FIN 2704/2704X

Week 11 Slides

Working Capital

Learning objectives

Understand a firm's working capital and its sources and uses of cash

Introduction to Working Capital

- Firms need *cash to pay for all their day-to-day activities*. They have to pay wages, pay for raw materials, pay bills and so on. The money available to them to do this is known as the firms' **working capital**.

- A company can be endowed with assets and profitability but short of ***liquidity*** if its assets cannot readily be converted into cash.

- **Positive working capital** is required to ensure that a firm is able to continue its operations and that it has sufficient funds to *satisfy both maturing short-term debt and upcoming operational expenses*.

- **Working capital management** refers to *choosing and controlling the levels and mix of cash, marketable securities, receivables and inventories*, as well as the different types of short-term financing.

Working Capital Terminology

- **Gross working capital:** total current assets.
- **Net working capital:** current assets minus current liabilities.
- **Net operating working capital** (NOWC): current assets minus *non-interest* bearing current liabilities.

NOWC = Operating CA – Operating CL

= (Cash + Inv. + A/R) – (Accruals + A/P)

- **Working capital policy:** *deciding the level of each type of current asset to hold, and how to finance* current assets, i.e., cash management, inventory management, receivables management.

Recall the Balance Sheet Identity (Lecture 2)

Assets = Debt + Equity

Current assets + fixed assets = current liabilities + long-term debt + equity

- Net working capital + fixed assets = long-term debt + equity
- Cash + other CA – CL + fixed assets = long-term debt + equity

Therefore

- Cash = equity* + long-term debt + current liabilities – current assets other than cash – fixed assets

Equity Includes **Retained Earnings which is increased by Net Income - Dividends*

Recall: Sources and Uses of Cash

- **Sources**
  - ***Increasing*** long-term debt, equity *or* ***current liabilities***
  - ***Decreasing*** fixed assets *or* ***current assets*** (other than cash)
- **Uses**
  - ***Decreasing*** long-term debt, equity *or* ***current liabilities***
  - ***Increasing current assets*** (other than cash) *or* fixed assets

Summary

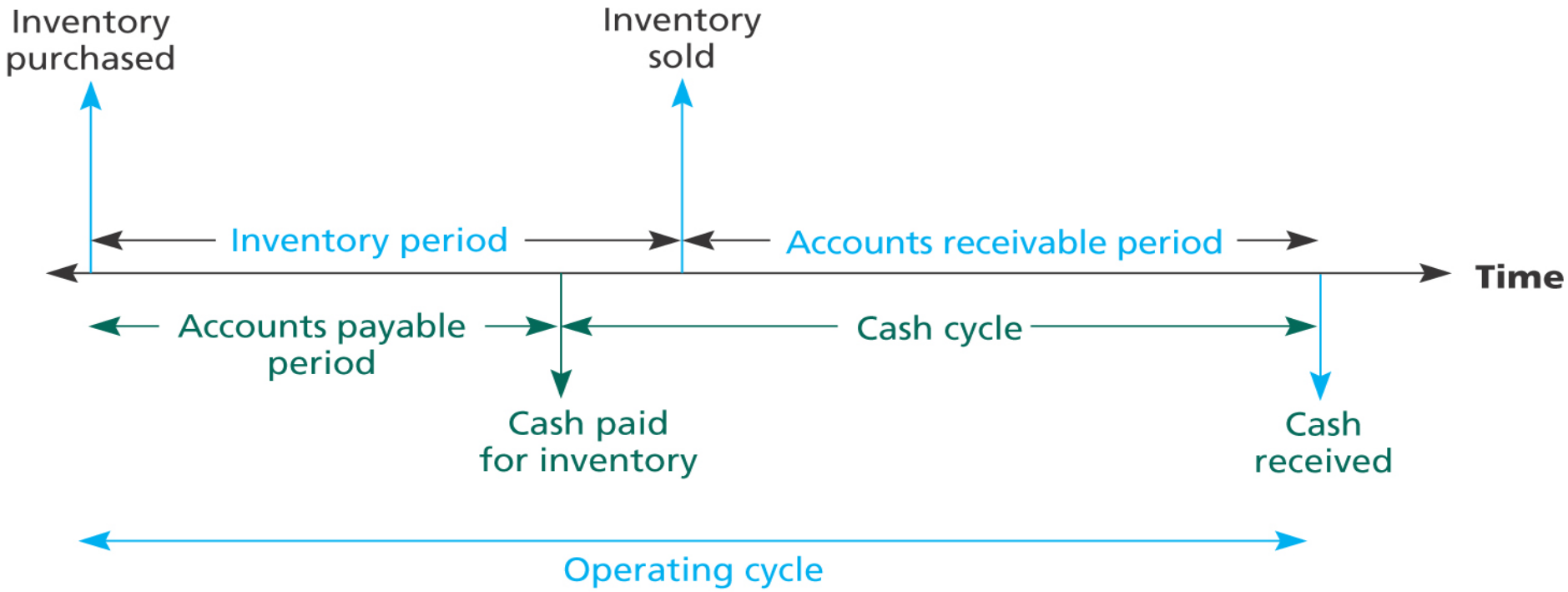
- Working capital:
  - Positive working capital
  - NOWC
  - Working capital management & policy
- Review of the balance sheet identity
- Sources and uses of cash

Operating Cycle & Cash Conversion Cycle

Learning objectives

- Understand what an operating cycle is
- Understand what a cash conversion cycle is

The Operating Cycle



The operating cycle is the time period from inventory purchase until the receipt of cash. (The operating cycle may not include the time from placement of the order until arrival of the stock.) The cash cycle is the time period from when cash is paid out to when cash is received.

The Operating Cycle

- **Operating cycle** – time between purchasing the inventory and collecting the cash from selling the inventory.
- **Inventory period** – time required to purchase and sell the inventory.
- **Accounts Receivables period (DSO)** – time to collect on credit sales.

Operating cycle = Inventory period + Accounts receivables period

Accounts Payable Period

- **Accounts Payable Period**
  - **Payables deferral period:** time between purchase of inventory and payment for the inventory
- **Payables Turnover =**

$$\frac{\text{Total Purchases from Suppliers}}{\text{Average Payable}} = \frac{\text{COGS} + \text{End Inventory} - \text{Beginning Inventory}}{\text{Average Payable}}$$

- **Accounts Payable Period =**

$$\frac{365}{\textit{Payables Turnover}}$$

Cash (or Cash Conversion) Cycle

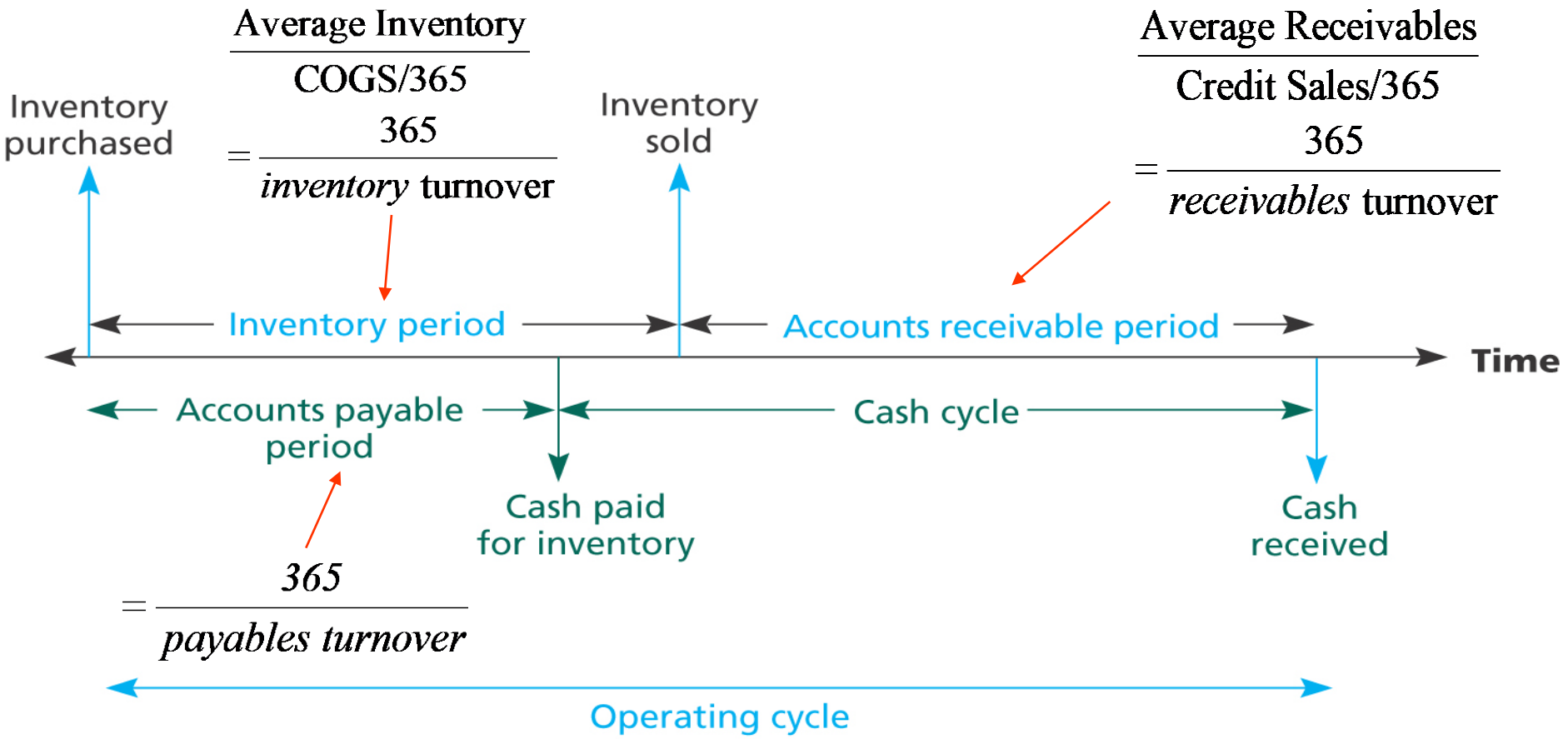
- Difference between when we receive cash from the sale and when we have to pay for the inventory
- Time period for which we need to finance our inventory

Cash conversion cycle

= Operating cycle – Accounts payables period

- Minimizing the ***cash cycle*** minimizes the amount of external financing the firm has to raise to fund current operations.

The Operating Cycle



The operating cycle is the time period from inventory purchase until the receipt of cash. (The operating cycle may not include the time from placement of the order until arrival of the stock.) The cash cycle is the time period from when cash is paid out to when cash is received.

Example: Recall last week's JAZ Inc.

Avg.	JAZ	Ind.
Current	2.25x	1.75x
Debt/Assets	58.76%	50.00%
Turnover of cash & securities	16.67x	22.22x
DSO (days)	45.63	32.00
Inv. Turnover	4.82x	7.00x
F. A. turnover	11.35x	12.00x
T. A. turnover	2.08x	3.00x
Profit margin	2.07%	3.50%
ROE	10.45%	21.00%

How Does JAZ's Working Capital Policy Compare With Its Industry?

- ***Working capital policy*** ⇨ reflected in (i) current ratio, (ii) turnover of cash and securities, (iii) inventory turnover, and (iv) accounts receivable turnover (DSO).
- ***These ratios indicate JAZ has large amounts of working capital relative to its level of sales***. JAZ is either very conservative **or** inefficient.

- A *conservative* (relaxed) policy may be appropriate if it leads to greater profitability. However, JAZ is not as profitable as the average firm in the industry. This suggests the company has excessive working capital.

Cash Cycle for JAZ Inc.

CC = Inventory period + Accounts Receivable period – Accounts payable period

CC = $\frac{\text{Days per year}}{\text{Inv. Turnover}}$ + $\frac{\text{Days per year}}{\text{Rec. Turnover}}$ – Accounts payable period

CC = $\frac{365}{4.82}$ + 46 – 30

CC = 76 + 46 – 30

CC = 92 days.

May be estimated by the credit terms provided by suppliers

Carrying vs. Shortage Costs

- Managing short-term assets involves a ***trade-off*** between carrying costs and shortage costs
  - ***Carrying costs*** – increase with *increased* levels of current assets, the costs to store and finance the assets
  - ***Shortage costs*** – decrease with *increased* levels of current assets, the costs to replenish assets
    - Trading or order costs
    - Costs related to safety reserves, i.e., lost sales and customers and production stoppages

Example: Small businesses suffer as India's bruised banks sit on deposits

Businessman Vineet Pandey has 500 housekeepers, security guards, electricians and plumbers on his books, servicing offices in India's booming financial metropolis Mumbai. ***He would love to hire more to keep up with demand, but cannot get a bank loan.***

Pandey, 36, recently ***had to turn away an order*** that would have created 100 new jobs and helped his firm, Kaarya Facilities, expand its $1.6 million in annual sales, ***after his credit application to a state-run bank in January went unanswered.***

A mountain of bad debt in India's banking system has led to a prolonged credit crunch that is inflicting most pain on small- and medium-sized enterprises (SMEs) such as Pandey's that depend upon banks for their day-to-day working capital and longer-term borrowing needs.

- Reuters, 16 May 2017

Summary

- Operating cycle
- Cash conversion period
- Trade-off between carrying costs and shortage costs

Cash Management

Learning objectives

- Understand why firms' hold cash
- Understand the principles of cash management

Cash

As Cash doesn't earn a profit, why hold Cash?

1. **Transactions** – must have some cash to operate.
2. **Precaution** – "safety stock". Reduced by line of credit and marketable securities.
3. **Compensating balances** – for loans and/or services provided.
4. **Speculation** – to take advantage of bargains and to take discounts.

The Goal of Cash Management

- To meet the above objectives, especially to **have enough** cash for transactions, and to **yet not have excess** cash.

- To minimize the need for cash in transactions balances (in particular), precautionary, compensating balances and speculation/opportunities.

Ways To Manage Cash

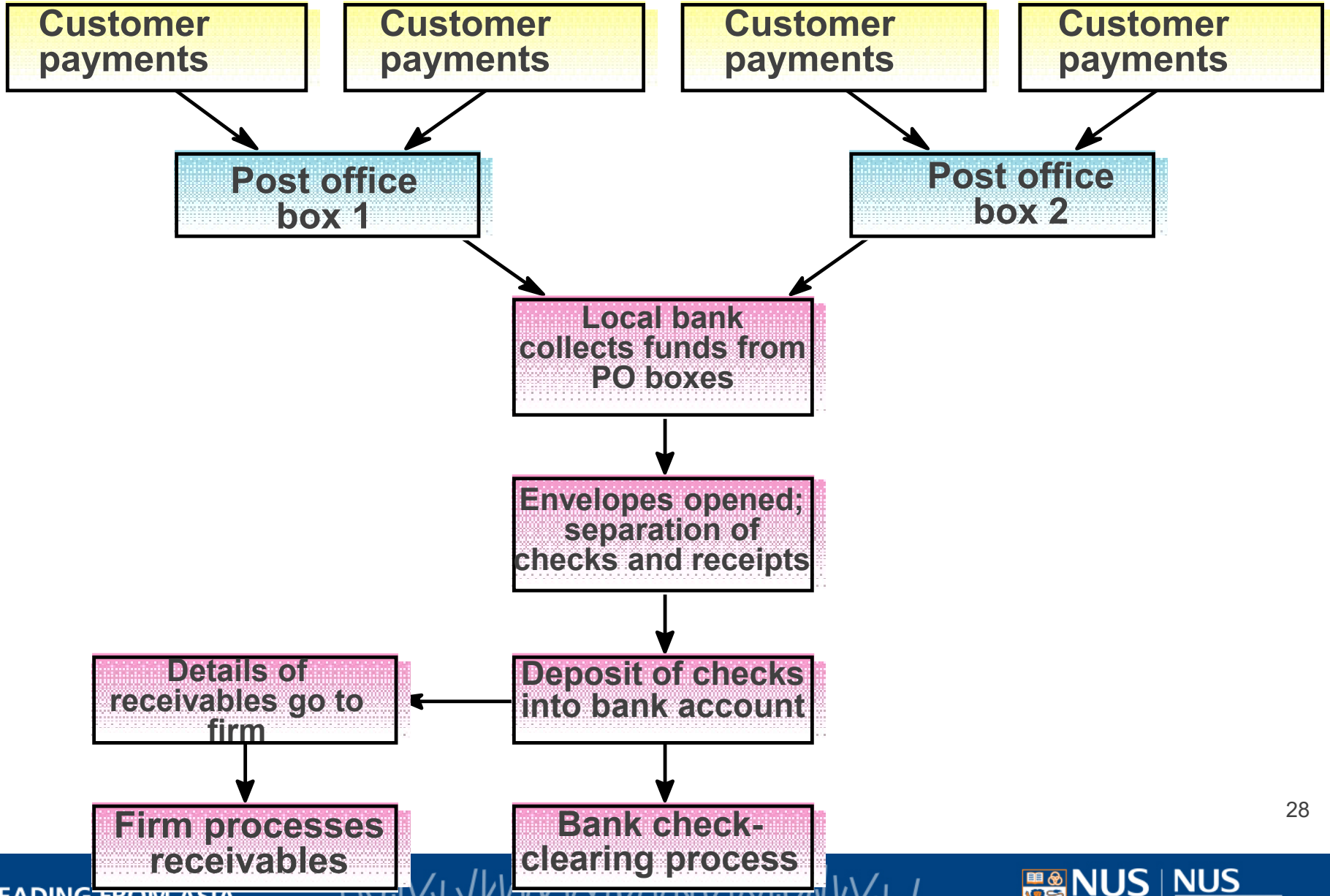
- Use a lockbox.
- Insist on wire transfers/digital payments from customers.
- Use a remote disbursement account.
- Reduce need for *"safety stock"* of cash.
  - Increase forecast accuracy
  - Hold marketable securities
  - Negotiate a line of credit

Lockbox

- A service offered to companies by banks whereby banks ***speed up*** the process of collecting, processing and ***making accessible customers' payments***.
- Traditionally, only involving checks. Incoming checks sent to PO boxes. Local banks collect and deposit checks into account. Bank provides daily record. Reduces time to process checks.
- Particularly relevant for companies and customers separated by great distances.
- ***Lockbox helps to turn accounts receivables as quickly as possible***.

- Lockbox provides a good example scenario in which to understand the value of shortening the cash cycle – reducing the time to process customers' payments shortens the cash cycle.

Overview of Lockbox Processing



Example: Corporate Banking & Cash Management

https://www.dbs.com.sg/sme/day-to-day/collections.page

https://www.dbs.com.sg/iwov-resources/forms/sgcorp/en/cash/electronic-banking/idealtm-connect/brochure.pdf

Excerpt:

"... Introducing DBS IDEAL™ Connect... gives you full access to ***the most comprehensive range of Cash Management products in the market***... IDEAL™ Connect ***simplifies your day-to-day business processes, such as making payments and receiving reports faster and easier...*** " Here's a list of transactions you can carry out with ease on IDEAL™ Connect :

Payments

- Domestic Transfers
  - Low value payment
  - High value payment
  - Account transfer (intra and inter-company)
  - Cheques and draft
- International Transfer
  - Telegraphic transfer

Reporting

- Bill Payment
- Direct Debit Authorisation (DDA)
  - *e*DDA via NETS Point of Sale terminal
  - *x*DDA via AXS Station
  - *i*DDA via DBS iBanking
- Lockbox (cheques processing)
- Credit Card Reconciliation
- Payment Advices
- Account Statement

The Future of Lockbox?

https://csbcorrespondent.com/blog/future-lock-box-and-how-banks-can-maximize-value

Excerpt:

"…In the long-term, lock box will all go digital, which will decrease the barrier to entry for many competitors and more non-banks will offer the service supported by virtual banks with a lower cost structure.

In addition, new payment methods, such as digital currencies and all mobile payments (payments not on the backbone of credit or debit cards) will need to be accommodated…

…More intelligent analytics, alerts, corporate financial management dashboards and a better risk interface covering both fraud and credit are on the horizon. Credit products will be integrated into payment platforms adding another dimension to lock box. Banks that build their systems now and make an ongoing investment will find that they will be able to bank a highly profitable customer almost anywhere in the world. Lock box, in our opinion, is one of the most critical products a bank can have…"

E.g. Traditional Lockbox

- A proposed single lockbox system will ***reduce*** collection time ***2 days*** on average
- Daily interest rate on T-bills = ***0.008%***
- Average number of daily payments to the lockbox is ***3,000***
- Average size of payment is ***$600***
- The processing fee is ***$0.08*** per check plus ***$10*** to transfer funds each day.
- What is the maximum up-front bank setup fee that would make this lockbox system acceptable?

Traditional Lockbox "Method 1"

- Benefits:

  Daily collections: 3,000 * $600 = $1.8M

  Increased bank balance = 2 * $1.8M = $3.6M

- Costs:

  Daily costs: (3,000 * $0.08) + $10 = $250

  PV = $250/0.00008 = $3.125M (the $250 daily cost is a perpetuity)

Any up-front bank setup fee less than $475,000 (in PV terms) would make this a positive NPV project.

Traditional Lockbox "Method 2"

- Benefits:

  Daily collections: 3,000 * $600 = $1.8M

  Increased bank balance = 2 * $1.8M = $3.6M

  Increased daily interest = $3.6M * 0.008% = $288

- Costs:

  Daily costs: (3,000 * $0.08) + $10 = $250

→Daily net benefit = $288 – $250 = $38

→NPV = $38/0.008% (perpetuity) = $475,000

Any up-front bank setup fee less than $475,000 (in PV terms) would make this a positive NPV project.

What Is "Float"?

- ***Float*** is the difference between cash in the bank account versus cash recorded in one's own accounting books

- **Float = Available Balance at Bank – Book Balance**

- If JAZ *collects checks in 2 days* but *those to whom JAZ writes checks don't process them for 6 days*, then JAZ will have *4 days of* ***net float***.

- If a firm with 4 days of net float writes and receives $1 million of checks per day, it would be able to operate with $4 million less capital than if it had zero net float.

Understanding Float

- ***Float*** – difference between **cash balance *recorded at the bank*** and the **cash balance recorded in the accounting *cash account***

- **Disbursement float**
  - Generated when a firm ***writes*** checks
  - Available balance at bank – book balance > 0

- **Collection float**
  - Checks ***received*** increase book balance before the bank credits the account
  - Available balance at bank – book balance < 0

- **Net float = Disbursement float + Collection float**

More on Float

- Net float

  = Disbursement float (+ve) + Collection float (-ve)

Think global transactions…

- Total Delay

  = Mailing Time + Processing Delay + Availability Delay

- Disbursement – what is within your control?

- Collection – what is within your control?

  ✓ Lockboxes reduce mailing time as well as processing delay

Example: Types of Float

- You have $3,000 in your checking account. You just deposited $2,000 and wrote a check for $2,500.
  - What is the *disbursement float*?
  - What is the *collection float*?
  - What is the *net float?*
  - What is your *book balance*?
  - What is your *available balance*?

Example: Types of Float

- Disbursement float is concerned with writing checks, hence the writing of a check of $2,500 will reduce the book balance to $500 ($3,000 – $2,500) but the bank balance remains at $3,000 due to the time delay:

  Available bal. at Bank – Book bal. = $3,000 - $500 = *$2,500.*

- Collection float is concerned with clearing of checks, hence the receipt and deposit of a check of $2,000 will increase your book balance of $3,000 to $5,000 while the bank balance remains at $3,000:

  Available bal. at Bank – Book bal. = $3,000 - $5,000 = *-$2,000.*

Net float = Disbursement float + Collection float
= $2,500 - $2,000 = ***$500.***

Book balance = $3,000 – $2,500 + $2,000 = ***$2,500.***

Bank Balance = ***$3,000***

Example: Measuring Float

- Size of float depends on the **dollar amount** and the **time delay**:

  Delay = mailing time + processing delay + availability delay

- Suppose you mail a monthly check for $1,000 and it takes 3 days to reach its destination, 1 day to process, and 1 day before the bank makes the cash available.

- What is the average *daily* float?
  - Method 1: (3+1+1) days * ($1,000)/30 days= $166.67
  - Method 2: (5days/30days)($1,000) + (25days/30days)($0) = $166.67

Example: Cost of Float

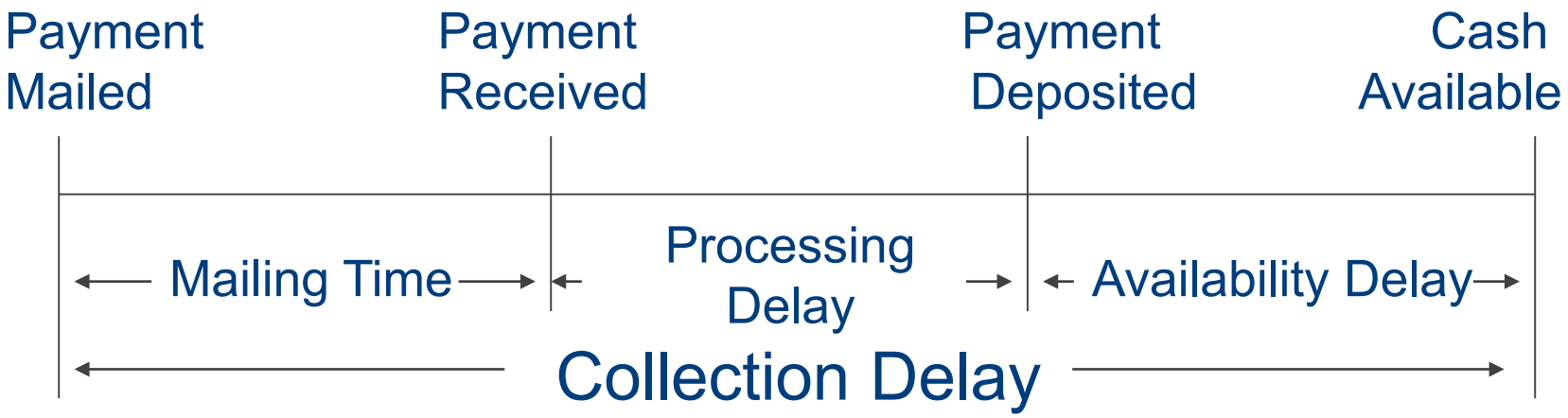
- **Cost of collection float** – opportunity cost of not being able to use the money.

- Similar to our first example: Suppose the average daily receipt is $3 million with a weighted average delay of 5 days.
  - What is the total amount unavailable (e.g. to earn interest)?
    - 5*$3 million = $15 million
  - What is the NPV of a project that could reduce the delay by 3 days if the cost is $8 million?
    - Immediate cash inflow = 3*$3 million = $9 million
    - NPV = $(9 – 8) million = $1 million

Cash Disbursements

- Slowing down payments can increase disbursement float – but it may not be ethical or optimal to do this.
- "Controlling" disbursements
  - Zero-balance account
  - Controlled disbursement account
- Stretch out accounts payable as long as possible. If a bill is due on the 13th, don't pay it on the 10th. If a company has enough clout, they can negotiate longer terms with vendors.

Cash Collection



One of the goals of float management is to try and reduce the collection delay.

Ways To Reduce Collection Delay

Turn receivables as quickly as possible by making it easy for customers to pay.

- Lockboxes
- Prepaid envelopes
- Set up payment transfer facilities
- Discounts, etc. may be utilized.

Cash Budget:

The Primary Cash Management Tool

- ***Purpose:*** Forecasts cash inflows, outflows, and ending cash balances. Used to plan loans needed or funds available to invest.

- ***Timing:*** Daily, weekly, or monthly, depending upon purpose of forecast. Monthly for annual planning, daily for actual cash management.

JAZ's Cash Budget for January and February

	Net Cash Inflows	
	Jan	Feb
Collections	$67,651.95	$62,755.40
Purchases	44,603.75	36,472.65
Wages	6,690.56	5,470.90
Rent	2,500.00	2,500.00
Total payments	$53,794.31	$44,443.55
Net CF	$13,857.64	$18,311.85

JAZ's Cash Budget

	Expected Cash Balance	
	Jan	Feb
Cash at start if no borrowing	$ 3,000.00	$16,857.64
Net CF	13,857.64	18,311.85
Cumulative cash	16,857.64	35,169.49
Less: target cash	1,500.00	1,500.00
Surplus (or Deficit)	$15,357.64	$33,669.49

What are some other potential cash inflows besides collections?

- Proceeds from the sale of fixed assets
- Proceeds from stock and bond sales
- Interest earned
- Court settlements

How could bad debts be worked into the cash budget?

- Collections would be reduced by the amount of the bad debt losses.
- For example, if the firm had 3% bad debt losses, collections would total only 97% of sales.
- Lower collections would lead to higher borrowing requirements or a lower surplus.

Back to JAZ's Forecasted Cash Budget

- *Assuming that the Target Cash Balance is $1,500*, the ***cash budget (for Jan. and Feb.) indicates the company is holding too much cash.***
- JAZ could improve its value by *either* investing cash in more productive assets, *or* by returning cash to its shareholders.
- If sales turn out to be considerably less than expected, JAZ could face a cash shortfall. *A company may choose to hold large amounts of cash if it does not have much faith in its sales forecast* (which is problematic of course), or if it is very conservative.
- It *might* be maintaining high cash, in part, to fund future investments.

Cash Management Example:

Happy Co. has a beginning cash balance of $200 on January 1. The firm had sales of $600 in December, and projected sales of $1200 in January and $800 in February. The cost of goods sold is equal to 70 percent of sales. Goods are purchased one month prior to the month of sale. The accounts payable period is 30 days and the accounts receivable period is 10 days. The firm has additional monthly cash expenses of $300. What is the projected ending cash balance at the end of January? Assume every month has 30 days.

Jan collections = (10/30)$600 + (20/30)$1200 = $1000

Jan disbursements for payables = 0.70($1200) = $840

Jan ending cash balance = $200 + $1000 - $840 - $300 = $60

Summary

- Cash management
  - Lock box
  - Float
- Cash budget

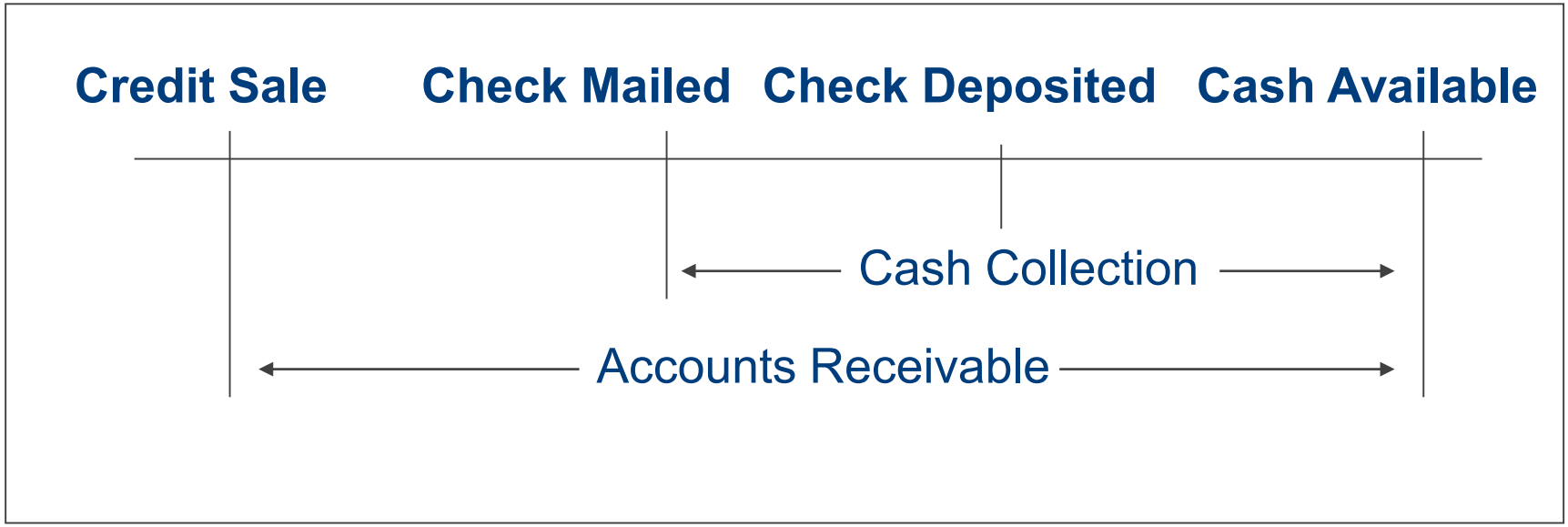
Receivable Management

Learning objectives

- Obtain an overview of receivable management and the effects of credit policy

Receivables Management

The Cash Flows from Granting Credit



Credit Management: Key Issues

- **Benefits** of granting credit: ***increases sales***
- **Costs** of granting credit:
  - Chance that customers won't pay ***(bad debt potential)***
  - ***Financing receivables***
- Credit management examines the ***trade-off*** between increased sales and the costs of granting credit

Accumulation of Receivables

The amount of accounts receivable outstanding at any given time is determined by 2 factors:

1. The volume of ***credit sales***
2. The average ***length of time*** between sales and collections

Account Receivable = Credit sales per day X Length of collection period

Monitoring the Receivables Position

- Days Sale Outstanding (DSO):

$$\text{DSO} = \frac{\text{Receivables}}{\text{Credit Sales per day}}$$

$$\text{Credit Sales per day} = \frac{\text{Annual Credit Sales}}{365}$$

- Aging Schedules: breaks down firm's receivables by age of account

Do JAZ's Customers Pay More Or Less Promptly Than Those Of Its Competitors?

- JAZ's DSO (45.6 days) is well above the industry average (32 days).
- JAZ's customers are paying less promptly.
- JAZ should consider tightening its credit policy in order to reduce its DSO.

Elements Of Credit Policy

Credit policy consists of 4 variables:

1. Credit period
2. Discounts for early payments
3. Credit standards
4. Collection policy

Terms of Sale

- Basic Form: 2/10 net 45
  - 2% discount if paid in 10 days
  - Total amount due in 45 days if discount not taken

- Buy $500 worth of merchandise with the credit terms given above
  - Pay $500(1 – 0.02) = $490 if you pay in 10 days
  - Pay $500 if you pay in 45 days

Terms of Sale

Pay full amount in 40 days

1. Credit Period

- How long to pay? Example: 3/15, net 40
- Shorter period reduces DSO and average A/R, but it may discourage sales

A 3% discount if paid within 15 days

2. Cash Discounts

- Lowers price; Example: 3/15, net 40
- Attracts new customers and reduces DSO.

Terms of Sale

3. Credit Standards

- Tighter standards tend to reduce sales, but reduce bad debt expense.
- Fewer bad debts reduce DSO

4. Collection Policy

- How tough?
- Tougher policy will reduce DSO but may damage customer relationships.

Example: Cash Discounts

- Finding the implied interest rate when customers do not take the discount

- Credit terms of 2/10 net 45
  - Period rate = 2 / 98 = 2.0408%

    Period rate = discount % / (100 – discount %)
  - Period = (45 – 10) = 35 days
  - 365 / 35 = 10.4286 periods per year

N = 1
PV = 98
FV = -100
CPT I/Y

- **EAR** = $(1.020408)^{10.4286} - 1 =$ **23.45%**

- The company essentially earns interest when customers choose to forgo discounts

Does JAZ Face Any Risk If It Tightens Its Credit Policy?

3/15, net 40 → 3/10, net 30

Yes, a tighter credit policy may discourage sales. Some customers may choose to go elsewhere if they are pressured to pay their bills sooner.

If JAZ succeeds in reducing DSO without adversely affecting Sales, what effect would this have on its Cash Position?

- ***Short run:*** If customers pay sooner, this increases cash holdings.

- ***Long run:*** Over time, the company would hopefully invest the cash in more productive assets, or pay it out to shareholders. Both of these actions would increase firm's value.

Credit Policy Effects

- ***Revenue Effects***
  - Delay in receiving cash from sales
  - May be able to increase price
  - May increase total sales
- ***Cost Effects***
  - Cost of the sale is still incurred even though the cash from the sale has not been received
  - Cost of debt – recall that the firm must finance receivables
  - Probability of nonpayment – some percentage of customers will not pay for products purchased
  - Cash discount – some customers will pay early and pay less than the full sales price

Example: Evaluating a Proposed Policy

- Your company is *evaluating a switch from a cash only policy to a net 30 policy*. The price per unit is $100 and the variable cost per unit is $40. The company currently sells 1,000 units per month. Under the proposed policy, the company will sell 1,050 units per month. The required monthly return is 1.5%.
- What is the NPV of the switch?
- Should the company offer credit terms of net 30?

Solution: Evaluating a Proposed Policy

- Incremental cash inflow (every month)
  - $(P - v)(Q' - Q) = (\$100 - \$40)(1{,}050 - 1{,}000) = \$3{,}000$
- ***Present value of incremental monthly cash inflow***
  - $[(P - v)(Q' - Q]/r = \$3{,}000/0.015 = 200{,}000$
- ***Cost of switching***
  - $PQ + v(Q' - Q) = \$100(1{,}000) + \$40(1{,}050 - 1{,}000) = \$102{,}000$
- **NPV of switching**
  - $-[PQ + v(Q' - Q)] + [(P - v)(Q' - Q]/r = -\$102{,}000 + \$200{,}000 = \$98{,}000$

Yes the company should switch.

Solution: Evaluating a Proposed Policy

	Month 1	2	3	4	OLD POLICY ...
Current Qty Sold, Q	1,000	1,000	1,000	1,000	
Price per unit, P	$ 100	$ 100	$ 100	$ 100	
Variable cost per unit, v	$ 40	$ 40	$ 40	$ 40	
Cashflow under old policy	$ 60,000	$ 60,000	$ 60,000	$ 60,000	

	Month 1	2	3	4	NEW POLICY ...
New Qty Sold, Q'	1,050	1,050	1,050	1,050	
Price per unit, P	$ -	$ 100	$ 100	$ 100	
Variable cost per unit, v	$ 40	$ 40	$ 40	$ 40	
Cashflow under new policy	$ (42,000)	$ 63,000	$ 63,000	$ 63,000	

Incremental Cashflow	$ (102,000)	$ 3,000	$ 3,000	$ 3,000

Short-Term Borrowing

Costs of Bank Loans - Example: Compensating Balance

We have a $500,000 line of credit with a 15% compensating balance requirement. The quoted interest rate is 9%. We need to borrow $150,000 for inventory for one year.

- How much do we need to borrow?
  - $150,000/(1 – 0.15) = $176,471
- What interest rate are we effectively paying?
  - Interest paid = $176,471*0.09 = $15,882
  - Effective rate = $15,882/$150,000 = 0.1059 or 10.59%

Summary

- Receivable management
- Credit policy
  - Cost and benefit of granting credit
  - Terms of sale
  - The effects of credit policy