by officers of the company to be valid and they remain locked in a secure location. In today's technology driven economy, fraud can also be committed

through computers. Access to financial information is heavily secured by a company's information technology through the use of encryption, passwords, and biometric technology such as fingerprints and facial recognition software.

While fraud and theft can be a problem for companies, mismanagement of cash is just as likely to be a problem. Managers have many different tools they can use so that a company does not become short on cash. In the short-term managers can use tools such as:

- Cash Forecasting
- Developing Relationships with Lenders
- Free Financing
- Credit Control

Managers can forecast the amount of cash they will receive each month based on historical projections of sales, collections of accounts receivable, payments made to suppliers/creditors, supplies needed, demand forecasts, etc. Producing a cash forecast, also called the cash budget, is one of a managers most important tools in properly managing cash (Wensveen, 2007). Table 5.3 shows what a cash forecast might look like for DirectJet Airlines in the first quarter of 2009.¹

¹

The data in the table assumes:

80% of Accounts Receivable (A/R) is retrieved in the month it is generated and 20% the next month.

85% of Accounts Payable (A/P) is paid in the month it is incurred, 15% the following month

All sales are credit sales and all supply purchases are on credit

At the beginning of the quarter cash on hand is \$1,000,000, A/R is \$2,000,000 and A/P is \$1,500,000

Table 5.3	Cash Forecast 1st Quarter 2009 DirectJet Airlines				
		Jan.	Feb.	Mar.	Quarter
Beginning Cash on hand	\$	1,000,000	2,000,000	(3,375,000)	\$ 1,000,000
Beginning Accounts Receivable		2,000,000	5,000,000	2,000,000	2,000,000
Sales		25,000,000	10,000,000	30,000,000	65,000,000
Cash collections from receivables		22,000,000	13,000,000	26,000,000	61,000,000
Ending Accounts Receivable		5,000,000	2,000,000	6,000,000	6,000,000
Beginning Accounts Payable		1,500,000	1,500,000	1,125,000	1,500,000
Supplies/Inventory purchased		10,000,000	7,500,000	10,000,000	27,500,000
Payments on account		10,000,000	7,875,000	9,625,000	27,500,000
Ending Accounts Payable		1,500,000	1,125,000	1,500,000	1,500,000
Wages paid		5,000,000	4,500,000	5,000,000	14,500,000
Rent/leases paid		6,000,000	6,000,000	6,000,000	18,000,000
Ending Cash on hand		2,000,000	(3,375,000)	2,000,000	\$2,000,000

In table 5.3 we see that DirectJet Airlines will run into a cash shortage at the end of February. Once managers identify, through forecasting, that cash problems may occur they can use one of the other three techniques to deal with projected shortages.

One technique that managers can use to deal with potential shortages of cash is to develop relationships with lenders. By developing relationships with lenders, a company can borrow money in the short-term during periods when additional cash is going to be necessary. A standing line of credit, for example, can be used to borrow cash in the short-term. Developing relationships with lenders also helps for longer-term cash needs, such as financing for capital projects.

Airlines and other companies also take advantage of free financing from suppliers when available. Most suppliers offer financing terms allowing the net balance to be paid in 30 days. By taking advantage of these terms, a company can reduce the amount of time from when the company pays its suppliers to the time that it receives cash from its customers.

To reduce the time that it takes for a company to receive cash from customers, companies control the credit they extend to customers. Retail stores such as Best Buy, Old Navy and Sears practice credit control by looking at the credit ratings of customers who apply for a store credit card. Companies control credit for those who have lower credit ratings by charging a higher interest rate to compensate for the higher risk of extending credit to these customers (Best Buy, 2008). Airline ticket distribution is largely over the internet through an online travel agent (i.e. Orbitz) or on the airline's own website, so the one area that airlines have some control over is the speed at which they get paid by the credit companies. The speed at which airlines are paid

is determined through contracts called covenants with banks and other financial institutions; typically, all of an airline's credit card transactions are processed by a limited number of banks or other financial institutions. The financial company holds back a percentage of the revenue as collateral in case the individual credit companies do not pay the full amounts that their customers have charged. If airlines can demonstrate that a very high percentage of accounts receivable from their customers are collected, the company in charge of processing these transactions and collecting payment will generally hold back a lower percentage of the airline's revenue. For example, United Airlines announced that it was able to reach such an agreement with one of its credit card processors, Paymentech, and it is estimated that the agreement gives United \$350 million in additional available cash (United Airlines, 2008, July 22). Therefore, airlines can potentially increase the amount of cash on hand by negotiating with the credit card processing companies.

Cash Surplus:

While not having enough cash can be a major problem for airlines and other aviation companies, having too much cash is also a problem. When a company has more cash than is needed, it means that cash is sitting idle when it could be invested and creating a return for the company. If a company has more cash on hand than is necessary to pay current liabilities, that cash should be invested into marketable securities. Marketable securities are short-term investments that can easily be sold and converted into cash; marketable securities are typically lower-yielding than bonds or stocks that are held for the long-term (Brigham & Gapenski, 1994). The idea behind investing in marketable securities is not to generate a huge rate of return but rather to gain some return, rather than having cash sitting idle. The marketable security can then be sold in a period where the company needs cash to pay current liabilities. Some examples of marketable securities are U.S. Treasury Bills or CDs (Certificates of Deposit). Table 5.4 shows the daily yield of short-term Treasury Bills in March 2009.

Table 5.4 Daily Treasury Bill Yields- March 2009²

DATE	4 WEEKS		13 WEEKS		26 WEEKS		52 WEEKS	
	BANK DISCOUNT	COUPON EQUIVALENT	BANK DISCOUNT	COUPON EQUIVALENT	BANK DISCOUNT	COUPON EQUIVALENT	BANK DISCOUNT	COUPON EQUIVALENT
03/02/2009	0.15	0.15	0.28	0.28	0.44	0.45	0.64	0.65
03/03/2009	0.14	0.14	0.27	0.27	0.43	0.44	0.65	0.66
03/04/2009	0.14	0.14	0.26	0.26	0.43	0.44	0.67	0.68
03/05/2009	0.10	0.10	0.20	0.20	0.39	0.40	0.63	0.64
03/06/2009	0.08	0.08	0.20	0.20	0.38	0.39	0.63	0.64
03/09/2009	0.11	0.11	0.23	0.23	0.46	0.47	0.66	0.67
03/10/2009	0.14	0.14	0.24	0.24	0.46	0.47	0.70	0.71
03/11/2009	0.14	0.14	0.23	0.23	0.45	0.46	0.70	0.71
03/12/2009	0.10	0.10	0.21	0.21	0.44	0.45	0.69	0.70
03/13/2009	0.08	0.08	0.19	0.19	0.41	0.42	0.66	0.67
03/16/2009	0.09	0.09	0.24	0.24	0.45	0.46	0.67	0.68
03/17/2009	0.14	0.14	0.24	0.24	0.44	0.45	0.67	0.68
03/18/2009	0.15	0.15	0.21	0.21	0.39	0.40	0.58	0.59
03/19/2009	0.09	0.09	0.20	0.20	0.39	0.40	0.58	0.59
03/20/2009	0.08	0.08	0.21	0.21	0.40	0.41	0.58	0.59
03/23/2009	0.08	0.08	0.22	0.22	0.40	0.41	0.58	0.59
03/24/2009	0.05	0.05	0.21	0.21	0.41	0.42	0.60	0.61
03/25/2009	0.02	0.02	0.19	0.19	0.40	0.41	0.58	0.59
03/26/2009	0.01	0.01	0.15	0.15	0.38	0.39	0.55	0.56

Source: U.S. Department of Treasury

For a comparison we also provide the national average of CD rates for CDs with maturities of 3 months or longer in table 5.5:

² Bank Discount refers to the quoted price on the secondary market based on a 360-day year; Coupon Equivalent refers to the purchase price and is based on a 365-day year.

Table 5.5 U.S. Certificate of Deposit (CD) averages as of 3/27/2009	
Term	Rate
3 months	3.15%
5 months	3.12%
6 months	3.23%
9 months	3.05%
12 months	2.94%
18 months	3.02%
24 months	3.02%
30 months	3.13%
36 months	3.08%
48 months	3.42%
60 months	3.33%
Source: http://www.best-certificate-rates.com/site/national_averages	

Liquidity (Cash) Management Models:

The question then becomes: What is the right amount of cash to have on hand? In practice, a wide variety of cash management models are used by firms in different industries to determine the appropriate level of cash to have on hand. In this section two different cash management methodologies are presented. The first of these models is called the Economic Order Quantity (EOQ). The EOQ model is a generalized version of the Baumol model and is also appropriate for different types of inventory as well as cash.³ The model assumes that the company uses cash at a constant rate and the demand for cash is distributed evenly throughout the year. The Baumol model determines a quantity of cash that should be “ordered” or converted from marketable securities as the cash balance approaches zero. This quantity of cash is called the Economic Order Quantity (EOQ). The formula for EOQ follows:

$$EOQ = \sqrt{\frac{2 \times C_o \times A}{C_h}}$$

Where :

C_o = cost of converting marketable securities to cash

C_h = opportunity cost of holding cash

A = annual demand for cash

³ William Baumol, “The Transactions Demand for Cash,” QJE Nov. 52, 545-556.

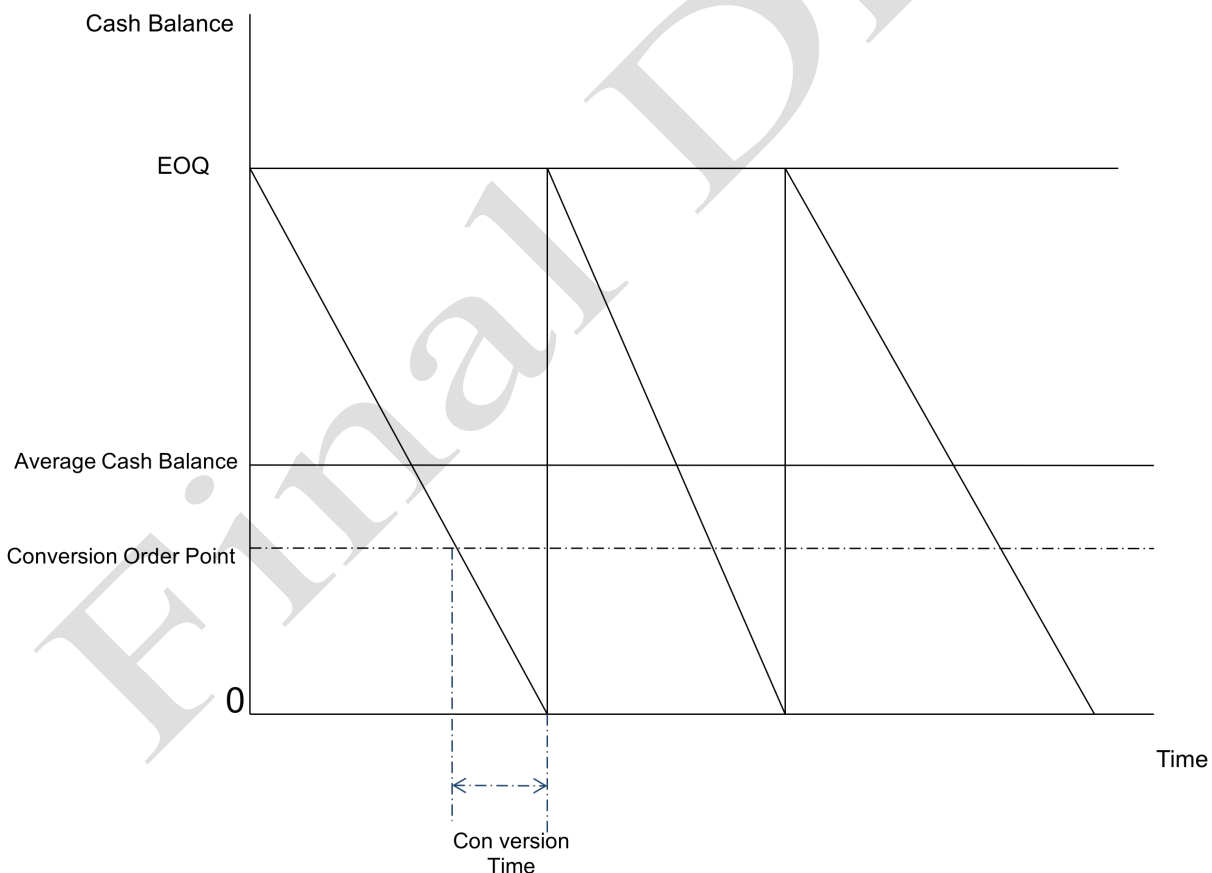
To understand the Baumol/EOQ model we show an example using DirectJet airlines. DirectJet has annual cash demand of \$100,000,000 and believes that it can receive a return of 5% on marketable securities (opportunity cost of holding cash). Each conversion of marketable securities to cash costs DirectJet \$200.

$$EOQ = \sqrt{\frac{2 \times 200 \times (100,000,000)}{0.05}}$$

$$EOQ = 894,427$$

The EOQ says that DirectJet should start the year with \$894,427 and convert this amount from marketable securities to cash every time the cash balance reaches zero. The amount of cash on hand for DirectJet will look like the following diagram throughout the year:

Figure 5.5 Baumol/EOQ Model



The length of time that it takes to convert marketable securities to cash is called the conversion time. The conversion time determines the point at which an order is placed to convert

marketable securities to cash. This *conversion order point* is the demand for cash during the conversion time. When the conversion order point is reached an order to convert marketable securities to cash must be placed to avoid running out of cash. Using the EOQ we can determine how many times throughout the year DirectJet would need to convert marketable securities into cash:

$$\text{No of Cash Conversions} = \frac{\text{Annual Cash Demand}}{EOQ}$$

$$\text{No of Cash Conversions} = \frac{\$100,000,000}{\$894,427}$$

$$\text{No of Cash Conversions} = 111 \text{ times per year}$$

With 111 cash conversions from marketable securities throughout the year this equates to a cash replenishment approximately every 3.2 days (360/111).

Fluctuations in Cash Flow:

Many businesses experience fluctuations in cash flow since the demand and supply of cash is not always constant. There may be periods where more cash is needed or where less cash is received than in other periods. In table 5.3 DirectJet Airlines experiences a major decrease in cash collected during the month of February. This is typical of the airline industry as demand for air travel is seasonal. In certain seasons, such as summer and winter holidays, demand for air travel is very high while in other seasons, such as after the winter's holidays and in the fall, demand is lower. Compounding the seasonal problem for airlines is the fact that the slow demand periods are also the times when airlines want to perform maintenance on aircraft so that they can keep the aircraft in service during the high demand periods. This means that maintenance costs rise when cash flow has decreased. The result is that the airline is left with higher costs and less cash coming in to pay these costs.

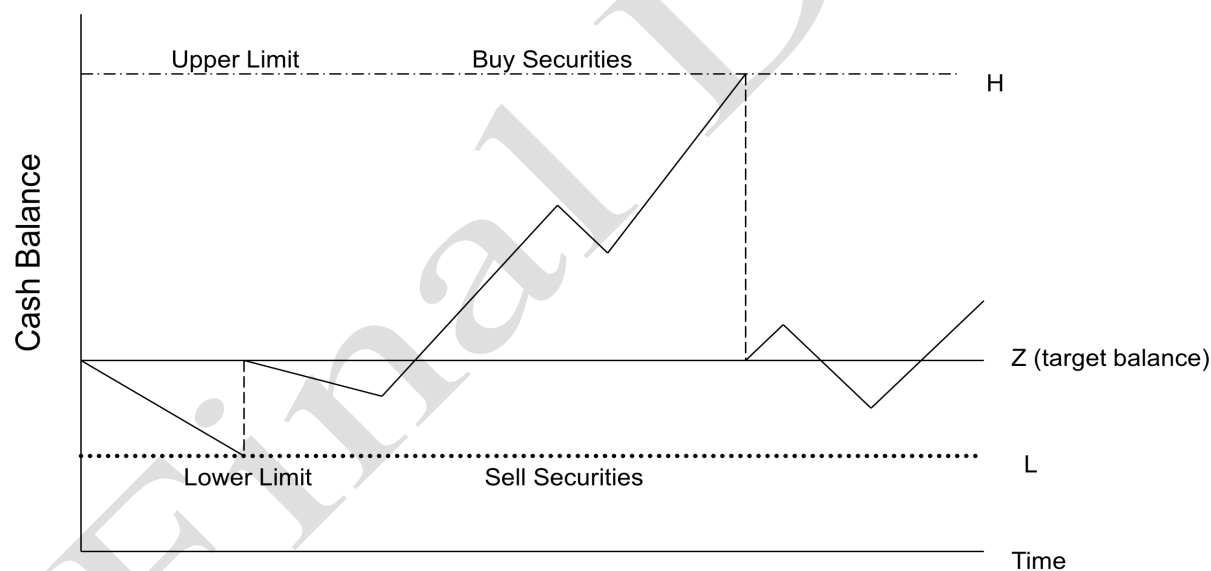
Businesses have various ways of trying to reduce the fluctuations in cash flow that they experience. Demand smoothing is one way to lower the fluctuation in cash flow. To reduce the fluctuation in demand airlines can set their fare structures so that lower fares are less available during peak demand seasons and more available during seasons that typically experience lower demand. In addition, airlines can structure maintenance contracts so that maintenance expenses

for a year are divided into twelve equal payments per month, rather than having the cost for each month dependent on the amount of work that is done.

The Miller-Orr Model

The Baumol model assumes constant cash flows. While demand smoothing and other techniques to reduce fluctuations in cash flow may have some effect, the reality is that cash flows are not constant. To determine the amount of cash to keep on hand when cash flows are not constant we can use the Miller-Orr model.⁴ Instead of prescribing a set amount of cash to convert from marketable securities each time like the Baumol model, the Miller-Orr model sets upper and lower limits for the amount of cash a company should carry. Figure 5.6 gives a representation of the Miller-Orr model.

Figure 5.6 Miller-Orr Model



In the Miller-Orr model a target balance for cash on hand is set for the month, year, etc. and upper and lower limits are also set. As you can see from figure 14.4, when the cash balance reaches the lower limit, marketable securities are sold to return cash on hand to the target

⁴ Merton Miller and Daniel Orr, "A Model of the Demand for Money by Firms," QJE Aug 66, 413-435.

balance. Conversely, when the cash balance reaches the upper limit, marketable securities are bought and the cash balance is returned to its target.

The target balance of a firm using the Miller-Orr model is established by comparing conversion cost and opportunity cost using an equation similar to the EOQ equation in the Baumol model. In addition to conversion cost and opportunity cost, the variance of cash flows must also be known in order to calculate the target balance. Also, a lower limit (L) for the cash balance must be set. The lower limit may already be established by a financial institution through a minimum balance requirement in a checking account for example. The equation for the target cash balance (Z) of a firm is shown in the equation below:

$$Z = \sqrt[3]{\frac{3 \times \text{conversion cost} \times \sigma}{4 \times \text{daily opportunity cost}}} + L$$

After a target balance and lower limit of cash has been determined the firm can use the following equation to establish the upper limit (H) of their cash balance:

$$H = 3Z - 2L$$

To demonstrate calculating the target balance and upper limit using the Miller-Orr model return to the DirectJet example used for the Baumol model.⁵ In addition to conversion costs of \$200 and an annual return of 5%, DirectJet's bank requires a minimum balance of \$1,000. The variance of daily cash flows is assumed to be \$50,000:

⁵ For more information on Miller-Orr model, see D. Mullins and R. Homonoff, "Applications of Inventory Cash Management Models," in S.C. Myers, ed., *Modern Developments in Financial Management*, Frederick A. Praeger, Inc., New York, 1976.

$$Z = \sqrt[3]{\frac{3 \times \text{conversion cost} \times \sigma}{4 \times \text{daily opportunity cost}}} + L$$

$$Z = \sqrt[3]{\frac{3 \times 200 \times 50000}{4 \times .05 / 360}} + 1000$$

$$Z = 3780 + 1000 = 4780$$

$$H = 3Z - 2L$$

$$H = 3 \times 4780 - (2 \times 1000)$$

$$H = 12,340$$

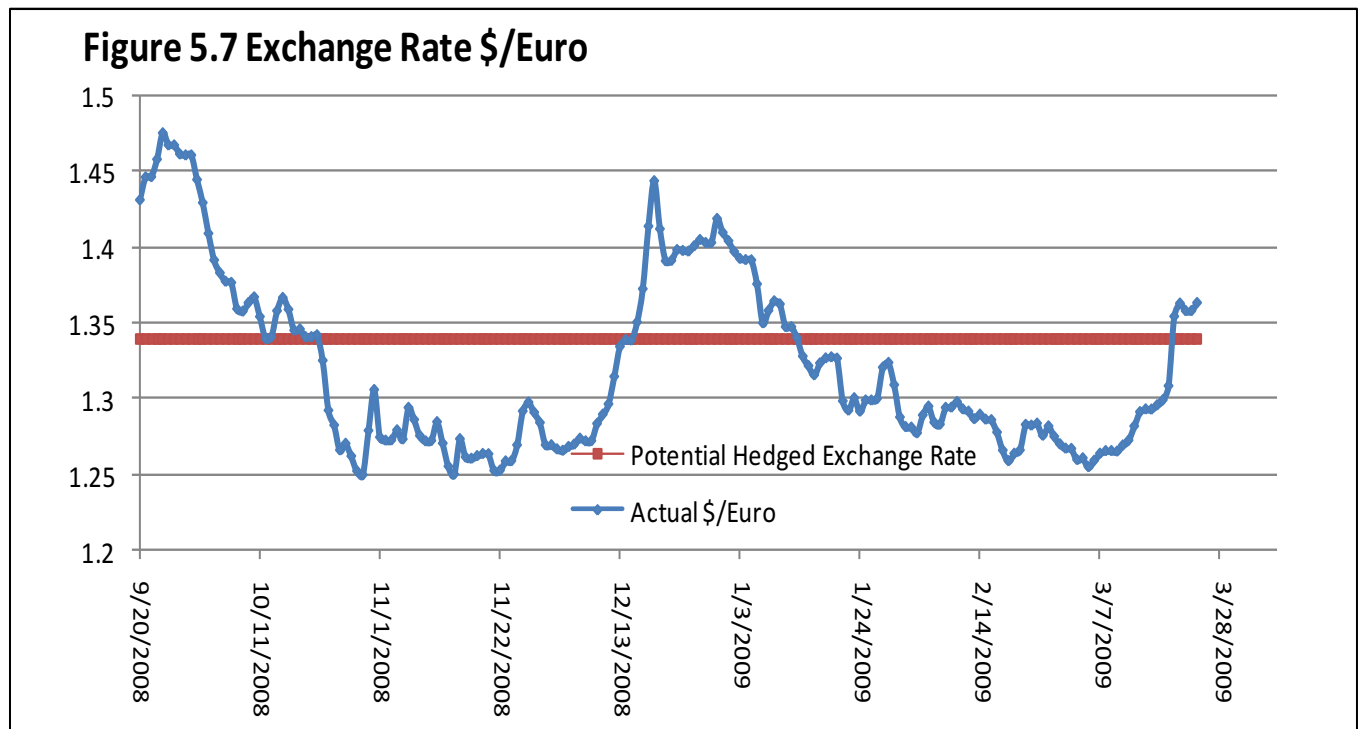
Therefore, according to the Miller-Orr model with a lower limit of \$1,000, DirectJet Airlines should have a target cash balance of \$4,780 and an upper limit of \$12,340.

Foreign Exchange:

In chapter two we explained that airlines experience foreign currency risk. The exchange rate between currencies may not be the same at the time that airlines actually exchange currency as it was when the airline sold the ticket. If the exchange rate goes down, airlines receive less cash than they would have if the exchange rate had stayed the same or gone up. For example, suppose that Delta Air Lines sold a ticket from Paris-Atlanta to a person in France. Delta Air Lines converted their fare of \$750 from U.S. Dollars to Euros at an exchange rate of \$1.50/Euro. The ticket would cost 500 Euros at the time of purchase. If the value of the Euro declines as compared to the Dollar between the time of purchase and the time Delta receives cash, then Delta will have lost money on the foreign currency exchange. For example, if a Euro is now only worth \$1.30 instead of \$1.50 then Delta only receives \$650 (500*1.50) for the ticket compared to the \$750 they would have received from a passenger in the United States.

To combat fluctuations in exchange rates, airlines and other global companies can hedge exchange rates. In much the same way as airlines hedge fuel, they may also hedge exchange rates.⁶ When exchange rates are hedged, the airline receives a fixed dollar amount for every unit of foreign currency (FX Trademaker, 2008). An example comparing foreign exchange rates with or without a hedging strategy is shown in figure 5.7:

⁶ Fuel and currency hedging are explained in greater detail in Chapter 13.

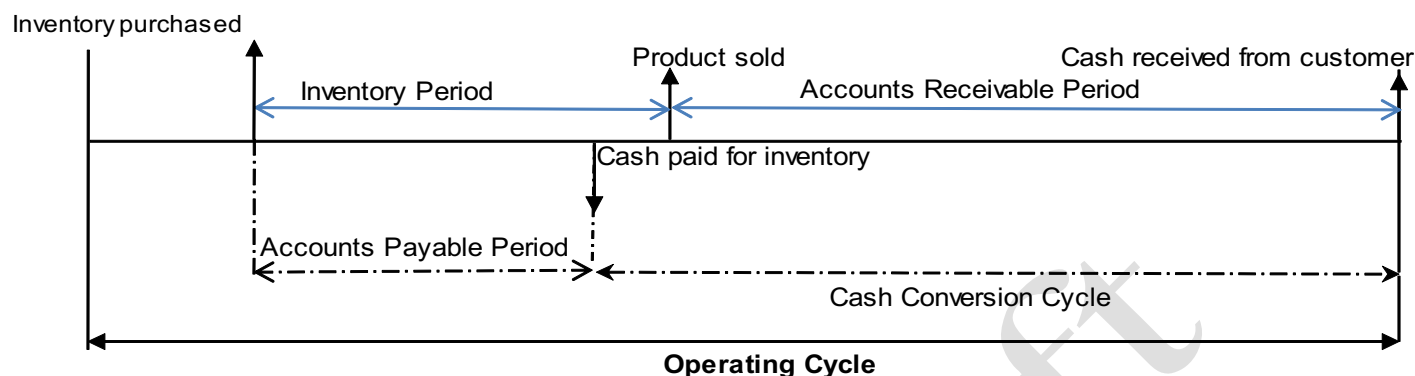


As with other financial options, exchange rate hedges have a premium; this is the amount that must be paid in exchange for the reduction in foreign exchange risk. Financial options are explained further in chapter 13.

Operating Cycle:

A company's operating cycle is the time between ordering materials/inventory and collecting cash from customers after that inventory is sold. The operating cycle consists of purchasing inventory, producing the product, and selling the finished products (Moyer, McGuigan, and Kretlow, 2008). The time from when a company pays its suppliers to when the company receives payment from customers is called the *cash conversion cycle*. The cash conversion cycle is merely one part of the operating cycle of a business. Figure 5.8 shows both the operating cycle and the cash conversion cycle:

Figure 5.8 Operating Cycle



As we can see in the diagram, there are four parts to the operating cycle: the inventory period, the accounts receivable period, the accounts payable period and the cash conversion cycle (Ross, Westerfield & Jordan, 2008). The cash conversion cycle (CCC) can be expressed in terms of the other three parts of the operating cycle.

$$\text{CCC} = \text{Inventory Period} + \text{Accounts Receivable Period} - \text{Accounts Payable Period}$$

Reducing the length of the cash conversion cycle is crucial to any business. Inventory must be sold and cash collected quickly from customers so that a business can buy additional inventory to sell to customers. From the equation for the cash conversion cycle shown above, we see that there are three methods that managers can use to reduce the cash conversion cycle:

1. Reduce Inventory Period
2. Reduce Accounts Receivable Period
3. Increase Accounts Payable Period

In the next three sections we discuss the management of these three areas; accounts receivable, accounts payable and inventory.

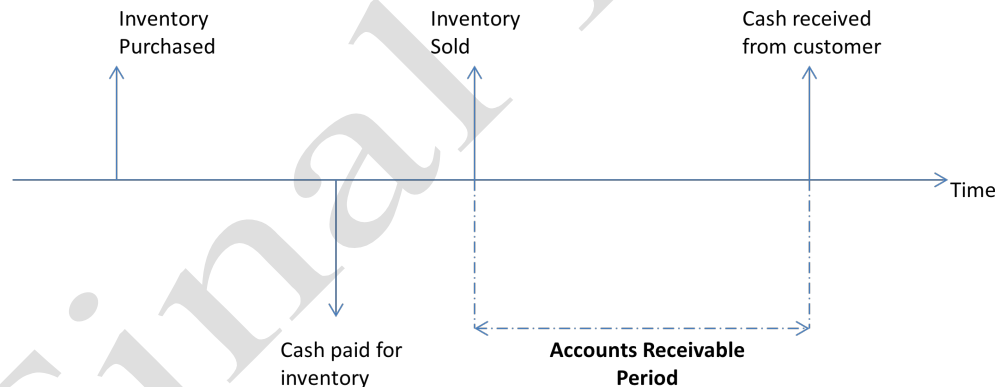
One may ask if airlines even have the operating cycle problem since the inventories that they sell (airline seats) are predominantly fixed. Airlines still have other inventory such as food and beverages that are sold on airplanes and it is especially important that food and beverages are turned into revenue quickly as spoilage is also a factor with food products. In addition airlines carry inventory in their maintenance departments. Maintenance must have spare parts on hand to replace airplane parts that become inoperable. Without the necessary replacement parts,

maintenance problems will not get fixed and airplanes will be stuck on the ground; airplanes on the ground cost airlines tremendous amounts of lost revenue.

Accounts Receivable

Accounts receivable is an important part of current assets; managers must monitor the company's accounts receivable balance to determine if the company is efficiently converting sales into cash. One way of measuring the efficiency of accounts receivable is to determine the average amount of time it takes to convert sales into cash; this time is called the receivables collection (accounts receivable) period. Therefore, the formal definition of the receivables collection period (or days of sales outstanding) is the length of time required to convert a company's accounts receivable into cash.

Figure 5.9 Receivables Collection Period



To determine the length of the receivables collection period managers must know the percentage of sales that are made on credit. For retail and department stores the percentage of sales on credit may vary since some customers will pay cash while others will pay with a personal or store credit card. For the airline industry nearly all sales are on credit. Passengers pay over the phone or on the internet with a credit card and very rarely does a passenger walk up to the ticket counter and pay cash for a ticket (doing so is likely to get you security flagged). Once managers know the percentage of sales made on credit, they can determine the annual credit sales by

multiplying the percentage by total annual sales. Annual credit sales are then used to calculate the average receivables collection period using the following equation:

$$\text{Receivables Collection Period} = \frac{\text{Accounts Receivable}}{\left(\frac{\text{Annual Credit Sales}}{360} \right)} = \frac{\text{Accounts Receivable}}{\text{Average Daily Credit Sales}}$$

Assuming that an airline's sales are all on credit, we can determine the receivables collection period for different airlines by examining their income statements and balance sheets. The accounts receivable, annual sales and receivables collection period for six U.S. airlines and two Brazilian airlines (GOL and TAM) are shown in table 5.6:

Table 5.6 Airline Accounts Receivable, Sales and Receivables Collection Period			
Airline	Accounts Receivable (\$ Millions)	Annual Sales (\$ Millions)	Receivables Collection Period (days)
American	811	23,766	12.28
Continental	453	15,241	10.70
Delta	1,443	22,697	22.89
GOL Lineas Aereas	568	2,788	73.34
Southwest	209	11,023	6.83
TAM S.A.	1,086	4,597	85.05
United	1,086	20,194	19.36
US Airways	291	12,244	8.56
Source: 2008 10-K SEC Filings except GOL and TAM, GOL and TAM data is for 2007			

By comparing the receivables collection period of the six major U.S. airlines we see that Southwest Airlines does a better job of converting accounts receivable to cash. On average Southwest Airlines is able to convert sales into cash in just under seven days. Delta on the other hand takes nearly 23 days to convert sales to cash. Receivables collection periods for the two Brazilian airlines were much higher than their American counterparts, 73 and 85 days. Companies, like Southwest, who are able to convert their accounts receivable into cash quickly will have a higher degree of liquidity and a greater working capital margin than companies that have a longer receivables collection period.

The receivables collection period tells us how long, on average, it takes to receive payment from customers. An *aging schedule* breaks down the accounts receivable balance further and is

necessary to develop cash forecast. The accounts receivable aging schedule tells a company, based on historical data, what percentage of accounts receivable is collected in the same month as sales, what percentage is collected in the following months, in two months, etc.

Table 5.7 is an example of an aging schedule for DirectJet Airlines, assuming all sales are credit sales. Sales last January were \$10,000,000 and the cash collected in each month for January's accounts receivable are shown in the table:

Table 5.7	Accounts Receive Collections-DirectJet Airlines			
Sales (January)	\$ 10,000,000			
	January	February	March	April
Cash Collections (January's sales)	\$ 1,500,000	\$ 5,000,000	\$ 3,000,000	\$ 500,000

Table 5.7 shows that DirectJet collected 15% ($1,500,000/10,000,000$) of January sales in January, 50% in February, 30% in March and 5% in April. If this collection pattern holds true for other months then DirectJet's aging schedule is the following:

- 15% of accounts receivable is received in the month of sales
- 50% of accounts receivable is collected in the month following sales
- 30% is collected two months after sales
- 5% is collected three months after sales

Managing accounts receivable is important for any business because there is an opportunity cost associated with carrying accounts receivable. In order to extend credit to customers, businesses may need to borrow cash from financial institutions to maintain enough cash on hand to pay its own creditors. The cost of carrying accounts receivable (A/R) is shown in the following equation:

$$\text{Cost of carrying receivables} = \text{Cost of debt} \times (\% \text{ of A/R financed} \times \text{A/R})$$

If we look at the balances for accounts receivable in table 5.6 we can compare each airline's cost of carrying receivables (if we assume they have the same cost of debt). Continental and Delta Air Lines have similar annual sales figures; however, Delta has a much higher cost of carrying receivables because it has a much higher accounts receivable balance. If we assume that both airlines have a 5% cost of debt and that 75% of accounts receivable are financed, then the cost of carrying receivables for Continental and Delta are:

$\text{Cost of carrying receivables}_{\text{CO}} = 0.05 \times (0.75 * \$453,000,000)$
$\text{Cost of carrying receivables}_{\text{CO}} = \$16,987,500$
$\text{Cost of carrying receivables}_{\text{DL}} = 0.05 \times (0.75 * \$1,443,000,000)$
$\text{Cost of carrying receivables}_{\text{DL}} = \$54,112,500$

Delta's higher accounts receivable gives Delta a higher cost of carrying receivables. This is because Delta must pay interest on the additional financing necessary to have the cash on hand to pay its current liabilities. This is a cost they would not incur if some or all of the accounts receivable were cash. This demonstrates the importance of collecting accounts receivable quickly, since a lengthy receivables collection period not only lengthens the cash conversion cycle, it also adds additional costs to doing business.

Current Liabilities Management

Just as important as managing current assets is the management of current liabilities since another way to increase working capital is to reduce the amount of current liabilities. In the following table we show the working capital for the same airlines we discussed in table 5.6:

Table 5.8	Working Capital and Total Liabilities (\$ Millions)			
Airline	Current Assets	Current Liabilities	Total Liabilities	Working Capital
American	\$5,935	\$9,374	\$28,110	\$ (3,439)
Continental	\$4,347	\$4,474	\$12,581	\$ (127)
Delta	\$8,904	\$11,022	\$44,140	\$ (2,118)
GOL Lineas Aereas	\$1,767	\$1,291	\$2,612	\$ 476
Southwest	\$2,893	\$2,806	\$9,355	\$ 87
TAM S.A.	\$2,840	\$1,730	\$4,528	\$ 1,110
United	\$4,861	\$7,281	\$14,727	\$ (2,420)
US Airways	\$2,359	\$3,966	\$7,175	\$ (1,607)
Source: 2008 10-K SEC Filings except GOL and TAM, GOL and TAM data is for 2007				

From table 5.8 we see that only Southwest, GOL and TAM have a positive working capital; of the airlines shown only these three have sufficient current assets to cover current liabilities. The negative working capital margins of American, Continental, Delta, United and US Airways show the financial trouble that U.S. legacy carriers are facing in the current industry and economic climate.

Because working capital is the amount of current assets financed by long-term liabilities or equity, using long-term debt or raising equity to purchase current assets reduces the need to use short-term debt to purchase supplies on credit. While it is true that long-term debt and equity also have costs associated them, it still may be less costly to manage current liabilities through understanding and taking advantage of longer term debt or equity. Working capital can also be better managed by better managing current liabilities through taking advantage of the terms of credit associated with current liabilities.

Terms of Credit:

The competitive nature of business and the global economy means that businesses that do not offer terms of credit to their customers will likely lose out on business. Airlines and other businesses allow customers to purchase with credit cards (this also allows the airline to sell tickets online). In business to business transactions suppliers will not always require payment immediately upon delivery of inventory. Suppliers give an invoice and then the terms and time period under which the inventory must be paid. Examples of credit terms are given below:

Net 10: Entire balance must be paid within 10 days

Net 30: Entire balance must be paid within 30 days

2/10, Net 30: Customer receives a 2% discount if invoice is paid within 10 days, otherwise the balance is due in 30 days

There are two ways in which businesses can use terms of credit from suppliers to help manage current liabilities. The first method is to use the full term to pay the liability. If the terms of the invoice are Net 30, there is no reason to pay the supplier in 5 days. The reason that a business would want to use the full term to pay the invoice is to reduce the cash conversion cycle (CCC). By waiting to pay the supplier, the business increases the accounts payable period of the operating cycle thereby reducing the cash conversion cycle ($CCC = \text{Inventory period} + \text{Accounts Receivable period} - \text{Accounts Payable period}$). The other reason that businesses should not pay invoices before they are due is that they are foregoing the opportunity cost of using the cash that was used to pay the inventory. The cash could be earning a return as a marketable security until the time that the invoice is due.

Suppose DirectJet Airlines has an invoice for \$10,000 from one of its parts suppliers that is due in 20 days. What would be the opportunity cost if the airline's investments in marketable securities have an annual return of 5%? This cost is calculated below:

Opportunity Cost of Early Invoice Payment

$$\text{Opportunity Cost} = (\text{Amount of invoice} \times \frac{\text{annual yield}}{360} \times \text{days paid early})$$

$$\text{Opportunity Cost} = (\$10,000 \times \frac{.05}{360} \times 20)$$

$$\text{Opportunity Cost} = \$27.78$$

While losing \$27.78 of investment return does not seem like a lot of money for a business, these amounts add up over time as businesses may receive hundreds or thousands of invoices a year. Taking advantage of credit terms is an easy way for a business to increase returns on investments and thereby, create a better financial position for the company.

The second method by which airlines and other companies can take advantage of terms of credit is by utilizing cash or early payment discounts offered by suppliers. Assume that the terms of credit were different for DirectJet Airlines' parts invoice, so that that DirectJet received a 2% cash discount for paying twenty days early. The question becomes: would the cash discount provide enough savings to compensate for the opportunity cost of investing the cash. The difference is calculated below:

Savings from Utilizing Cash Discount

$$\text{Savings} = \text{Cash discount} - \text{Opportunity cost}$$

$$\text{Savings} = (.02 * \$10,000) - \$27.78$$

$$\text{Savings} = \$200 - \$27.78$$

$$\text{Savings} = \$172.22$$

DirectJet should take advantage of the cash discount for early payment since it will net DirectJet \$172.22 in savings. Taking advantage of the cash discount not only eliminates current liabilities from the balance sheet, it also increases net working capital by the amount of the savings (cash discount – opportunity cost).

In this section we have discussed two seemingly opposite strategies; one in which companies should take the full payment period to pay off invoices, and the other which states that companies should pay early when a cash discount is involved. How does a company know which strategy to use? If a cash discount is not offered for early payment do not pay early. Paying early adds the opportunity cost of cash not being able to be invested over that time period. If a cash discount for early payment is offered, calculate the net savings of the cash discount (discount – opportunity cost). If net savings is positive, take advantage of the cash discount and pay early.

Inventory Control Models

To many businesses inventory represents a necessary evil. Businesses don't want to have stacks of inventory piled up in stores, warehouses or factories; however, businesses also know that if they do not have inventory available when customers want to purchase they will lose the sale. Inventory has costs associated with it and these are: the cost of purchasing the products from suppliers, the costs to place an order for inventory, the costs of holding the inventory and the costs of having a stock out (not having inventory available when a customer wants it). Inventory management then is the managing of inventory costs. Businesses want to be able to have enough inventories on hand to satisfy customer demand but at the same time keep inventory levels down to reduce costs.

Sometimes it is assumed that once the inventory has been purchased that the cost of the purchase is the only cost associated with inventory. However, in reality there are many other costs associated with holding inventory. Some of these are listed below:

Inventory Carrying (Holding) Costs

- **Cost of capital-** The cash used to pay for inventory that could be invested in capital projects or marketable securities
- **Taxes & Insurance-** Inventory is an asset therefore any inventory that is on the balance sheet incurs taxes for the company. Insurance may be taken out on inventory to protect against damage or theft.
- **Spoilage, Theft, Obsolescence-** While waiting to be sold inventory may spoil (become unusable) or fall victim to theft or obsolescence. Obsolescence occurs when new and better versions of the product or similar products become available to customers. For example, when Boeing introduced the 737NG, the 737 Classic became somewhat obsolete since the 737NGs had better fuel efficiency.
- **Cost of Storage-** Inventory must be stored somewhere and a company may need to pay rent for a storage facility. In addition there must be employees to man the storage facility and move inventory. Also, security guards may also be hired to protect the company from theft of inventory. Increased wages for the manpower associated with holding inventory can be a major cost for a company.

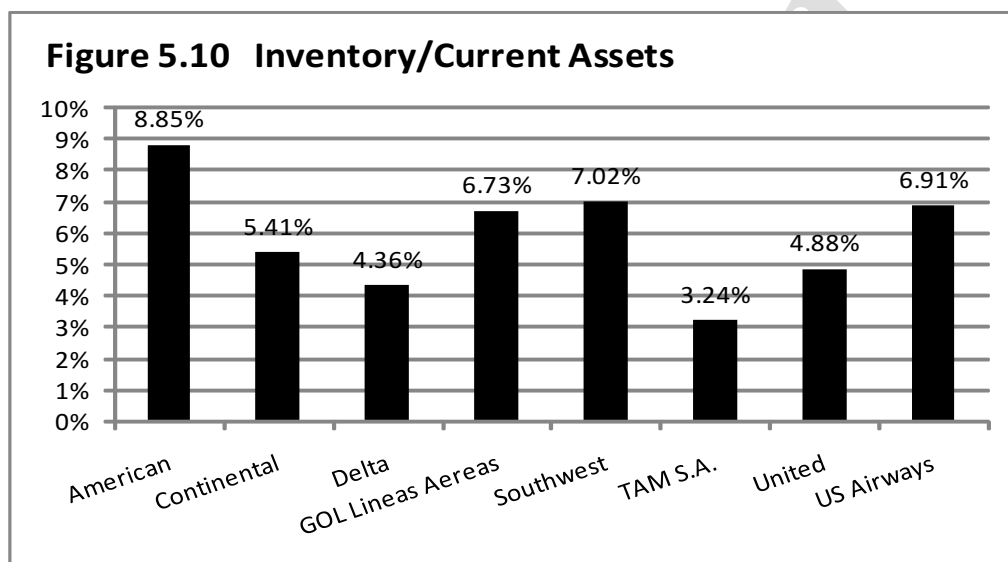
In addition to holding costs, businesses also incur ordering costs each time they order inventory. The cost of ordering inventory arises from the fact that it takes the time of management, the purchasing department, or some other employee of the company to fill out the order forms, inspect the inventory for damage when it arrives and to pay the bill for the inventory when it comes due. In addition suppliers may charge an order processing fee with each order.

But airlines don't have a physical product to sell; air travel is a service, so airlines don't have to deal with inventory issues, right? In a sense airline seats are inventory, but a very perishable inventory. Once a flight leaves with empty seats, those seats can no longer be filled. While the number of seats on an airplane is relatively fixed, airlines can carry too many seats in their inventory; we call this overcapacity. That is, there may be too many planes with unfilled seats and this can be quite costly. In addition, many of the support activities of an airline must carry inventory. The maintenance department must carry spare parts to have them available if an aircraft needs a new part. Therefore, the maintenance department of an airline must make critical

decisions about inventory levels of spare parts. Also, airlines must make inventory decisions on how much food and beverage to carry for in-flight service. In table 5.9 and figure 5.10 we show the percentage of current assets that inventory consists of for the eight airlines examined in the previous tables:

Airline	Inventory (Millions)	Current Assets (Millions)	Inv./CA	Inv./Sales
American	\$525	\$5,935	8.85%	2.21%
Continental	\$235	\$4,347	5.41%	1.54%
Delta	\$388	\$8,904	4.36%	1.71%
GOL Lineas Aereas	\$119	\$1,767	6.73%	4.27%
Southwest	\$203	\$2,893	7.02%	1.84%
TAM S.A.	\$92	\$2,840	3.24%	2.00%
United	\$237	\$4,861	4.88%	1.17%
US Airways	\$163	\$2,359	6.91%	1.33%
Average:	\$245	\$4,238	5.92%	2.01%

Source: 2008 10-K SEC Filings except GOL and TAM, GOL and TAM data is for 2007



In the remainder of the chapter we present three inventory control models or methods:

1. Economic Order Quantity (EOQ)
2. Just-In-Time (JIT)
3. ABC Inventory Control

1. Economic Order Quantity (EOQ)

Several inventory methodologies determine when to reorder and most of these rely on mathematical models to handle these processes. Businesses must make a tradeoff between the costs of ordering inventory and the costs of holding inventory. This tradeoff process is captured in the economic order quantity model. The economic order quantity (EOQ) model uses the same formula as the Baumol cash management model we discussed earlier in the chapter:

<p>EOQ Model</p> $EOQ = \sqrt{\frac{2 \times C_o \times A}{C_h}}$ <p><i>Where :</i></p> <p>C_o = ordering cost (per order)</p> <p>C_h = holding cost (per unit)</p> <p>A = annual demand</p>
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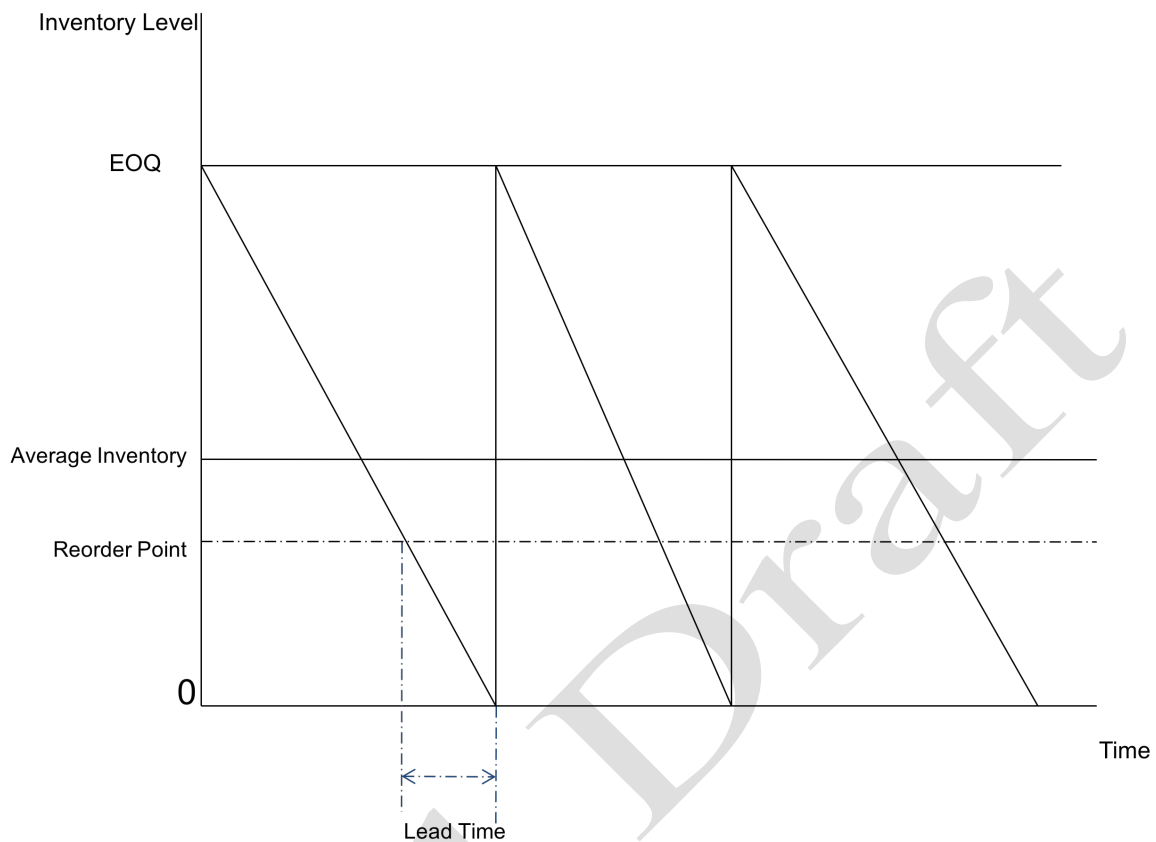
There are several assumptions that must be fulfilled to use of the EOQ model and these are:

Assumptions of the EOQ model:

- All values are known with certainty and are constant over time.
- Inventory usage is uniform over time.
- Carrying costs change proportionally with changes in inventory levels.
- All ordering costs are fixed on a per order basis.

A diagram of the EOQ model is shown in figure 5.11:

Figure 5.11 Economic Order Quantity (EOQ) Inventory Model



In order to demonstrate the economic order quantity model we again look at DirectJet Airlines:

Example: Assume that airline seats have movable parts (recline mechanism) and are often in need of replacement due to malfunction or wear and tear. DirectJet anticipates that 2000 seats will need to be replaced during a typical year. The cost of an airline seat is \$1000 and the holding cost is 20% of the cost per seat. Each order for airline seats from the manufacturer of the seats costs DirectJet \$500. Determine the economic order quantity. Using the EOQ equation we have the following calculation:

$$EOQ = \sqrt{\frac{2 \times C_o \times A}{C_h}}$$

$$EOQ = \sqrt{\frac{2 \times 500 \times 2000}{0.2 \times 1000}} = 100 \text{ seats}$$

- DirectJet should order 100 airline seats at a time from the seat manufacturer.

If we know the economic order quantity we can determine other important information regarding a company's inventory position and ordering pattern. The average inventory, number of orders the company places for the product per year, and the total inventory cost of the product can all be determined:

$$\begin{aligned}\text{Average Inventory} &= \frac{Q}{2} \\ \text{Number of orders per year} &= \frac{A}{Q} \\ \text{Total Holding Cost (THC)} &= C_h \times \frac{Q}{2} \\ \text{Total Ordering Cost (TOC)} &= C_o \times \frac{A}{Q} \\ \text{Total Inventory Cost (TIC)} &= \text{THC} + \text{TOC} \\ \text{TIC} &= C_h \times \frac{Q}{2} + C_o \times \frac{A}{Q}\end{aligned}$$

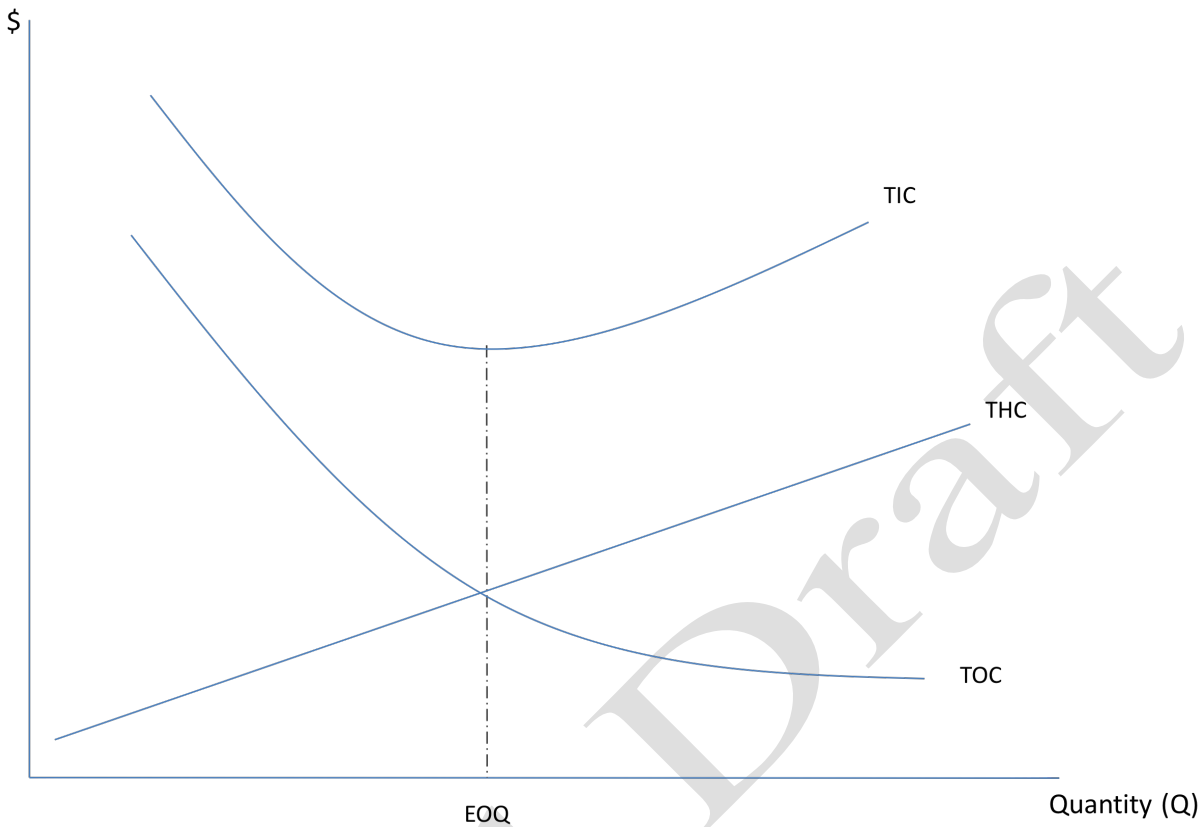
When the economic order quantity is used as the quantity ordered (Q), total holding cost (THC) and total ordering cost (TOC) are equal to each other (Ross, Westerfield & Jordan, 2008).

$$\text{THC} = \text{TOC}$$

$$\text{When } Q = \text{EOQ}$$

At the point where THC and TOC are equal the total inventory cost is minimized as shown in figure 5.12:

Figure 5.12 Total Inventory Cost



Determining EOQ with Quantity Discounts

Returning to our previous example of DirectJet Airlines ordering spare airline seats, what should DirectJet do if the seat manufacturer offers a \$100 discount per seat on orders of at least 150 seats? Should DirectJet increase their order quantity to 150 or keep the EOQ of 100 seats? In order to determine this simply compare the total inventory cost (TIC) under each scenario and choose the order quantity which minimizes cost.

$$\text{Total Inventory Cost (TIC)} = C_h \times \frac{Q}{2} + C_o \times \frac{A}{Q}$$

$$\text{Total Inventory Cost (TIC)}_{100 \text{ seats}} = (0.2 \times \$1000) \times \left(\frac{100}{2}\right) + \$500 \times \left(\frac{2000}{100}\right) = \$20,000$$

$$\text{Total Inventory Cost (TIC)}_{150 \text{ seats}} = (0.2 \times \$900) \times \left(\frac{150}{2}\right) + \$500 \times \left(\frac{2000}{150}\right) = \$20,166.67$$

- DirectJet should stay with their EOQ of 100 seats since total inventory cost is \$20,000 compared to \$20,166.67 if it orders 150 seats at a time.

Reorder Point

Once an appropriate order quantity has been determined the next step in inventory management is to determine the reorder point. The reorder point is based on demand and the length of time of it takes from the time an order is placed to the time the order is received (lead time). Therefore the reorder point is the inventory level at which an order is placed to replenish inventory that has been used to fill customer demand.

The formula to determine the reorder point is:

$$\text{Reorder point} = \text{Demand} \times \text{lead time}$$

Returning to our airline seats example, if the lead time for spare airline seats is two weeks, at what inventory level should DirectJet reorder spare airline seats?

$$\text{Reorder point} = \text{Weekly Demand} \times \text{lead time}$$

$$\text{Reorder point} = \frac{A}{52 \text{ weeks/year}} \times 2 \text{ weeks}$$

$$\text{Reorder point} = \frac{2000}{52} \times 2 \approx 77 \text{ seats}$$

- DirectJet should place their order for the EOQ of 100 seats when their inventory level reaches 77 seats.

In order to protect against stock outs some businesses implement an inventory policy that incorporates the element of safety stock. Safety stock is additional inventory that is carried to insure that when there is customer demand the product will not be out of stock. Safety stock is common in businesses because demand is not always constant. Airline maintenance is a great example of the fluctuations in demand. A part for an engine may need to be replaced on five different engines in one week but not needed on any engines the next week. Airlines may incorporate safety stock into parts inventory to ensure that the part will always be available. Because additional inventory is being held; the use of safety stock increases inventory holding costs and, subsequently, the total inventory cost. In addition, the reorder point is also increased by the amount of safety stock. The formula changes as follows:

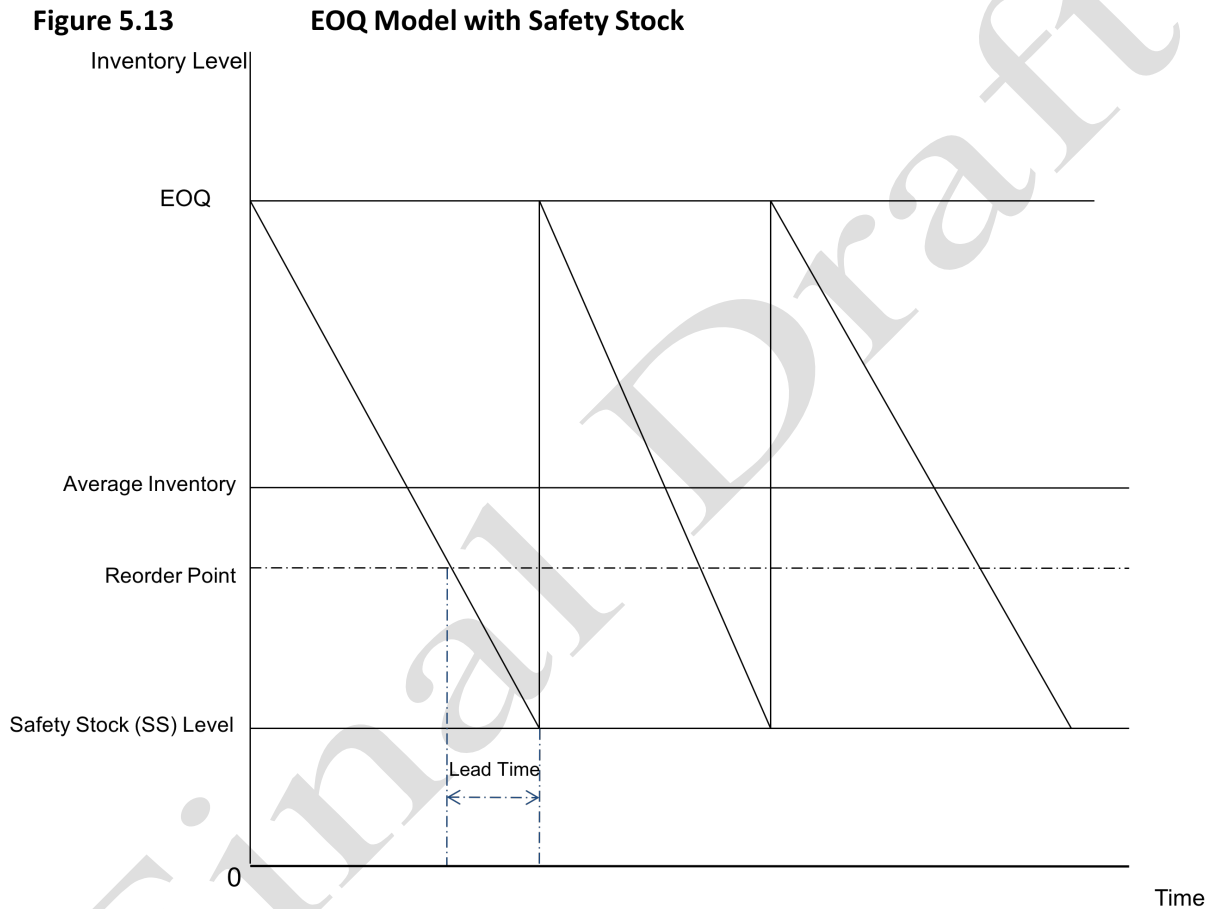
Total Holding Cost with Safety Stock (SS):

$$\text{Total Holding Cost (THC)} = C_h \times \left(\frac{EOQ}{2} + SS \right)$$

Reorder Point with Safety Stock (SS):

$$\text{Reorder point} = (\text{Demand} \times \text{lead time}) + SS$$

Figure 5.13 shows the EOQ model with the addition of safety stock:



2. Just in Time (JIT):

In any inventory control model, the basic principle is that inventory has to be replenished. Other inventory management methods besides the EOQ model can be used; these methods include a Just-In-Time (JIT) system and an ABC inventory analysis. JIT is based on material planning and control and elimination of waste. The basic elements of JIT were developed by

Toyota in the 1950's, and became known as the Toyota Production System (TPS).⁷ In a JIT system a business works closely with suppliers to ensure that inventory arrives only when it is needed to satisfy customer demand. The goal of a JIT inventory system is to operate without holding inventory or by holding as minimal inventory as possible. In a JIT environment each unit is organized so that parts arrive for the next job just when the others are completed, and therefore, the manufacturing process proceeds quickly. One prominent example of a JIT system is Dell Computers. Dell works closely with suppliers to reduce lead time and only orders computer components based on actual customer orders for computers (Woodgrange Technologies, 2007). There are three components that are necessary to implement a JIT system:

- Close coordination with suppliers
- Consistent quality production (no waste)
- Near zero lead time

Just as JIT has many strong points, there are also weaknesses as well. In this model everything is interdependent and each process relies on all the others (Greenberg, 2002). This means that, if one process fails, then all others fail as well. However if a high degree of reliability in the individual processes can be achieved then just-in-time is a source of great strategic advantage and can provide large savings. Therefore, there are a great number of companies and industries that have implemented JIT inventory systems.

3. ABC Inventory Control Model

An ABC inventory system classifies different items in a company's inventory into three different categories that are based on the cost, importance and frequency of use of each inventory item. In an ABC inventory system, inventory that is worth a greater dollar amount and is of great importance to the company is placed in the A category (the category with the highest level of oversight and control). Less important inventory items are then categorized together and inventory levels are monitored less closely (Block and Hirt, 2005). The ABC model is an inventory management model where the inventory is divided into three categories:

- **A Category-** Inventory that has the highest value, usage or importance to the company. Inventory levels of "A" items are kept higher and are monitored more closely.

⁷ Chase, Jacobs, and Aquilano, Operations Management, 11th edition, Irwin/McGraw-Hill

- **B Category-** Inventory items that have less importance, value or demand than the A items. There is less control and monitoring of inventory levels than the A category.
- **C Category-** Inventory items that have the lowest value or importance. For these items there is minimal control and monitoring of inventory levels.

Many airline maintenance departments find that the ABC inventory approach works best for them. Critical aircraft parts are placed in the A category and inventories of these parts are kept high and monitored daily or weekly. More common, less-expensive items like nuts and bolts may be put in the C classification and placed in a bin for easy access and/or retrieval. An order to replace C inventory items may not be made until the bin is near empty.

Summary

This chapter has discussed the basics of working capital and current asset management. The major topics discussed included: Cash management, inventory theory and operating cycle. Cash is the most important current asset to manage as it is used to pay current liabilities but at the same time, it does not yield a return to the company unless invested. Other current assets, such as accounts receivable and inventory, must also be managed effectively since insufficient management of accounts receivable and inventory can result in additional costs that airlines and other businesses should avoid.

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