

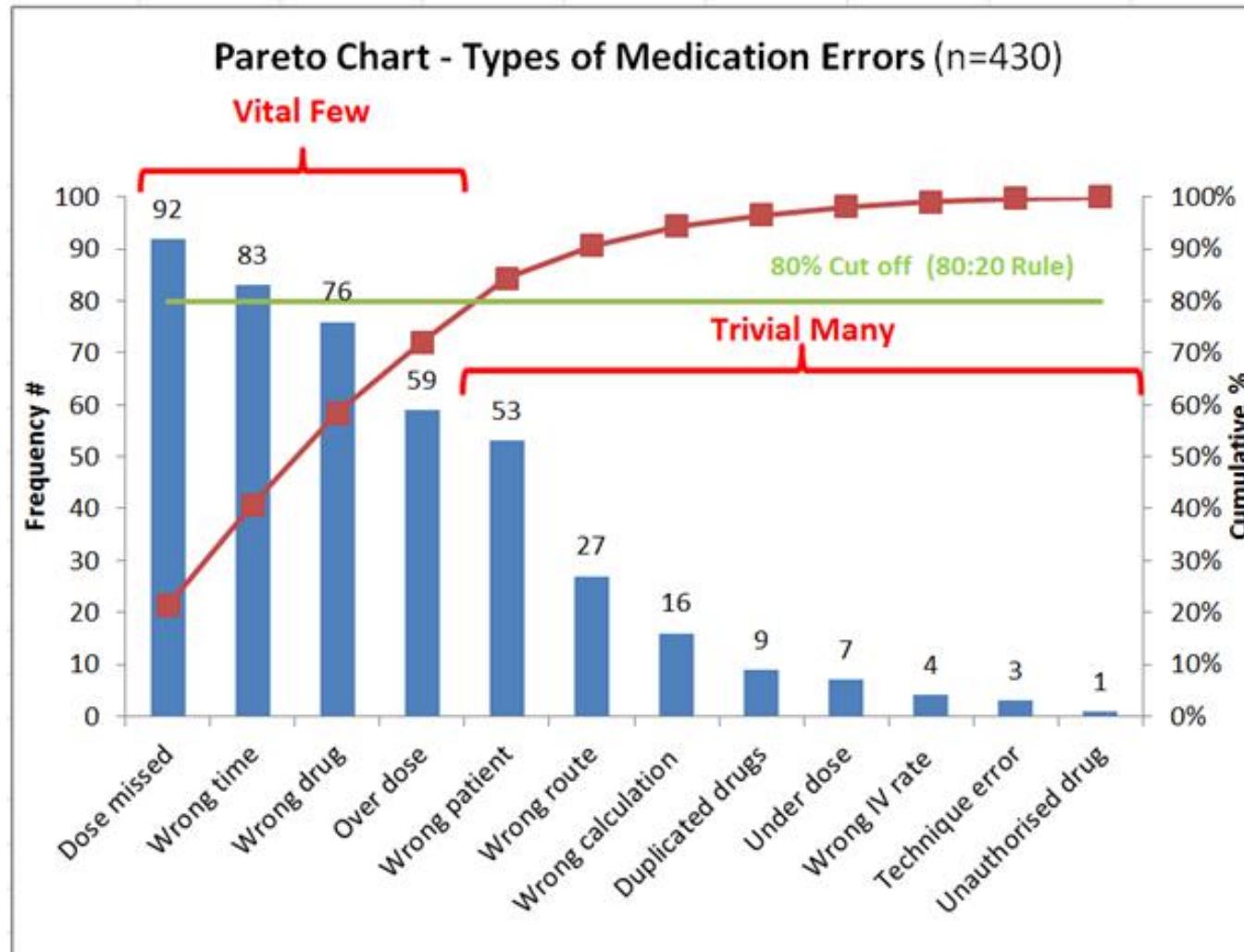
Introduction to the BDM course

What is the need for this course?

Majority of the data sets and analyses that we will come across will be from the space of business:

- *from within companies*
- *from the markets in which the companies operate*

Example 1: Use of Pareto charts



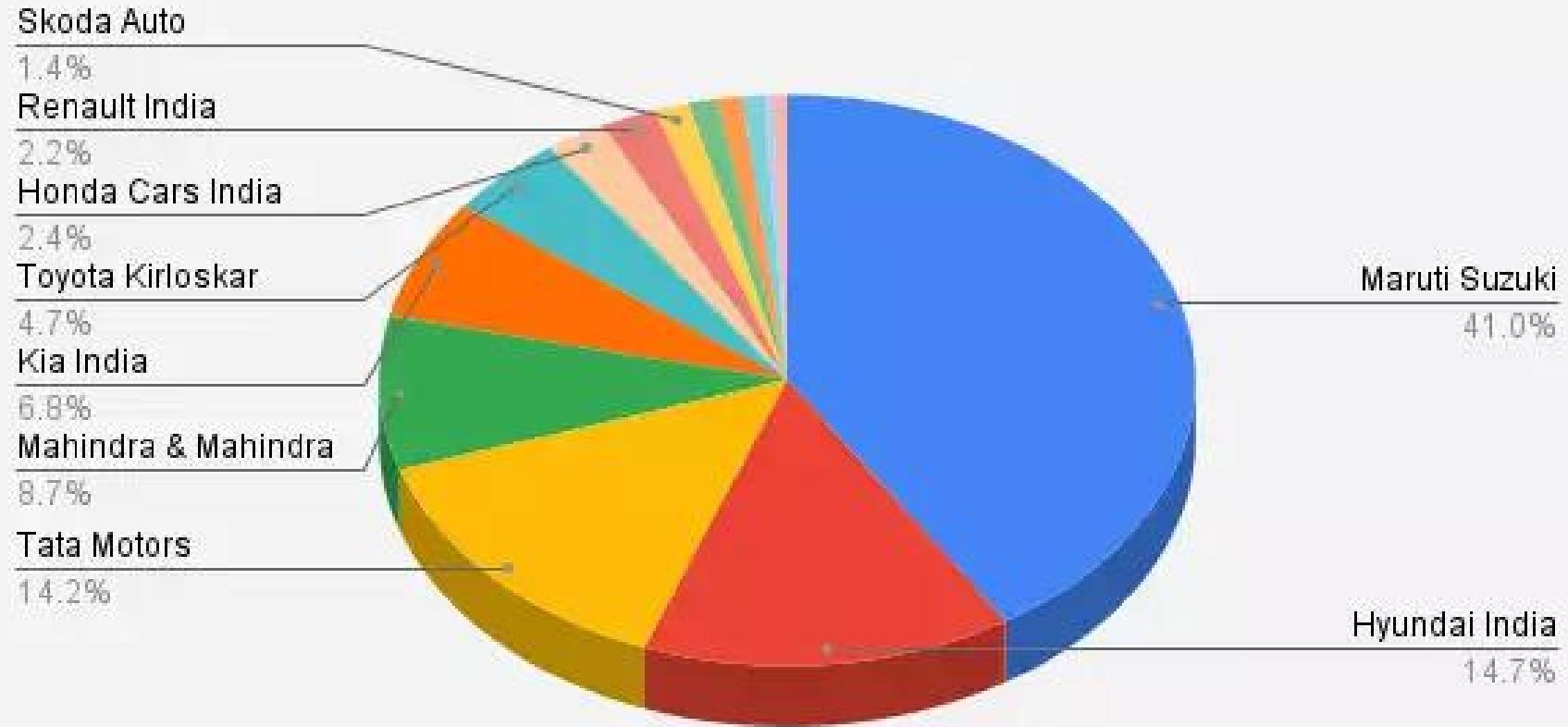
Using this chart, a pharma company can focus on remedies for the four most common types of medication errors that lead to lower performance of their drug.

To prepare a chart like this, it will need to collect data about medication error incidents from hospitals and other places.

In the chart shown 430 such data items were collected

Example 2: Use of pie charts

PV OEMs Market Share (April-Sep 2022)

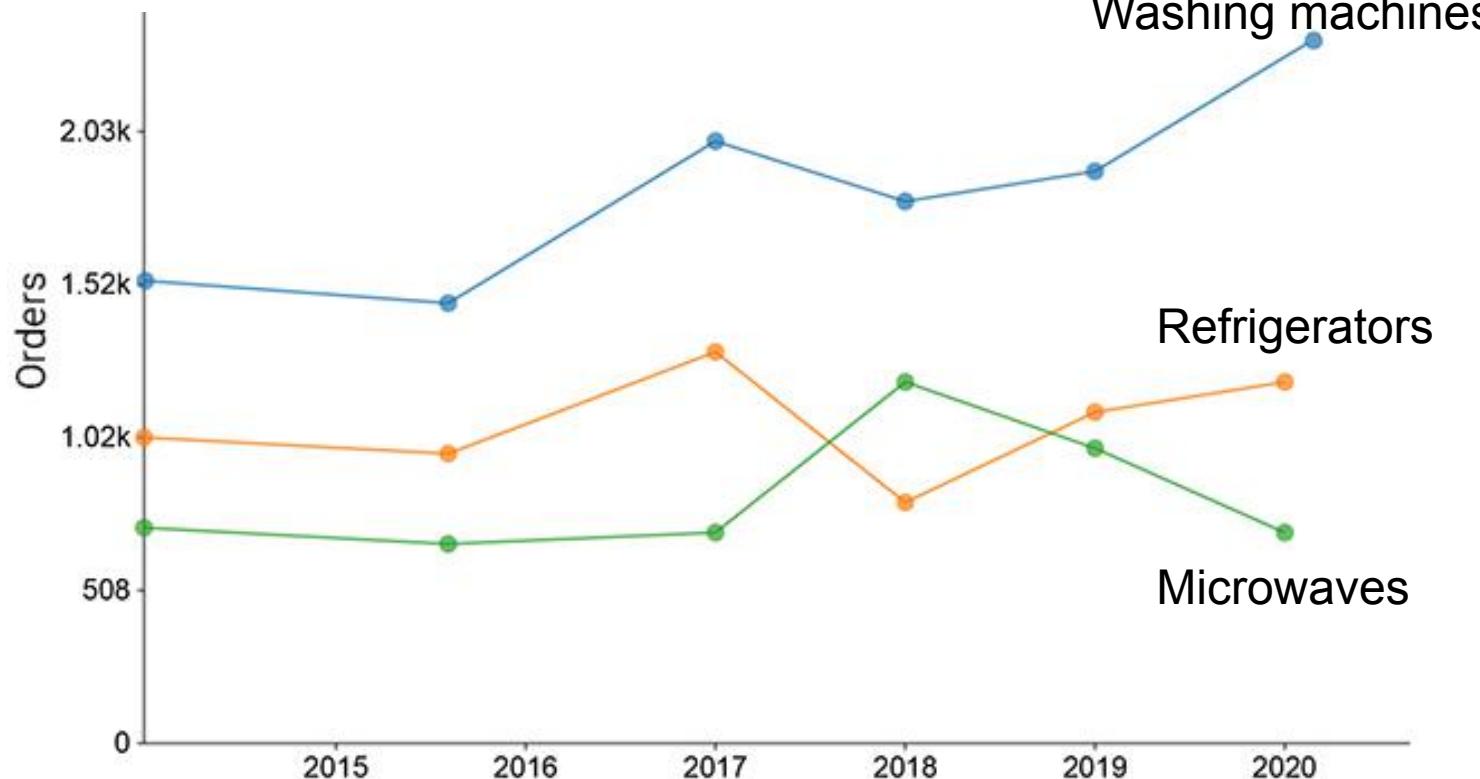


Using this chart, an auto company can determine where it stands with respect to its competitors

To prepare a chart like this, we need information about all cars sold during that period. This can be obtained from:

- Survey of dealers
- Ministry of road transport which registers these vehicles
- ...

Example 3: Use of trend charts

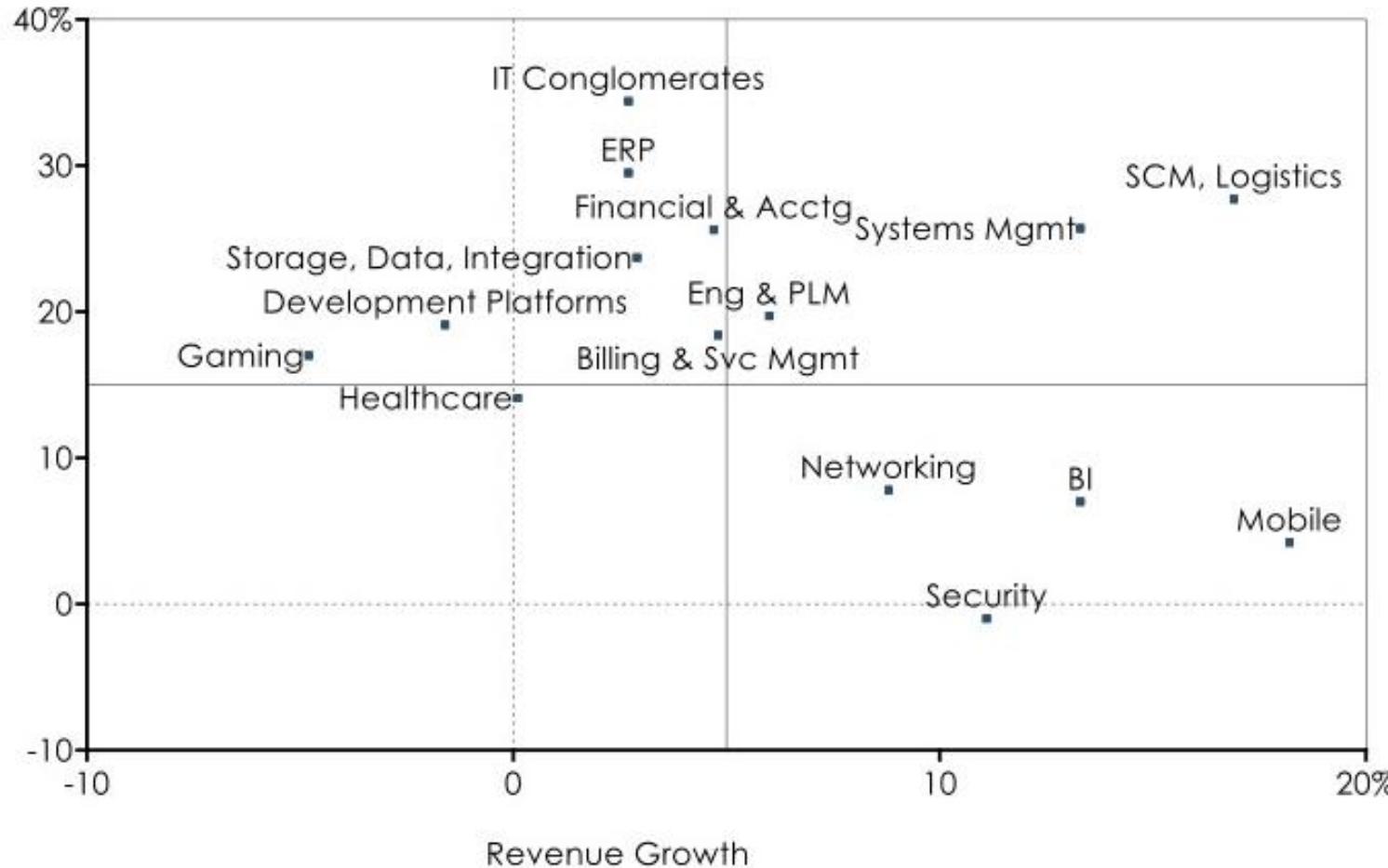


Using this chart, an electrical durables store can determine which items to stock

To prepare a chart like this, the store needs to analyse all the sales bills over several years

Example 4: Use of 2 x 2 scatter diagrams

Profit margin



Using this chart, a software product startup can determine which product area to get into

To prepare a chart like this, the startup needs access to sales and profit information of all the software companies over several years

Data sources for the 4 examples

Example

- Pareto chart of medication errors
- Pie chart of market share
- Trend chart of sales
- 2x2 scatter diagram of sales growth and profit margin

Data source

- Internal/External
- External
- Internal
- External

First 4 weeks of the course: Analysis of external data sources

Next 8 weeks of the course: Analysis of internal data sources through 4 case studies

The only tool we will use is a spreadsheet

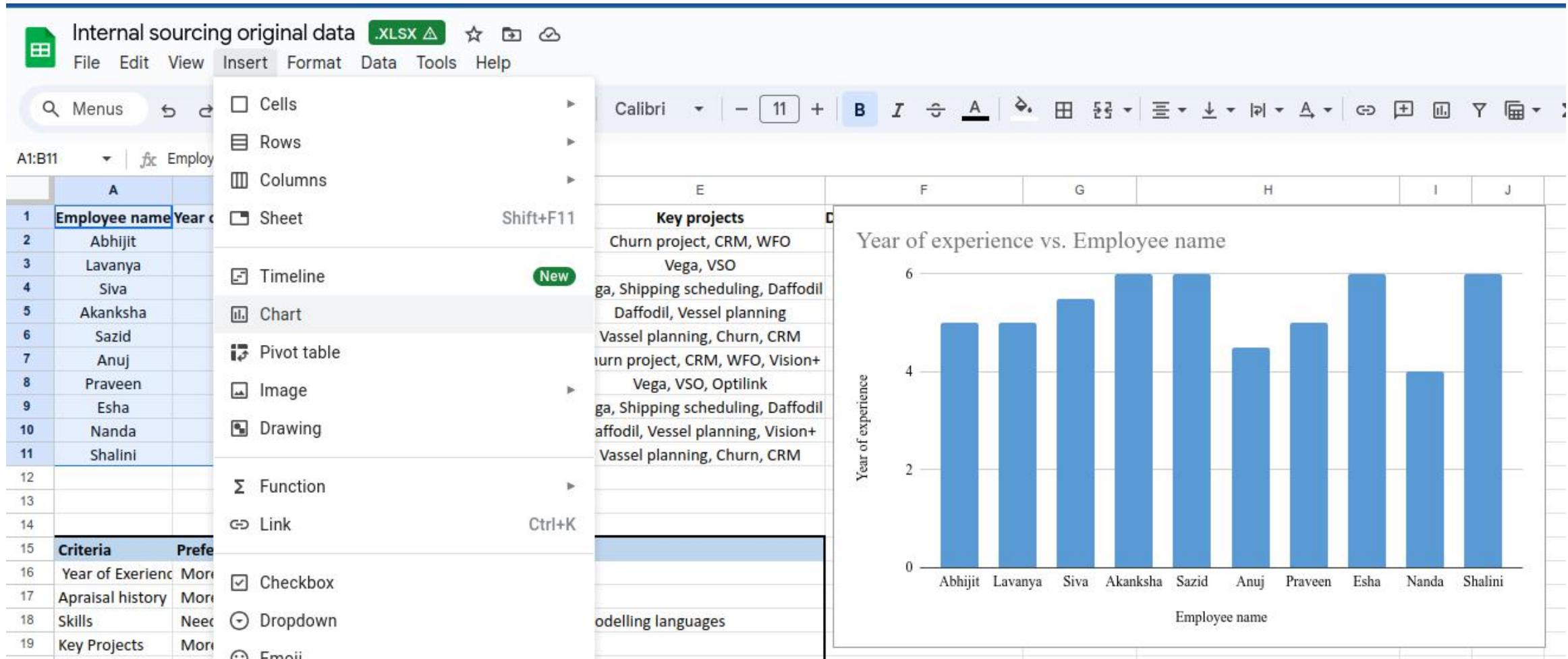
- Example spreadsheets: Microsoft Excel, Google sheets, ...

The screenshot shows a Microsoft Excel spreadsheet with the following data:

	A	B	C	D	E	F	G	H
1	Employee name	Year of experience	Appraisal history	Skills	Key projects	Duration in the current role	Bench duration	When the candidate will be available
2	Abhijit	5	0.8,0.8,0.8	C++/C#, Java,Tableau	Churn project, CRM, WFO	2	1	Saturday, August 28, 2021
3	Lavanya	5	0.75,0.8,0.8	Python, Java	Vega, VSO	2	1	Monday, August 30, 2021
4	Siva	5.5	0.7,0.7,1	R, Java	Vega, Shipping scheduling, Daffodil	2	0	Monday, September 13, 2021
5	Akanksha	6	0.75,0.8,0.85	Python, Java	Daffodil, Vessel planning	3	1	Monday, September 20, 2021
6	Sazid	6	0.75,0.8,0.8	C++/C#, Java	Vessel planning, Churn, CRM	3	1	Thursday, August 26, 2021
7	Anuj	4.5	0.8,0.85,0.85	C++/C#, Java,Tableau	Churn project, CRM, WFO, Vision+	2	0	Saturday, August 21, 2021
8	Praveen	5	0.75,0.85,0.8	Python, Java	Vega, VSO, Optilink	2	1	Sunday, August 29, 2021
9	Esha	6	0.75,0.8,0.8	Python, Java	Vega, Shipping scheduling, Daffodil	4	0.5	Tuesday, August 17, 2021
10	Nanda	4	0.7,0.7,1	R, Java, Tablue,C	Daffodil, Vessel planning, Vision+	2	0	Saturday, August 28, 2021
11	Shalini	6	0.7,0.7,0.75	C++/C#, Java	Vessel planning, Churn, CRM	4	0	Wednesday, September 22, 2021

The only tool we will use is a spreadsheet

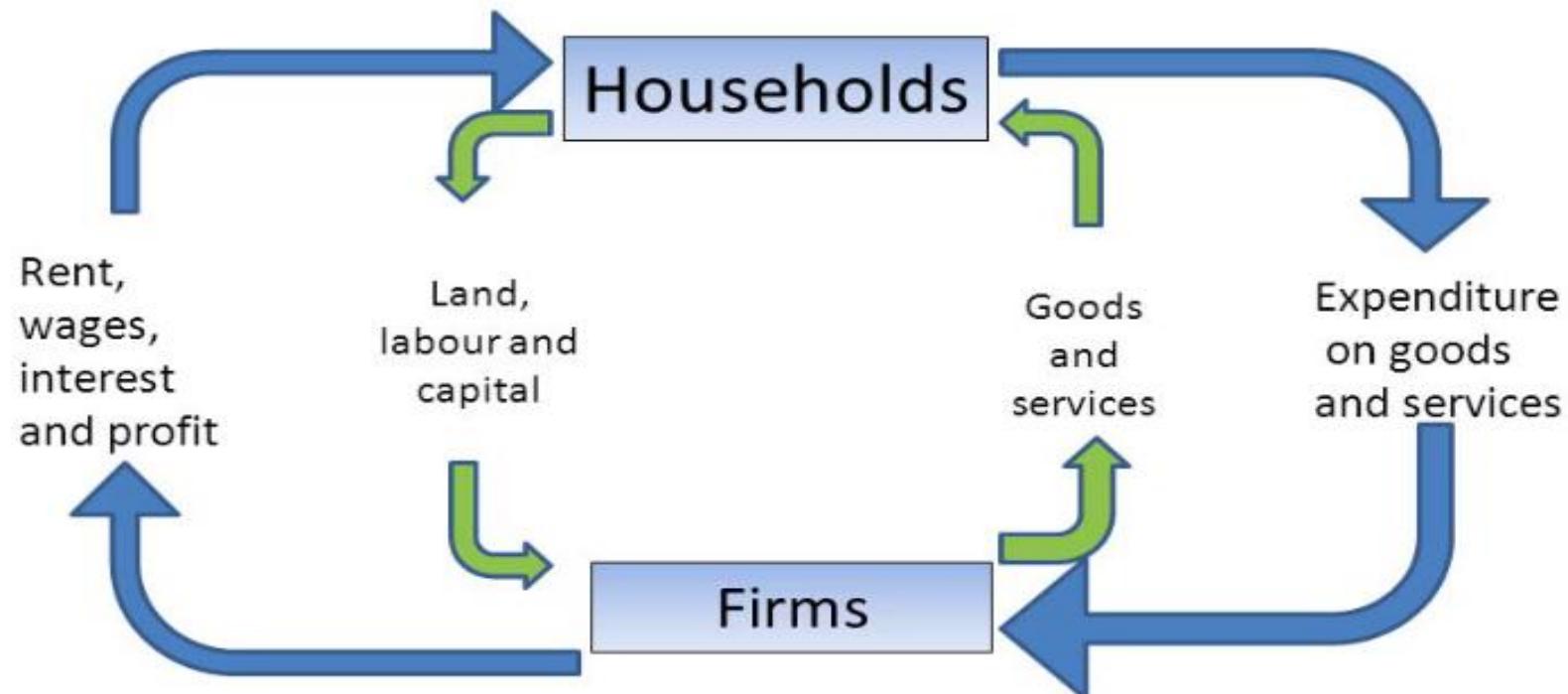
- We will also use it for producing charts ...



Economics: Producers, consumers and exchange

- Households buy goods and services from firms
- Households offer land, labour and capital to firms
- The flow of these from one side to another is studied in economics
- It is an excellent place to start if we are to understand the context of all the **external** data
- A very basic *introduction to key economic concepts will be provided during the first 4 weeks*

The circular flow of income



First 4 weeks: External data

- Household consumption data (what they have bought in the last month)
- Household aspirational data (what they would like to buy)
- Carrying out custom surveys
- Analysing consumption data using Excel
- Determining the number of people who will buy two wheelers from the data sets
- Determining the number of people who will take loans to buy two wheelers
- Using loan issue data to analyse the market for loans

Retail market case study: e-commerce company

- How the e-commerce industry works
- Analysis of the sales by units and amount of different categories of products
- Determining which products to focus on - pareto
- How the products are distributed to customers
- Maintaining the right level of stocks in warehouses based on analysis of data
- How to store the products in the warehouse - 2x2 scatter diagrams

Manufacturing case study: automotive gears company

- How the manufacturing industry works
- Using sales and market data to forecast the production volumes
- Planning the production
- Managing efficiency of operations by reducing wastage and improving utilisation
- Purchasing materials at the right time
- Improving unit profitability

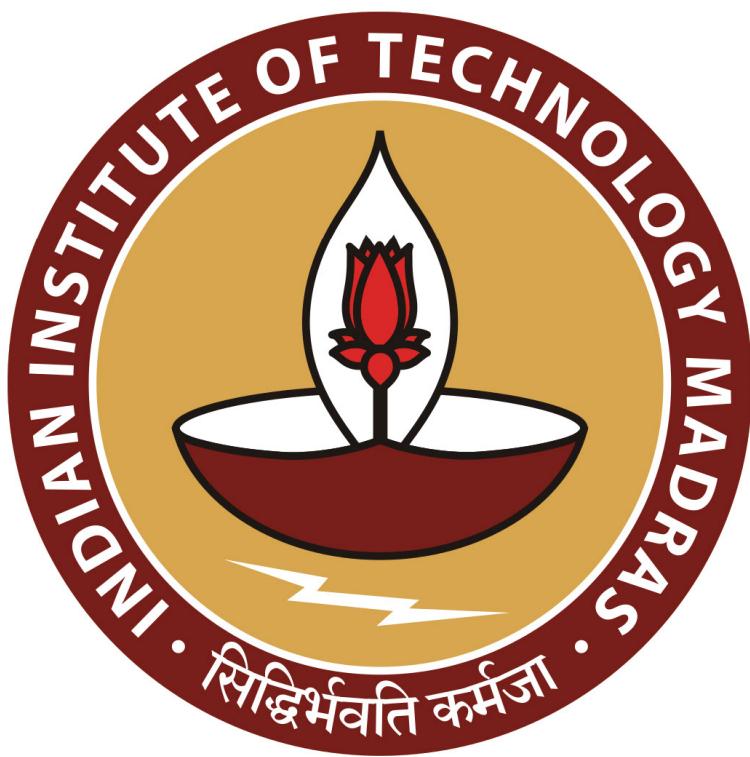
Recruitment case study: IT company

- Introduction to unstructured data sets
- How the recruitment function works - different channels used for recruitment
- Resume and job description data
- Analysing resume information to short list candidates
- Using unstructured data analysis to determine the optimal channel to use

Financial services case study: payment company

- How the payment industry works
- Introduction of a new product (buy now pay later) - what are the considerations
- Analysis of payment data to determine appropriate customers to target
- Nudge economics - driving adoption through nudges
- Using A/B testing to determine the effectiveness of the nudge

--- **End** ---



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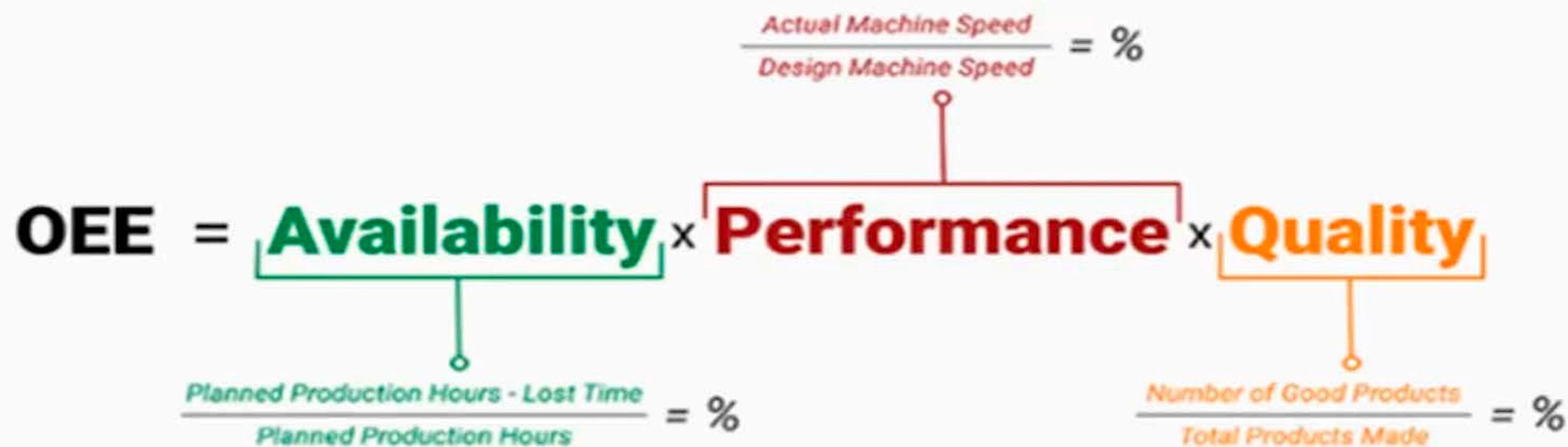
ONLINE DEGREE

OVERALL EQUIPMENT EFFECTIVENESS (OEE)

Gold Standard in measuring manufacturing productivity

OEE is the product of availability, performance, and quality.

What does OEE of 100% Signify?



SCRAP ANALYSIS - BROACHING PROCESS

The Scrap Production in Week 1 and 3 are 2% and 1% respectively

The scrap production is under the acceptable limits

	2/10/2019		3/10/2019		4/10/2019		5/10/2019		6/10/2019		Week Total	Total Hobbing Production	Scrap %
	Shift 1	Shift 2											
Week -1 Broaching Scrap	11	8	13	0	7	6	11	8	4	6	71	3,462	2.05%
16/10/2019		17/10/2019		18/10/2019		19/10/2019		20/10/2019		Week Total	Total Hobbing Production	Scrap %	
	Shift 1	Shift 2											
Week -3 Broaching Scrap	4	2	1	0	0	5	5	10	7	4	37	3,835	0.96%

FINANCIAL LOSS OF SCRAP

GEAR	MATCHING PART NO.
Gear 2-A	Blank-001
Gear 2-B	Blank-002
Gear 3-A	Blank-011
Gear 3-B	Blank-021
Gear 4-A	Blank-011
Gear 4-B	Blank-022
Gear 5-A	Blank-012
Gear 5-B	Blank-021
Gear 6-A	Blank-012
Gear 6-B	Blank-022

Part Number	Per Unit Cost
Blank-011	105
Blank-012	35
Blank-021	47
Blank-022	25

Given the Information that Gear-6A needs Blank-012, the direct material cost is INR 35 per Unit

Material Loss due to Scrappage of components of GA-6A is

$$35 \times (71 + 37) = \text{INR } 3780$$

OVERALL COST AND MARGINS

SALES DETAILS (GEAR ASSEMBLIES)	Sales Price	Direct Materials	Direct Labour	Production Overhead	Cost of Goods Sold	Unit Margin	Unit Margin %
Gear Assembly 3 (BS4/6)	555.00	152	95	165	412.00	143.00	26%
Gear Assembly 4 (BS4/6)	490.00	130	65	145	340.00	150.00	31%
Gear Assembly 5 (BS4/6)	350.00	82	35	115	232.00	118.00	34%
Gear Assembly 6 (BS4/6)	205.00	60	25	45	130.00	75.00	37%

MARGIN ANALYSIS - INFERENCE

1. Gear Assembly - 5 & 6 provides maximum margin in the months of Nov-2020 and Dec-2020
2. GAs-3, 4, and 5 have Gross Margins of 26%, 31%, and 33.5% to make them at least 34 % -
What should be the revised price
 - a. Use Goal Seek function

SALES DETAILS (GEAR ASSEMBLIES)	Modified sale Price	Original Sale Price	Change
Gear Assembly 3 (BS4/6)	625.20	555.00	70.20
Gear Assembly 4 (BS4/6)	515.89	490.00	25.89
Gear Assembly 5 (BS4/6)	352.06	350.00	2.06
Gear Assembly 6 (BS4/6)	205.00	205.00	0.00

Basic Concepts

ABC Analysis

It is an inventory evaluation technique, in which items are classified into three categories A, B, and C.

Category	Value	Control	Record Maintenance	Purchase/ Inventory Strategies
A	High	Tightly Controlled	Accurate	Just-in-Time, Planned Orders
B	Medium	Moderately Controlled	Good	Planned Orders (Safety Stock)
C	Low	Minimally Controlled	Simple	Economic Order Quantity

Basic Concepts

Gear Blanks - B Category Item

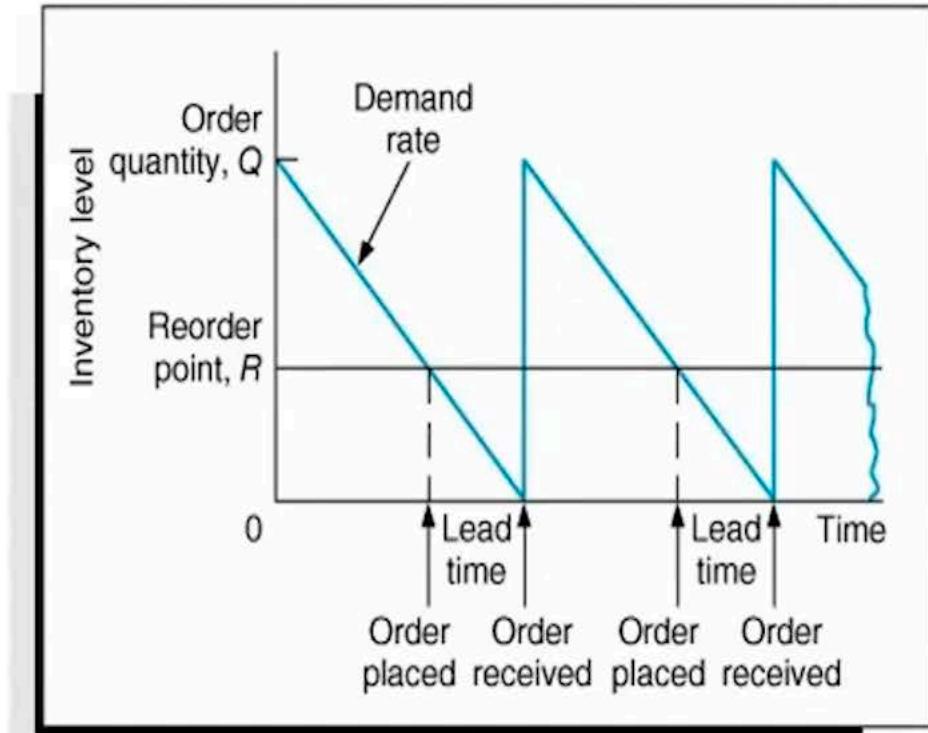
Safety Stock - It is the amount of inventory that must be held by an factory unit to meet exigencies.

Safety stock = (Maximum usage) – (Average usage).

Lead time Demand is assumed to be the annual average demand of the item

Reorder Point (ROP) - It is the minimum inventory or stock level for a specific product that triggers the reordering of more inventory when reached.

Reorder Point (ROP) = Demand during lead time + safety stock



Basic Concepts

Economic Order Quantity (EOQ) - It the optimal quantity of material units that needs to be ordered at a time. It is the factor of holding cost, ordering cost and Demand

$$Q = \sqrt{\frac{2DS}{H}}$$

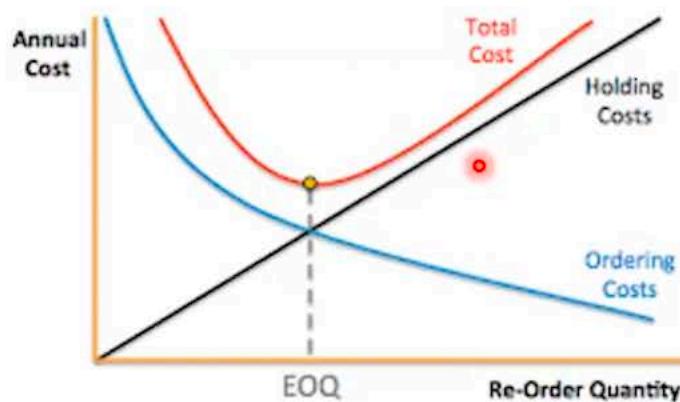
where:

Q = EOQ units

D = Demand in units (typically on an annual basis)

S = Order cost (per purchase order)

H = Holding costs (per unit, per year)



RAW MATERIAL INVENTORY ANALYSIS

Production Issue Vs. Order Quantity - (Blank 001)



Production Issue and Order Quantity (Blank-011)



Order Quantity is more smoothed for Blank-001 compared to Blank-011

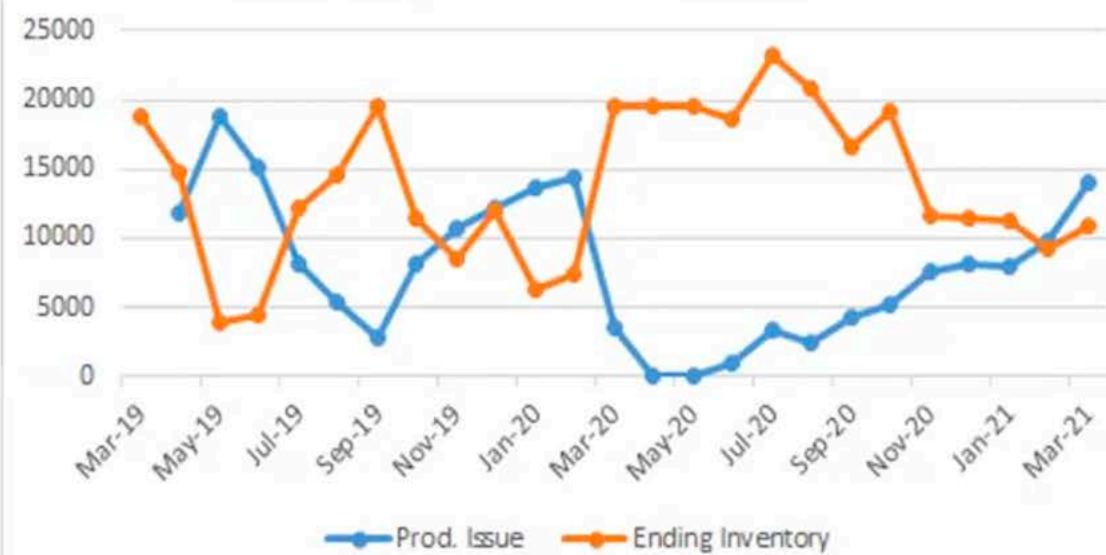
Ponder over the impact of Changeovers in Blank Supplier company due to fluctuations in demand?

ENDING INVENTORY

Ending Inventory vs. Production Issue (Blank-001)



Ending Inventory vs. Production Issue (Blank-011)





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Application Security Engineer | Tech Enterprises

The Application Security Engineer will be responsible for integrating security into the development of ABC's applications. The Application Security Engineer will work closely with the product and software development team to threat model, vulnerability scan, and pen test the early software, system, and network architecture and identify required control points in the application stack. The Application Security Engineer will also work closely with developers to diagnose, document, and remediate application security vulnerabilities. The Application Security Engineer will also be responsible for evaluating, recommending, and implementing application security related software in an automated continuous integration/deployment environment.

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- Continuously evaluate the organization's existing application security practices, define and measure security-related activities, and demonstrating concrete improvements to the application assurance program within the organization.
- Conduct code reviews and penetration testing
- Develop and maintain unit and integration tests designed to ensure security controls are tested on every build

Primary and Secondary Skills Requirements:

- Primary Skills: Development language - Java development, JavaScript, Python, Ruby, C++/C#, Perl Application Security etc.,,
- Secondary Skills: Security penetration testing tools - Metasploit, w3af, Blackduck, Veracode & burp suite (any one or two)
- Other Skills: Jenkins, Pivotaltracker, Cloud Foundry, AWS

Position Requirements:

- Bachelor Degree in Engineering.
- CEH, GSEC, GIAC certification preferred.
- A strong understanding of application security frameworks
- 5 years' experience in application development and security.
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- Understanding of Test-Driven Development built on User Stories

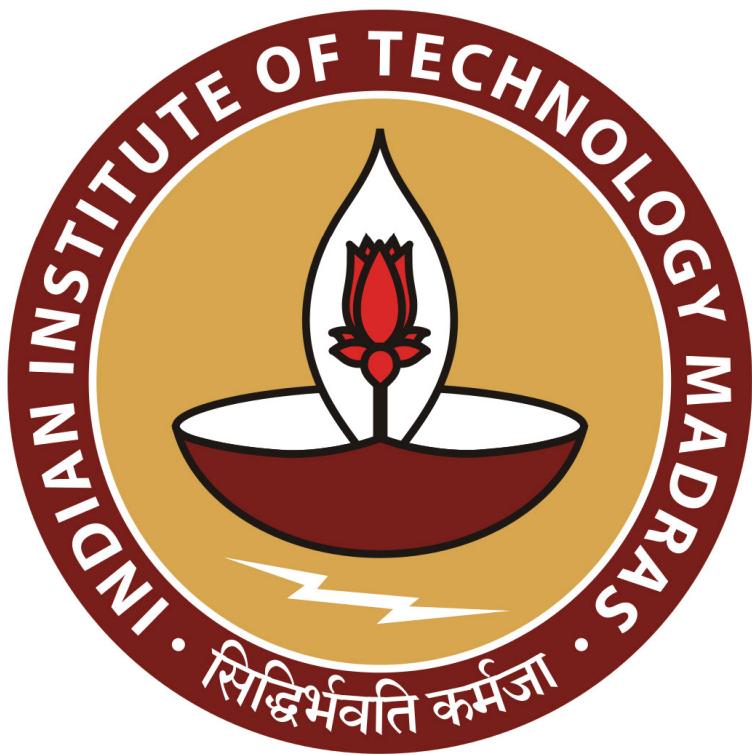
What we offer you

Tech Enterprises will offer you an inviting workplace, talented colleagues from diverse backgrounds, career path, and steady growth prospects with great scope to innovate. Our goal is to create an ecosystem of easily configurable data applications focused on storytelling for public and private use.

Contact us to apply

Hiring manager: XYZ ABC

Send your resume to: xyz@techenterprises.com



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Business Data Management

Introduction to HR as a function

Prof. G. Venkatesh
Dr. Milind Gandhe

Varsha Gandhe



Overview



Learning objective

At the end of this case discussion we will learn:

- What are the various steps involved in a recruitment process
- How data analytics can be used in this recruitment process



Key concepts

- Manpower planning
 - Also called as Human Resource Planning
 - Involves
 - Putting right number of people, right kind of people(correctly staffed)
 - At the right place, right time (in the correct job)
 - Doing the right things (with clarity on what's expected of them)
 - So that it helps the organization to achieve its goals.
- Recruitment process
 - The process of actively seeking out, finding and hiring candidates for a specific position or job.
 - Includes the entire hiring process, from inception to the individual recruit's integration into the company.



Need for Human Resource Planning

- Organizations need a plan for functioning
 - Analyse the current human resources, how many people, doing what kinds of work, getting what kind of revenue for the organization
 - Create manpower forecasts – how many more people will we need to do how much more for the organization
- Helps plan the labor cost
- Helps in growth and diversification of business



Brief overview of Tech Enterprises

- Tech Enterprises, a Bangalore based company, provides digital solutions across various domains to their global clients.
- A quick profile for the organization

**Founded in
2005**

**3500
employees**

**Glassdoor
rating - 3.5**

**Attrition rate
<18%**



The key players

Person	Role
Madhuri	Program Manager
Ritesh	Recruitment Head, Tech Enterprises
Vidya	VP ,Tech Enterprises



Caselet 1 – Madhuri's team

- Madhuri has been with Tech Enterprises since her recruitment at campus as a fresher.
- She has grown through the ranks to become a project director in 13 years and leads a team of 55 employees



Caselet 1 :

Madhuri's team needs a replacement

- Abhi, who like Madhuri was hired out of campus as an engineer and is part of Madhuri's team has decided to pursue further education. He has resigned and is serving his notice period. His last working day is 31st May
- Madhuri now needs a replacement for Abhi and contacts Ritesh for this hiring.
- Ritesh handles the recruitment for Vidya's business at Tech enterprises. He is part of the HR Team and works closely with Vidya and her leadership team which includes Madhuri



Internal sourcing of candidates



Caselet 1: Internal sourcing

- To replace Abhi, Ritesh opted for internal sourcing
- In internal sourcing, a position is filled by sourcing from the existing employees, either by promotion or by lateral movement.
- Ritesh mailed the employees with the criteria
 - 5+ years of work- experience in this company
 - Experience of managing a small team and working in a cross-functional group of people
 - A 2 year history of good appraisal rating
 - Experience on Visualization tools, basic data modelling



Key concept

Appraisal:

- The process of evaluating an employee's current and/or past performance as against certain predetermined standards.
- All organisations have some formal or informal means of appraising their employee's performance.
- The performance appraisal process, therefore, will include defining the job, appraising performance and providing feedback.



Internal sourcing

Before starting the formal recruiting process, companies would much rather check if they have internal resources who can actually do this role.

To ensure this companies typically

- Publish all vacancies on the intranet or internal portal for employees to apply for
 - Employee must meet certain criteria before they can apply for a role
- Check similar skill sets from employees on the bench



Internal sourcing (contd)

Post shortlisting, Internal candidates are assessed through interviews and certification tests and then selected for the role

HR informs the existing manager or the bench manager on successful placement of an internal candidate and usually a period of 2 months is identified for transitioning the person from one role to another



Job description, Candidate sourcing



Caselet 2 : Madhuri wins a deal ...

- Over the last two years, Tech Enterprises has seen plenty of growth.
- Much of this growth has created a need for a strategic, specific recruiting processes.
- Madhuri, who you have previously met is the Program Manager who handles a team of 55 and has recently won a large business deal for a telecom major in the beginning of Mar 2021



She needs more people on her team

- Madhuri needs 5 team members and 1 project leader in the month of June 2021 to complete deliverables of the latest project.
- She will need another 5 team members and 1 project leader in the month of August 2021
- Madhuri reaches out to the Recruitment Head Ritesh and tells him that she desperately needs 12 people on board in her team and asks him to start looking for suitable profiles



Madhuri's next steps

- Ritesh asks for Madhuri for the following
 - What is your headcount plan for the year? Do you have a budget for these positions ?
 - Can you get me an approval for these positions and raise a requisition ?
- Madhuri then reaches out to Vidya, VP of her business and outlines her requirements, updates the manpower plan and seeks approval
- Once the approval process is completed Ritesh once again initiates the process, but this time Madhuri's needs are more complex



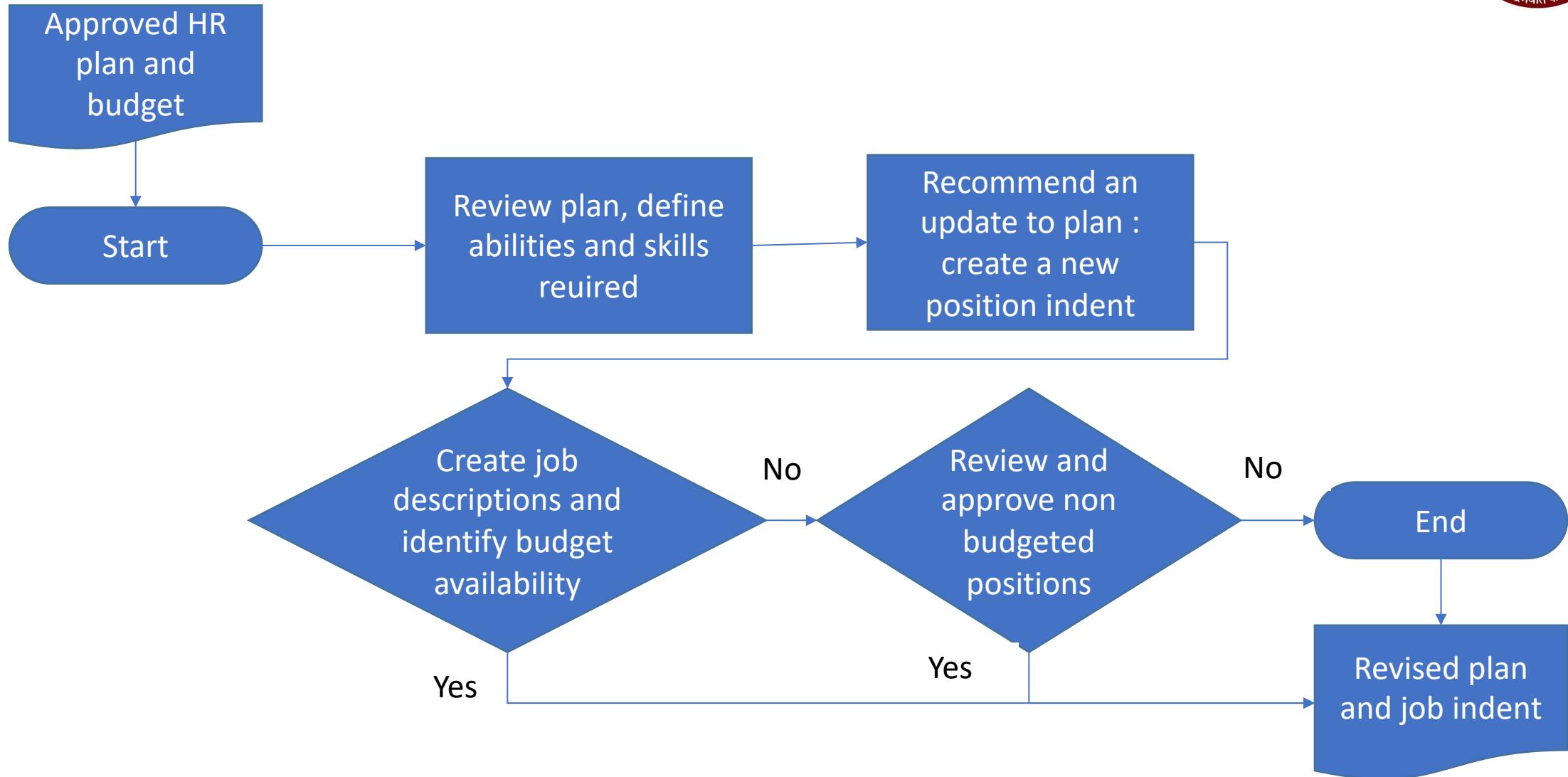
The recruitment process flow

A good **recruitment process** can minimize the time involved in the searching, interviewing, **hiring** and training. It can streamline these **processes** and make your search for viable candidates much more efficient. It is **very important** to build a positive image to your customers, peers and competitors.





Sub process 1 : HR planning and job indent





Key concepts

- **A requisition or an indent**
 - A form usually created by HR that outlines:
 - the budgetary details
 - the timelines of the position required
 - whether the position is full time part time or on TPP
 - skills and capabilities required.



Key concepts..

- **Job description (JD)**
 - A quick summary of :
 - what the role is expected to do,
 - key responsibilities
 - how the performance will be measured
 - the skills, capabilities, experience and educational qualifications required to do that particular job

The JD explanation



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Contact us to apply

Hiring manager: XYZ ABC
Send your resume to: xyz@techenterprises.com



The search for candidates begins

- Madhuri creates job descriptions, one each for the project leader and ten team members along with the timeline on when she wants these role filled in
- Ritesh reviews these job descriptions and commences the hiring process to remain compliant with Madhuri's timeline. He creates **a recruitment plan** that outlines the steps and expected timelines. He runs this past Madhuri so that they are both aligned on the outcomes



The Recruitment Plan

- The recruitment plan consists of
 - Open Position
 - Timeline
 - Channels of fulfilment



The sourcing process

- Ritesh creates an opening on company's website and puts an advertisement on a recruitment portal.
- Ritesh notifies all employees about the **Employee referral policy** and announces bonus of either INR 15000 for team members or INR 25000 for project leaders.
- He also uses Tech Enterprises's Twitter, Facebook, LinkedIn accounts to broadcast the job openings as part of the **social media** campaign.



The sourcing process (contd)

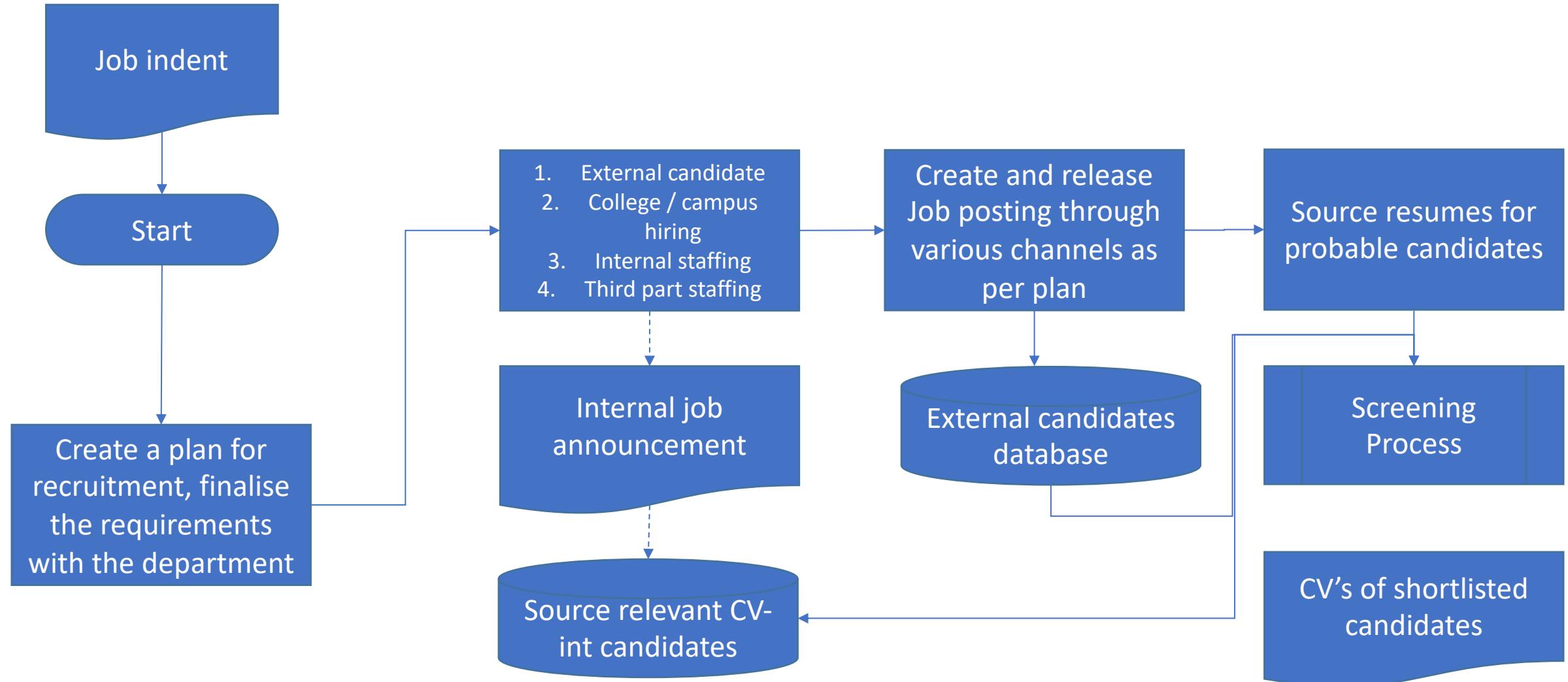
- After a careful self review, he decided not to go for a **walk-in** for team members since only a few positions are available.
- He opts for fresher pool to be **hired out of campus** for the team member positions



Ritesh encounters an issue

- At the end of first week, he could manage only 5 applications.
- To fit Madhuri's timeline, Ritesh needs to collect more applications.
- Ritesh mulls working with some recruitment consultants to try to find very specialized talent in management to fill the project leader positions.
- Since he has a fixed budget for this quarter, he needs to decide which channels are effective for this recruitment

Sub process 2 : Sourcing of candidates





Hands-on session

Dashboard for Ritesh

What will Ritesh focus on for monitoring his own work ?



- To start work the following metrics
 - Which is the most effective channel for this kind of role
- Once he starts on the recruitment process
 - How many CV's has he got from which channel
 - How many new CV's is he getting per week
 - How many CV's have gotten past the screening process
 - How much of a match is there between the CV's and JD's
 - What is the TAT time left on the position (i.e. how many more days for closing the offer and how many more for the joining)

What will Ritesh focus on for monitoring his own work ? (contd)



- Once he starts on the recruitment process (contd)
 - How many interviews have been scheduled
 - How easy has it been for candidates to apply



A walkthrough of the data



Results of sourcing strategy

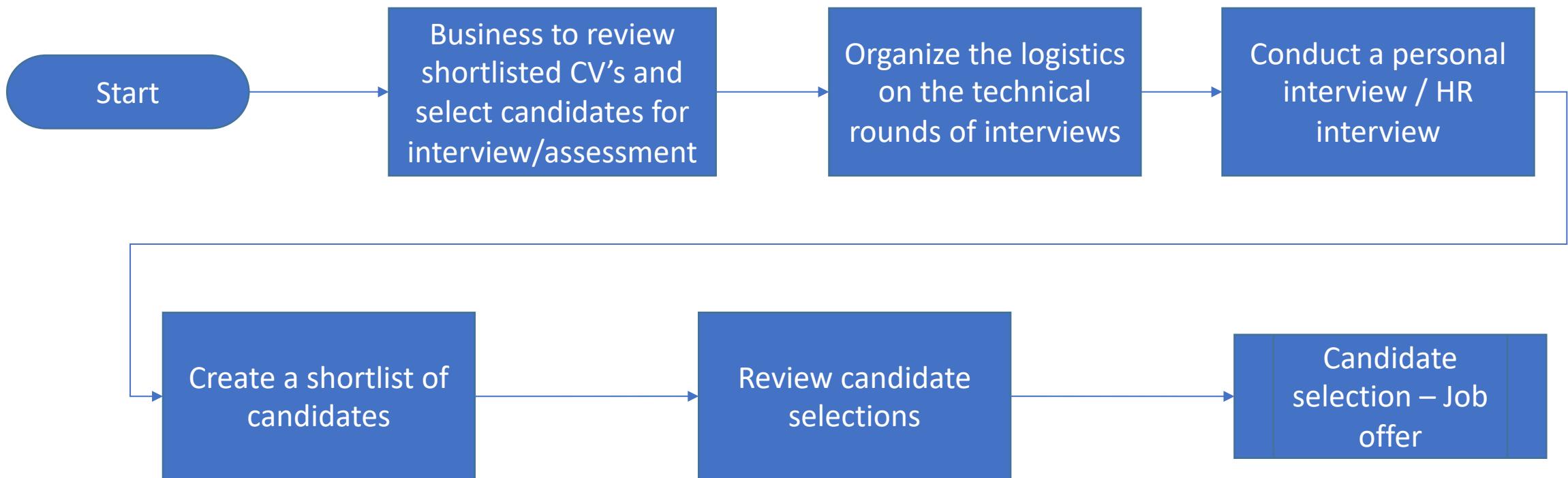
- After a three-week period, Ritesh has 24 applications for the project leader positions, 78 candidates for the team member position.
- Pleased with the way recruiting progresses, he starts reviewing the résumés to continue with the selection process.



Selecting candidates and onboarding



Sub process 3: Scheduling interviews and assessments





The case

- At the end of week 3, Madhuri
 - Has gone through 102 profiles shared by Ritesh
 - **Shortlisted** 7 profiles for the project leader positions
 - Another 25 for the team member positions
- Selection Process
 - Identify an interview panel
 - Each Candidate faces
 - **A written test**
 - **two rounds of assessments : Technical and HR**



The case (contd)

- Ritesh's team reached out to the 32 candidates shortlisted and arranged for the tests on a specific date and interviews based on common convenience of the interview panel and the candidates
- Ritesh has a template that gathers the feedback on various parameters by the interview panel which he received after the interviews



The case (contd)

- Shortlisting
 - Project Leader Position: 1 candidates
 - Team member position: 7 candidates
 - Based on the test scores and the interview feedback
- Offer letters
 - Based on Madhuri's recommendation
 - Ritesh rolls out **offer letters**
 - 1 candidate selected for the project leader position
 - 5 offers for the top ranking team member candidates
 - Offer letter has details of the position, the level, the designation and salary details

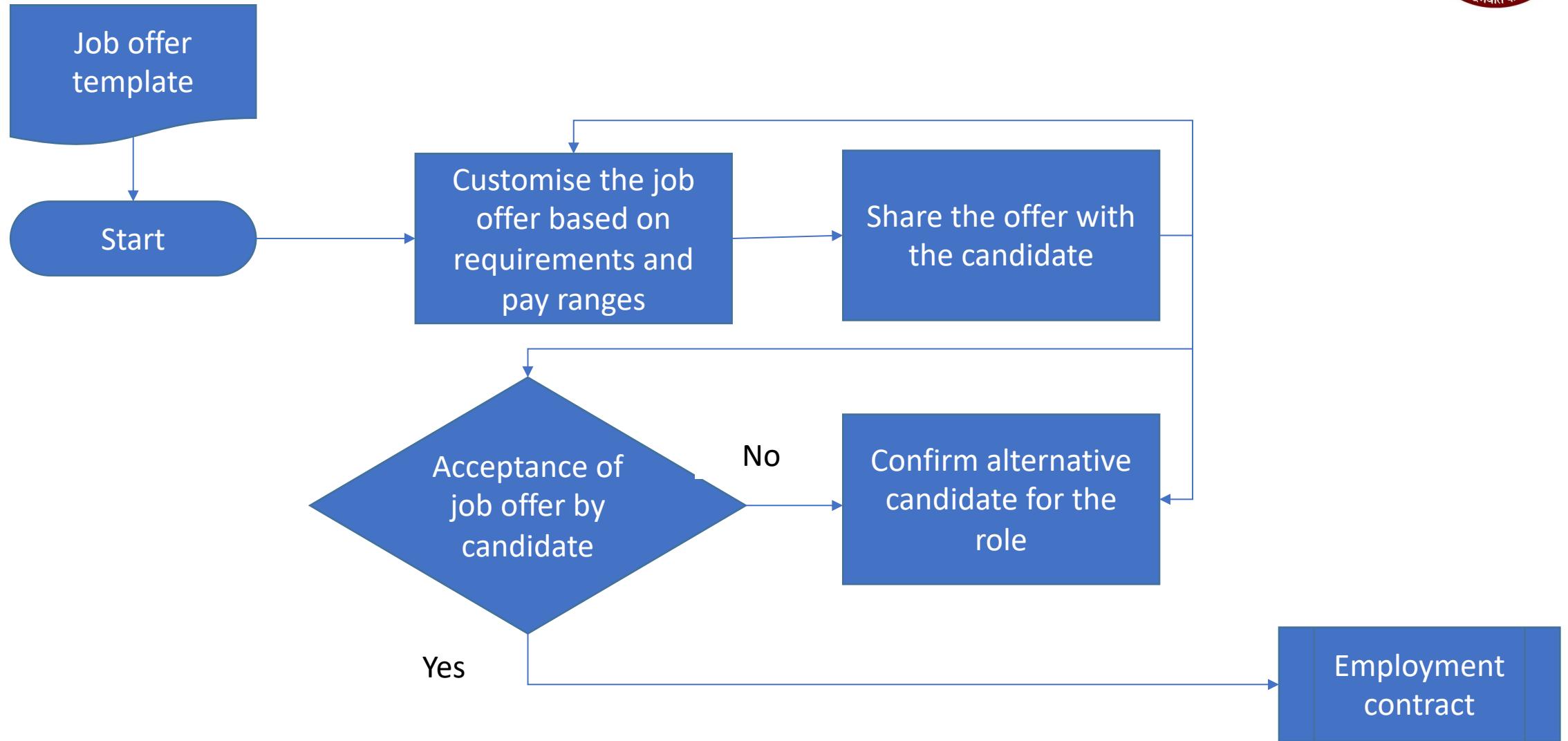


The case (contd)

- However both the project leader candidate and two other from the team members rejected the offer for reasons like joining date, location or salary



Sub process 4: Offer roll out





The case...

- Ritesh engaged with the candidates and negotiated the joining date aspects where he could. One of the team member candidates was persuaded to join.
- The other shortlisted candidate for the team member was now made an offer while the project leader candidates procedure was revisited and refreshed given this.
- The 5 team members joined Tech Enterprises in two months and the position of the Project leader was also being fulfilled

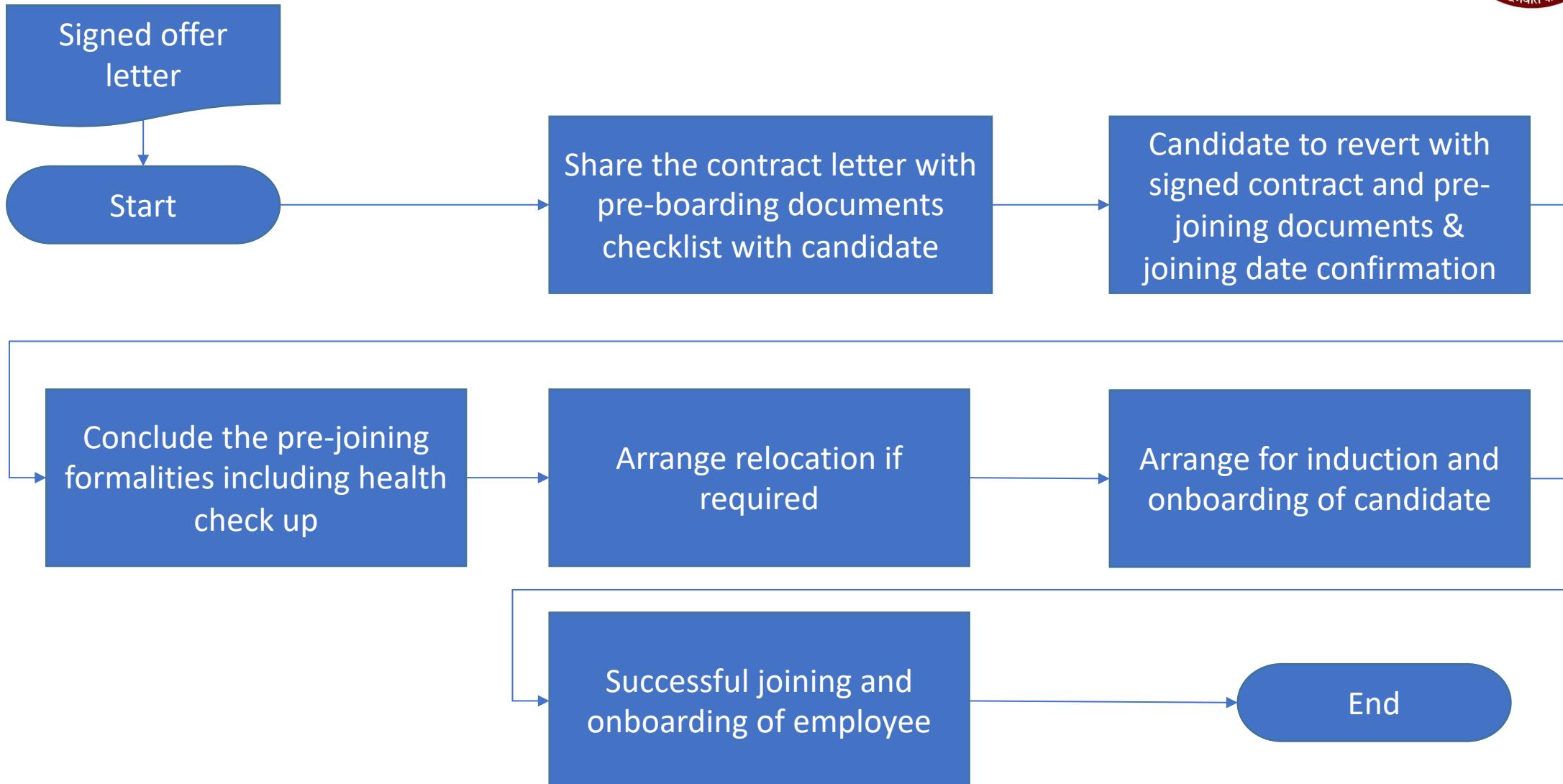


The case...

- **Induction and on boarding** was conducted by Ritesh's team ensuring that the all the candidates submitted their documents (certificates and bank documents) closing the 5 indents for Madhuri's team
- The other indents followed the similar process



Sub process 5: Induction and on boarding

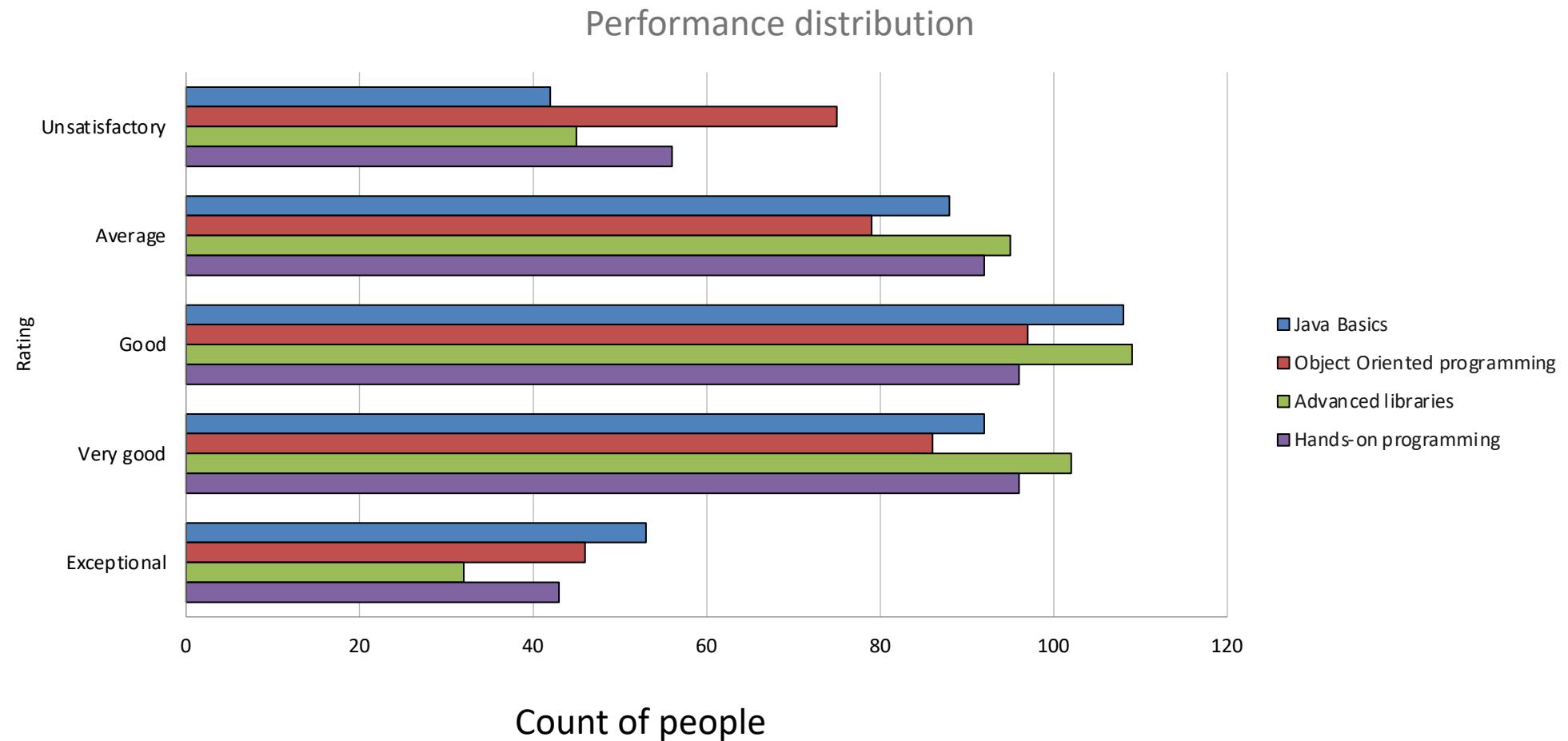




Hands-on session: Dashboard for Madhuri

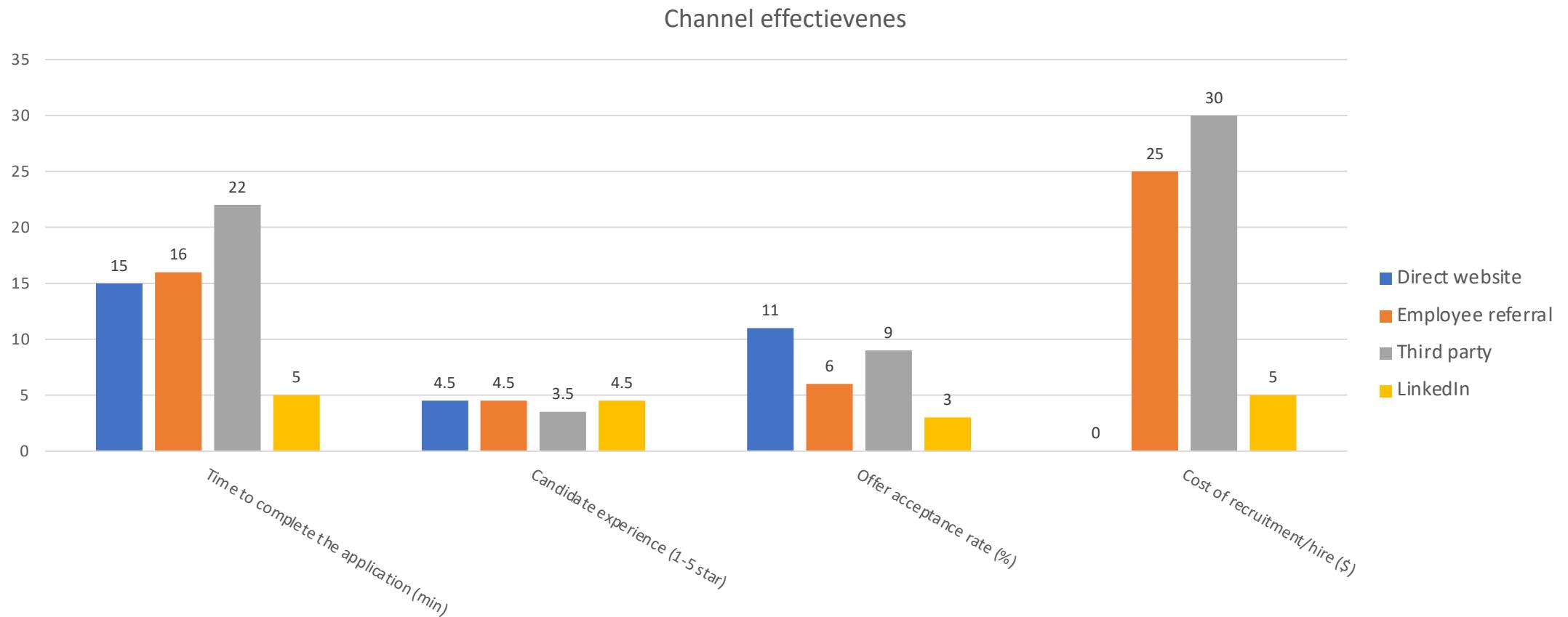


Skill distribution dashboard



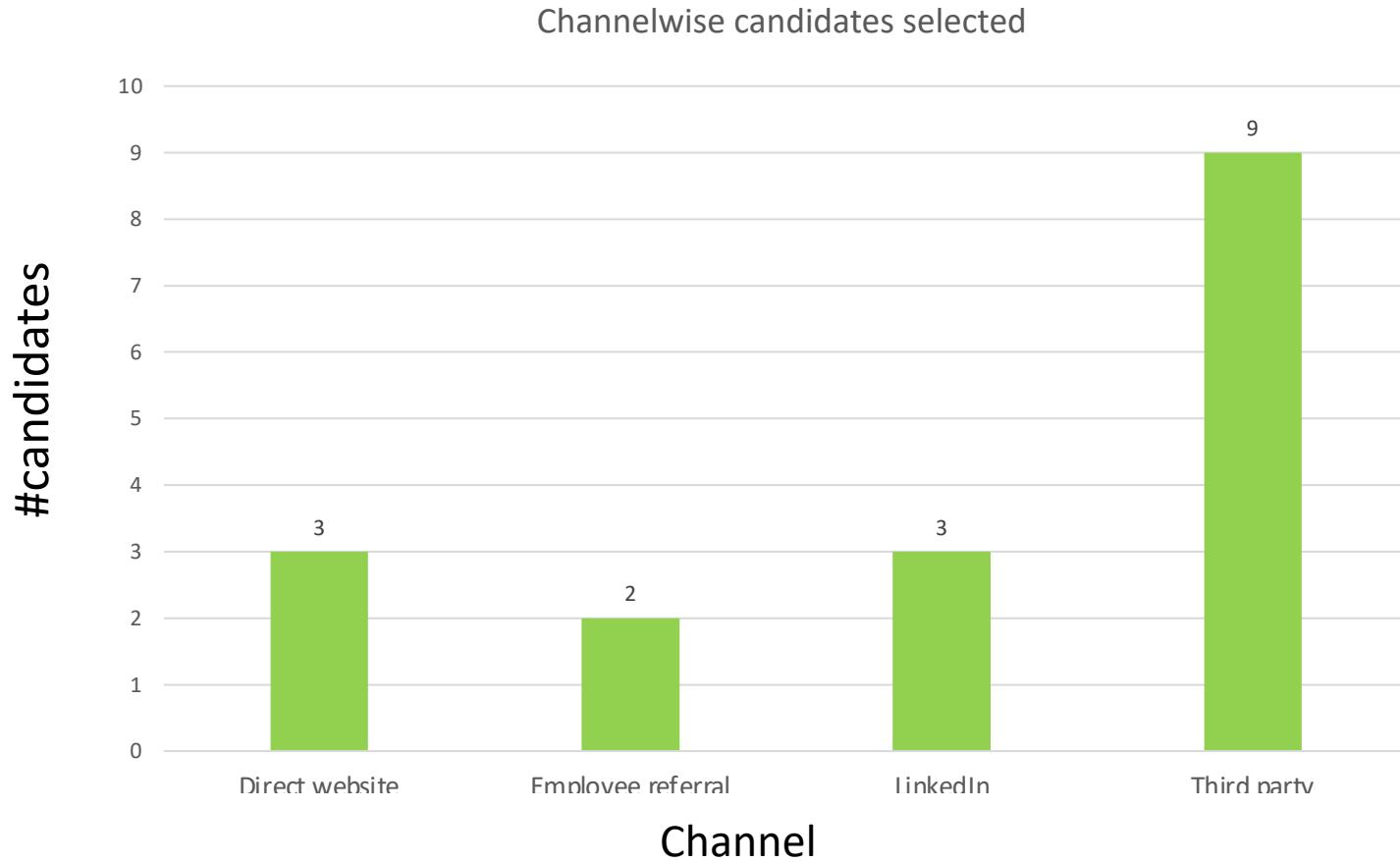


Channel effectiveness





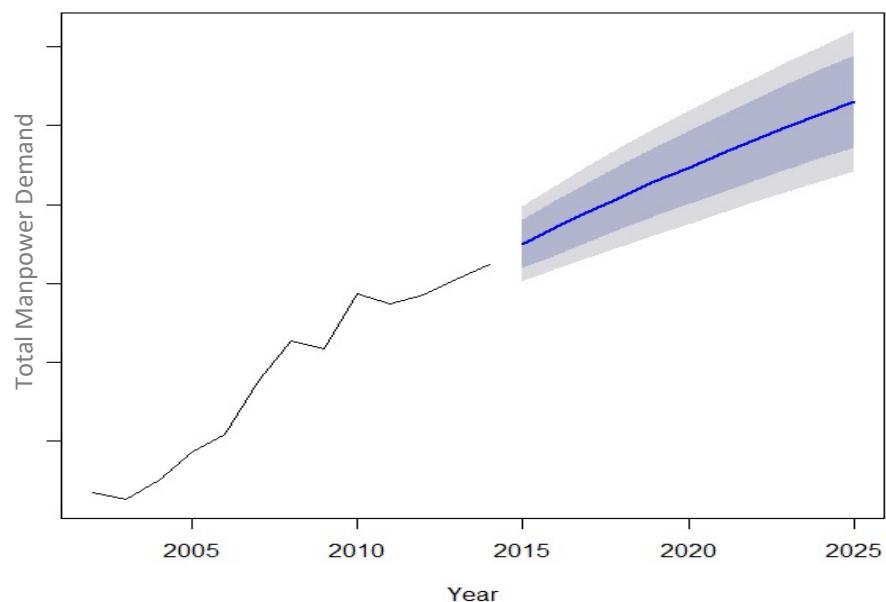
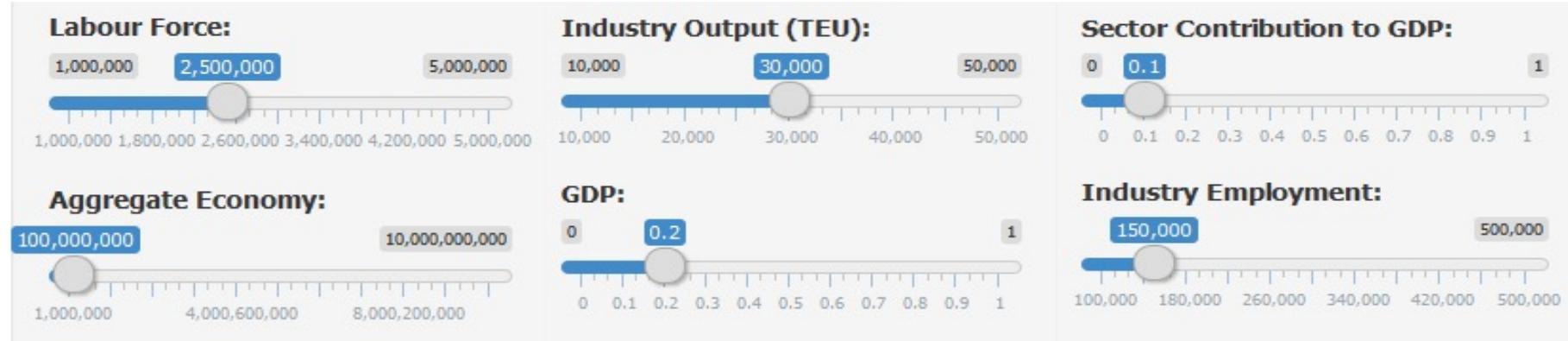
Channel-wise candidates selection matrix





Summarizing

Workforce forecast model – Estimate demand

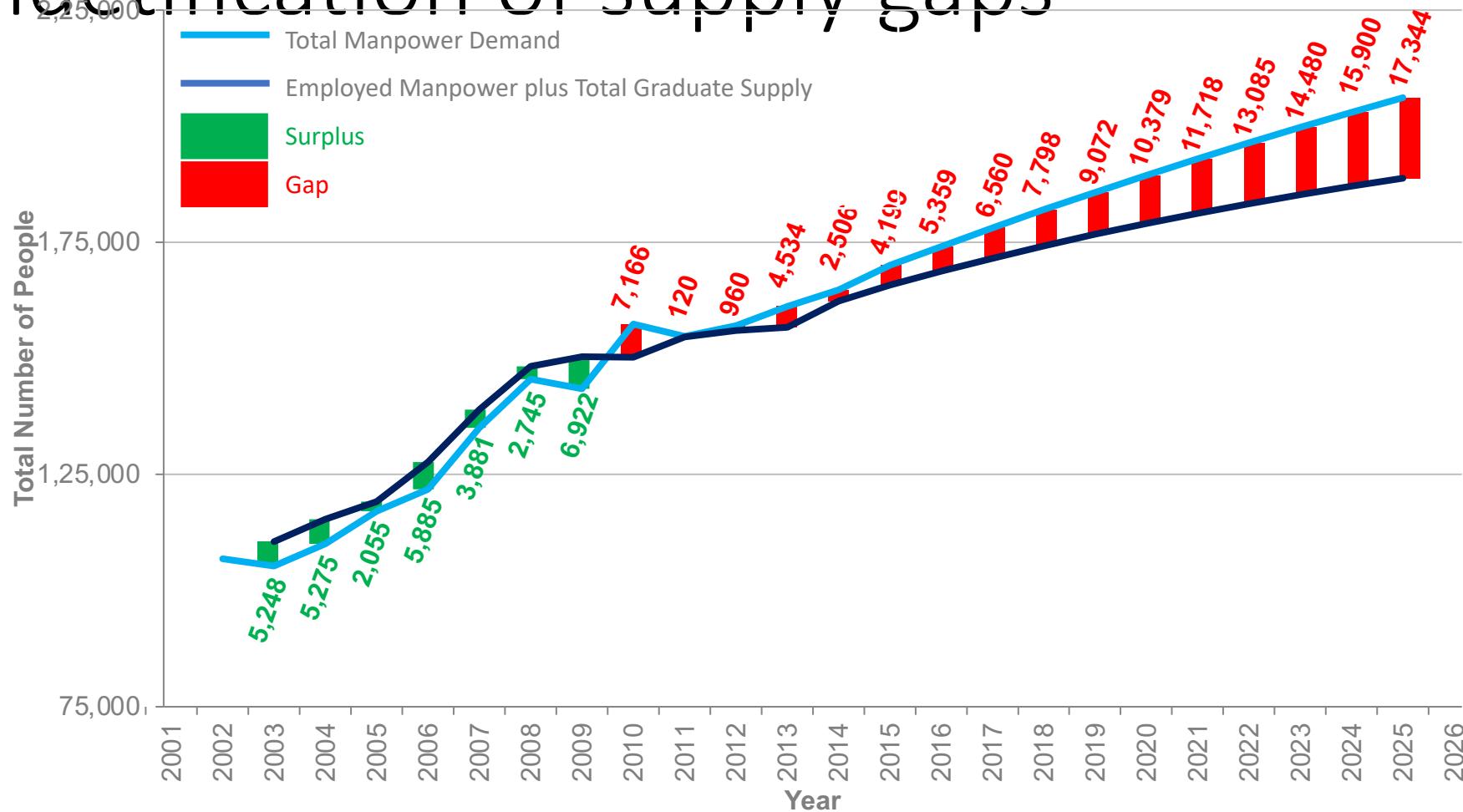


Year	Point Forecasts	Lo 95% Confidence Interval	Hi 95% Confidence Interval
2015	1,713	1,643	1,782
2016	1,729	1,627	1,830
2017	1,724	1,699	1,848
2018	1,801	1,637	1,966
2019	1,866	1,726	1,905
2020	1,819	1,758	2,080
2021	1,966	1,728	2,004
2022	1,908	1,831	2,185
2023	1,950	1,866	2,133
2024	2,093	1,833	2,253
2025	2,041	1,829	2,253

Six to eight factors considered for creating a workforce model and estimating demand

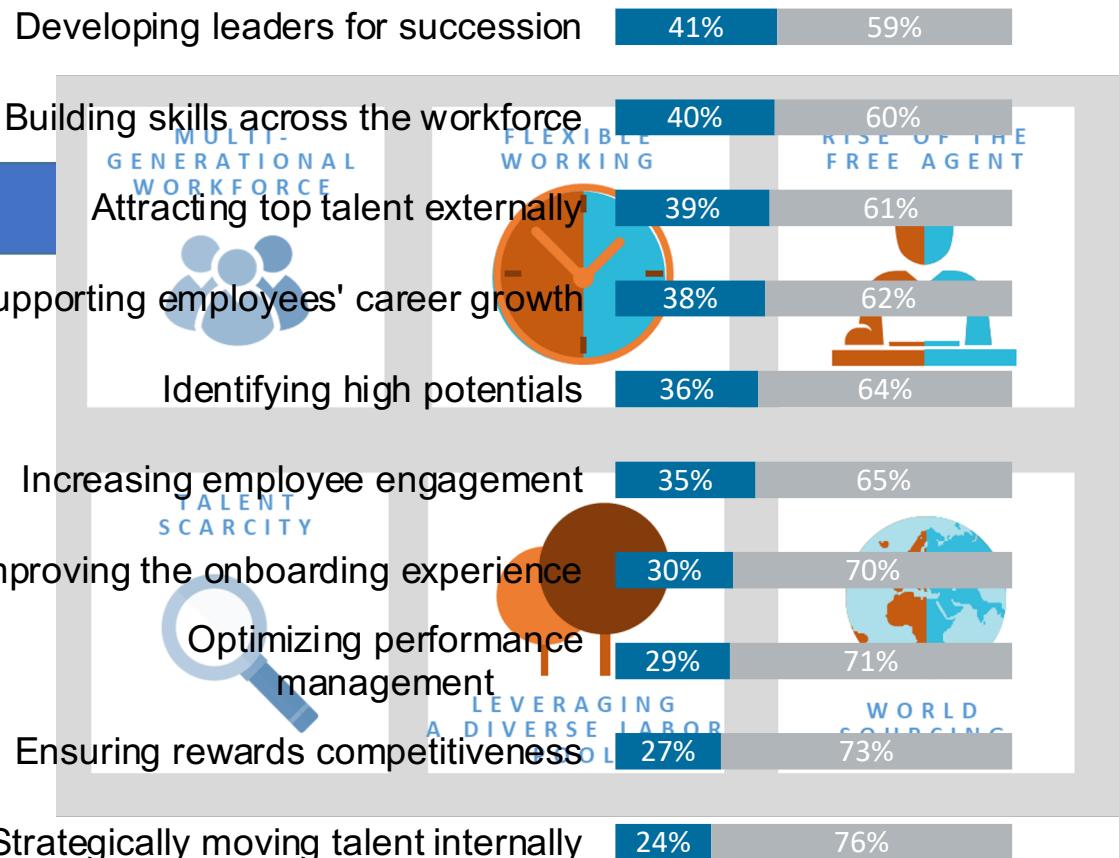
Used for generating various scenarios to determine demand-supply gaps

Workforce forecast model – Scenarios for identification of supply gaps



What keeps a CHRO busy

HR'S TOP 10 PRIORITIES FOR 2018
(from a list of 20 options)



MANAGING TRENDS IN TALENT MANAGEMENT AND ACQUISITION

India will have 53% companies increasing workforce and intent to hire
will be stronger in the tech and pharma sectors CHRO will have to deal
with the some of the characteristics of the talent market we see below



Evolution of the measures and how analytics are looked at

2000 MEASURING HR'S VALUE BY ESTABLISHING HR KPIs	2010 PEOPLE ANALYTICS FOR HR	2020 PEOPLE ANALYTICS FOR THE BUSINESS
<p>'The HR Scorecard' advised using HR metrics, selected on an organisation-by-organisation basis, to measure HR's contribution to the business.</p> <p>How can I measure the value of HR?</p>	<p>The application of analytics to provide insights on topics related to people in a Talent Supply Chain.</p> <p>How should my workforce needs adapt to changes in the business environment?</p>	<p>An outside-in approach to people analytics with focus on business opportunities.</p> <p>What people factors will improve my business performance?</p>

How long does it take to **hire for certain positions at different levels?**

What is the **aging and percentage of open positions?**

How can we build a compelling **job indent to increase applicants per indent and selection ratio?**

What analytics will help us understand **what is the cost per hire?**

How might **analytics for recruitment funnel effectiveness?**

How can we ensure our **that the time to fill and hire for positions is within the norm ?**

How can we **measure the candidate experience** in line with our employer of choice philosophy?

Is our **technology helping the application completion rate?**

I would like to see the effectiveness of hire viz. **first year attrition and performance scores for new hires**

Which sourcing channel **is the most effective** for fulfilling our requirements?



Thank you

Week 9

Lecture 1 - Introduction to HR as a function

Learning objective

Watch later S

At the end of this case discussion we will learn:

- What are the various steps involved in a recruitment process
- How data analytics can be used in this recruitment process

Key concepts

- Manpower planning
 - Also called as Human Resource Planning
 - Involves
 - Putting right number of people, right kind of people(correctly staffed)
 - At the right place, right time (in the correct job)
 - Doing the right things (with clarity on what's expected of them)
 - So that it helps the organization to achieve its goals.
- Recruitment process
 - The process of actively seeking out, finding and hiring candidates for a specific position or job.
 - Includes the entire hiring process, from inception to the individual recruit's integration into the company.

Need for Human Resource Planning

- Organizations need a plan for functioning
 - Analyse the current human resources, how many people, doing what kinds of work, getting what kind of revenue for the organization
 - Create manpower forecasts – how many more people will we need to do how much more for the organization
 - Helps plan the labor cost
 - Helps in growth and diversification of business
-

Lecture 2 - Introduction to the Tech Enterprises, and their immediate crisis

Brief overview of Tech Enterprises

- Tech Enterprises, a Bangalore based company, provides digital solutions across various domains to their global clients.
- A quick profile for the organization

Founded in
2005

3500
employees

Glassdoor
rating - 3.5

Attrition rate
<18%

The key players

Person	Role
Madhuri	Program Manager
Ritesh	Recruitment Head, Tech Enterprises
Vidya	VP ,Tech Enterprises

Caselet 1 – Madhuri's team

- Madhuri has been with Tech Enterprises since her recruitment at campus as a fresher.
- She has grown through the ranks to become a project director in 13 years and leads a team of 55 employees

Caselet 1 :

Madhuri's team needs a replacement

- Abhi, who like Madhuri was hired out of campus as an engineer and is part of Madhuri's team has decided to pursue further education. He has resigned and is serving his notice period. His last working day is 31st May
 - Madhuri now needs a replacement for Abhi and contacts Ritesh for this hiring.
 - Ritesh handles the recruitment for Vidya's business at Tech enterprises. He is part of the HR Team and works closely with Vidya and her leadership team which includes Madhuri
-

Lecture 3 - Internal sourcing

Caselet 1: Internal sourcing

- To replace Abhi, Ritesh opted for internal sourcing
 - In internal sourcing, a position is filled by sourcing from the existing employees, either by promotion or by **lateral movement**.
 - Ritesh mailed the employees with the criteria
 - 5+ years of work- experience in this company
 - Experience of managing a small team and working in a cross-functional group of people
 - A 2 year history of good appraisal rating
 - Experience on Visualization tools, basic data modelling
-

Key concept

Appraisal:

- The process of evaluating an employee's current and/or past performance as against certain predetermined standards.
- All organisations have some formal or informal means of appraising their employee's performance.
- The performance appraisal process, therefore, will include defining the job, appraising performance and providing feedback.



Internal sourcing

Before starting the formal recruiting process, companies would much rather check if they have internal resources who can actually do this role.

To ensure this companies typically

- Publish all vacancies on the intranet or internal portal for employees to apply for
 - Employee must meet certain criteria before they can apply for a role
- Check similar skill sets from employees on the bench



Internal sourcing (contd)

Post shortlisting, Internal candidates are assessed through interviews and certification tests and then selected for the role

HR informs the existing manager or the bench manager on successful placement of an internal candidate and usually a period of 2 months is identified for transitioning the person from one role to another

Lecture 4 - Review of Data

Introduction to HR dataset and discussion

Lecture 5 - Internal sourcing: Ranking of Internal Candidates

Working on the excel dataset

Lecture 6 - Caselet 2 - Introduction: Job Description

Caselet 2 : Madhuri wins a deal ...

- Over the last two years, Tech Enterprises has seen plenty of growth.
- Much of this growth has created a need for a strategic, specific recruiting processes.
- Madhuri, who you have previously met is the Program Manager who handles a team of 55 and has recently won a large business deal for a telecom major in the beginning of Mar 2021

She needs more people on her team

- Madhuri needs 5 team members and 1 project leader in the month of June 2021 to complete deliverables of the latest project.
- She will need another 5 team members and 1 project leader in the month of August 2021
- Madhuri reaches out to the Recruitment Head Ritesh and tells him that she desperately needs 12 people on board in her team and asks him to start looking for suitable profiles



Madhuri's next steps

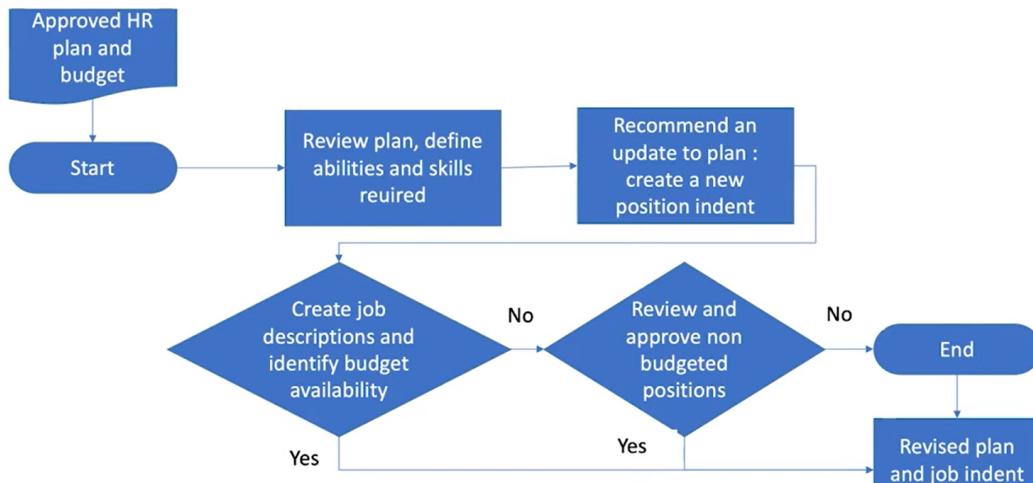
- Ritesh asks for Madhuri for the following
 - What is your headcount plan for the year? Do you have a budget for these positions ?
 - Can you get me an approval for these positions and raise a requisition ?
- Madhuri then reaches out to Vidya, VP of her business and outlines her requirements, updates the manpower plan and seeks approval
- Once the approval process is completed Ritesh once again initiates the process, but this time Madhuri's needs are more complex

The recruitment process flow

A good **recruitment process** can minimize the time involved in the searching, interviewing, **hiring** and training. It can streamline these **processes** and make your search for viable candidates much more efficient. It is very **important** to build a positive image to your customers, peers and competitors.



Sub process 1 : HR planning and job indent



Key concepts

- **A requisition or an indent**

- A form usually created by HR that outlines:
 - the budgetary details
 - the timelines of the position required
 - whether the position is full time part time or on TPP
 - skills and capabilities required.

Key concepts..

- **Job description (JD)**

- A quick summary of :
 - what the role is expected to do,
 - key responsibilities
 - how the performance will be measured
 - the skills, capabilities, experience and educational qualifications required to do that particular job

The JD explanation

Application Security Engineer | Tech Enterprises

The Application Security Engineer will be responsible for integrating security into the development of ABC's applications. The Application Security Engineer will work closely with the product and software development team to threat model, vulnerability scan, and pen test the early software, system, and network architecture and identify required control points in the application stack. The Application Security Engineer will also work closely with developers to diagnose, document, and remediate application security vulnerabilities. The Application Security Engineer will also be responsible for evaluating, recommending, and implementing application security related software in an automated continuous integration/deployment environment.

Primary duties:

- Work closely with application development and QA teams to help formulate and implement a strategy for software security that is tailored to the specific risks facing the organization, including threat modeling and applications security advisement services.
- Conduct application security assessments / penetration tests and implement tools for dynamic/automated code reviews.
- Ensure application design and implementation best-practice with role-based and appropriate access standards, as well as integration with Identity and Access Management environments.
- Ensure compliance with society, regulatory, and industry standards for application security.
- Conductively evaluate the organization's existing application security practices, define and measure security-related activities, and demonstrating concrete improvements to the application assurance program within the organization.
- Conduct code reviews and penetration testing
- Develop and maintain unit and integration tests designed to ensure security controls are tested on every build

Primary and Secondary Skills Requirements:

- Primary Skills: Development language - java development, JavaScript, Python, Ruby, C++/C, Perl Application Security etc.
- Secondary Skills: Security penetration testing tools - Metasploit, w3af, Blackduck, Veracode & burp suite (any one or two)
- Other Skills: Jenkins, Pivotltracker, Cloud Foundry ,AWS

Position Requirements:

- Bachelor Degree in Engineering.
- CEH, GSEC, GIAC certification preferred.
- A strong understanding of application security frameworks
- 5 years' experience in application development and security.
- Practical understanding and use of commercial application security tools
- Must be fluent in write technical reports based on findings.
- Proficient with development languages including Java, Python, Ruby.
- Strong self-starter who has the ability to operate independently.
- Excellent oral/written presentation skills with ability to communicate effectively with senior executive leadership, proficiency in preparation of presentations, analytical reports, and documents regarding program operational status, achievement and performance.
- Understanding and passion for Agile/XP/Scrum/Kanban is preferred
- Understanding of Test-driven Development built on User Stories

What we offer you

Tech Enterprises will offer you an inviting workplace, talented colleagues from diverse backgrounds, career path, and steady growth prospects with great scope to innovate. Our goal is to create an ecosystem of easily configurable data applications focused on storytelling for public and private use.

Contact us to apply

Hiring manager: XYZ ABC
Send your resume to: xyz@techenterprises.com

Lecture 7 - Sourcing channels and their analysis

The search for candidates begins

- Madhuri creates job descriptions, one each for the project leader and ten team members along with the timeline on when she wants these roles filled in
- Ritesh reviews these job descriptions and commences the hiring process to remain compliant with Madhuri's timeline. He creates a **recruitment plan** that outlines the steps and expected timelines. He runs this past Madhuri so that they are both aligned on the outcomes

The Recruitment Plan

- The recruitment plan consists of
 - Open Position
 - Timeline
 - Channels of fulfilment

The sourcing process

- Ritesh creates an opening on company's website and puts an advertisement on a recruitment portal.
- Ritesh notifies all employees about the **Employee referral policy** and announces bonus of either INR 15000 for team members or INR 25000 for project leaders.
- He also uses Tech Enterprises's Twitter, Facebook, LinkedIn accounts to broadcast the job openings as part of the **social media** campaign.

The sourcing process (contd)

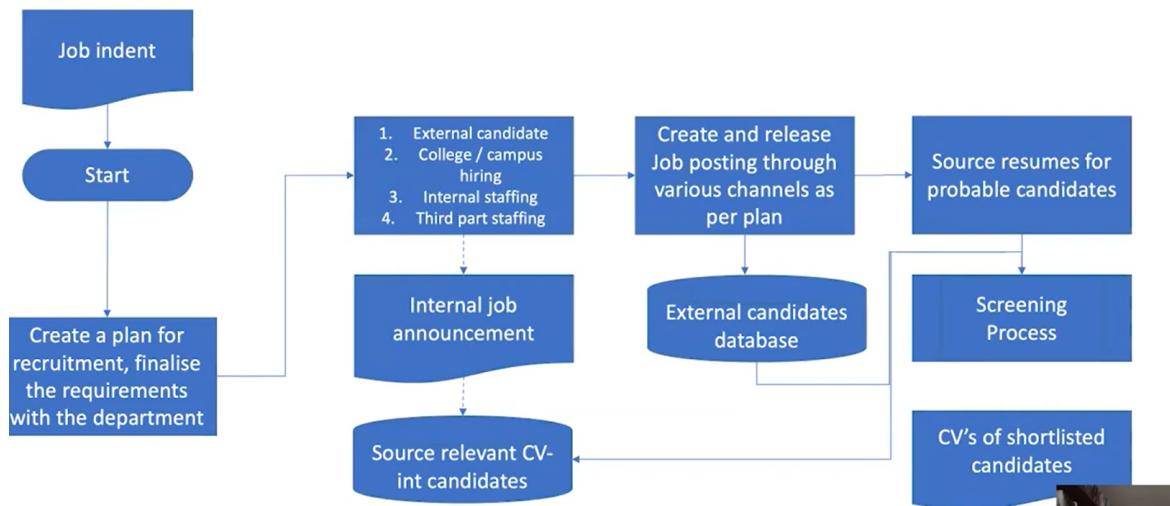
- After a careful self review, he decided not to go for a **walk-in** for team members since only a few positions are available.
- He opts for fresher pool to be **hired out of campus** for the team member positions

Ritesh encounters an issue

- At the end of first week, he could manage only 5 applications.
- To fit Madhuri's timeline, Ritesh needs to collect more applications.
- Ritesh mulls working with some recruitment consultants to try to find very specialized talent in management to fill the project leader positions.
- Since he has a fixed budget for this quarter, he needs to decide which channels are effective for this recruitment



Sub process 2 : Sourcing of candidates



Lecture 8 - Introduction to dataset and gender diversity

Introduction to new dataset and some calculations

Lecture 9 - Selection criteria

Work on same dataset

Lecture 10 - Channel effectiveness

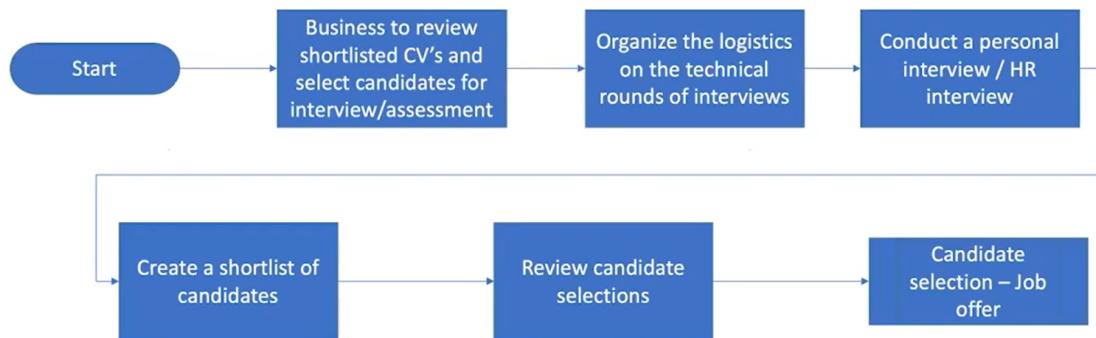
Work on same dataset

Lecture 11 - Combining measurements into a composite score and ranking

Work on same dataset

Lecture 12 - Recruitment process and onboarding

Sub process 3: Scheduling interviews and assessments



The case

- At the end of week 3, Madhuri
 - Has gone through 102 profiles shared by Ritesh
 - **Shortlisted** 7 profiles for the project leader positions
 - Another 25 for the team member positions
- Selection Process
 - Identify an interview panel
 - Each Candidate faces
 - **A written test**
 - **two rounds of assessments : Technical and HR**

The case (contd)

- Ritesh's team reached out to the 32 candidates shortlisted and arranged for the tests on a specific date and interviews based on common convenience of the interview panel and the candidates
- Ritesh has a template that gathers the feedback on various parameters by the interview panel which he received after the interviews

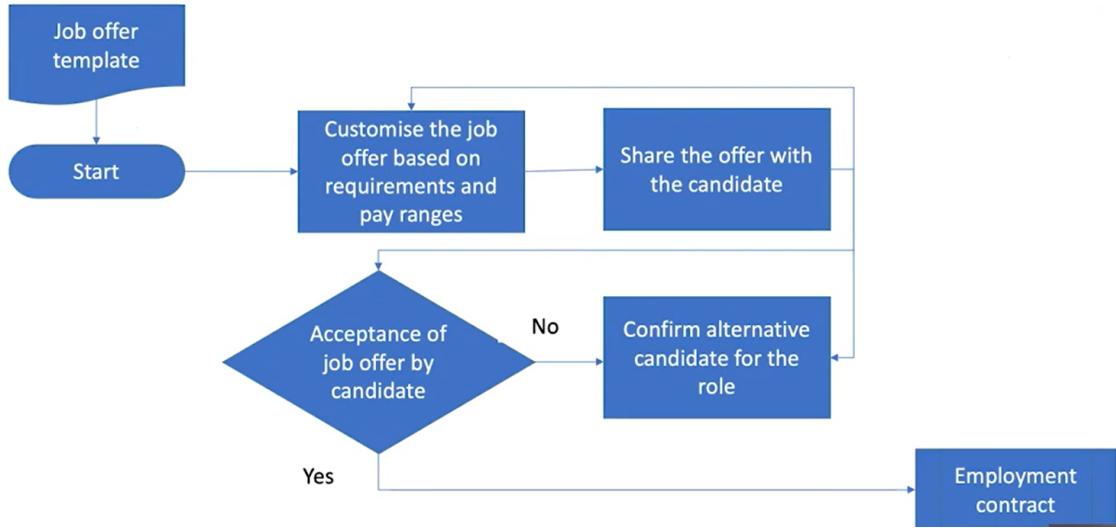
The case (contd)

- Shortlisting
 - Project Leader Position: 1 candidates
 - Team member position: 7 candidates
 - Based on the test scores and the interview feedback
- Offer letters
 - Based on Madhuri's recommendation
 - Ritesh rolls out **offer letters**
 - 1 candidate selected for the project leader position
 - 5 offers for the top ranking team member candidates
 - Offer letter has details of the position, the level, the designation and salary details

The case (contd)

- However both the project leader candidate and two other from the team members rejected the offer for reasons like joining date, location or salary

Sub process 4: Offer roll out



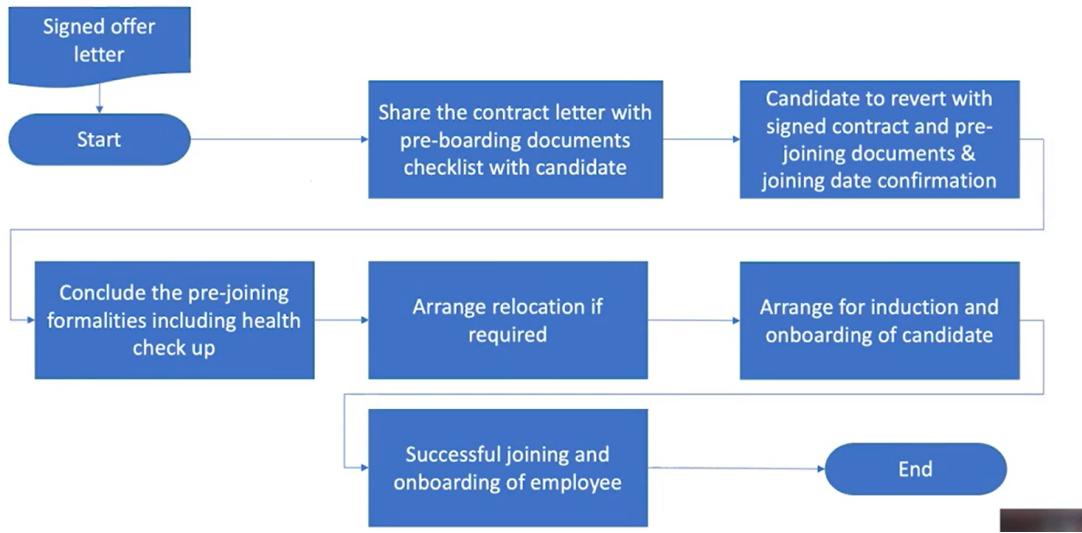
The case...

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- The other shortlisted candidate for the team member was now made an offer while the project leader candidates procedure was revisited and refreshed given this.
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The case...

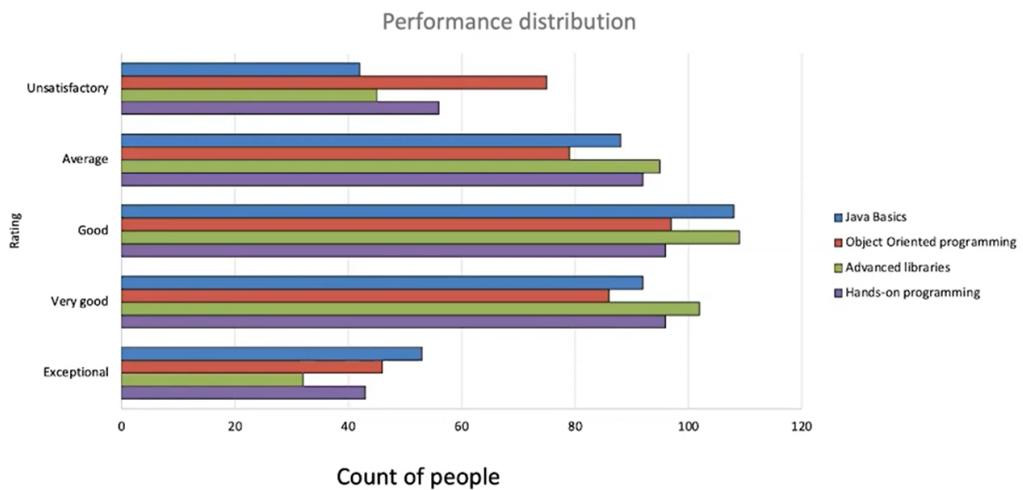
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Sub process 5: Induction and on boarding



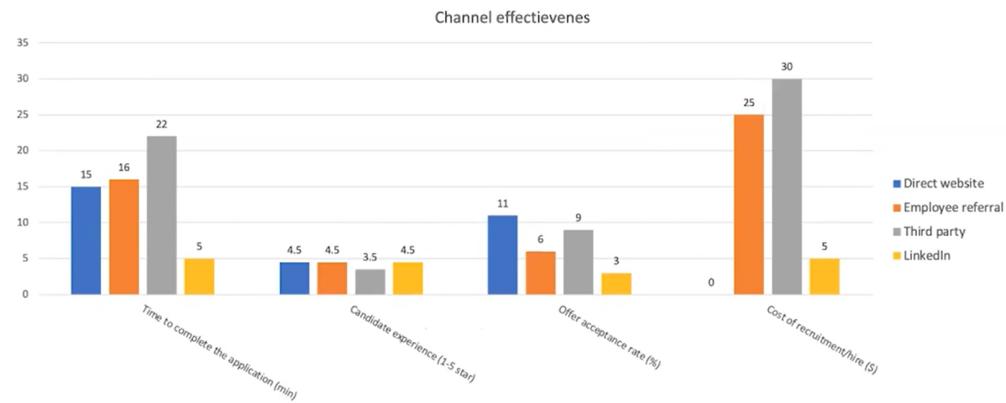
Lecture 13 - Presentation of results and analysis

Skill distribution dashboard

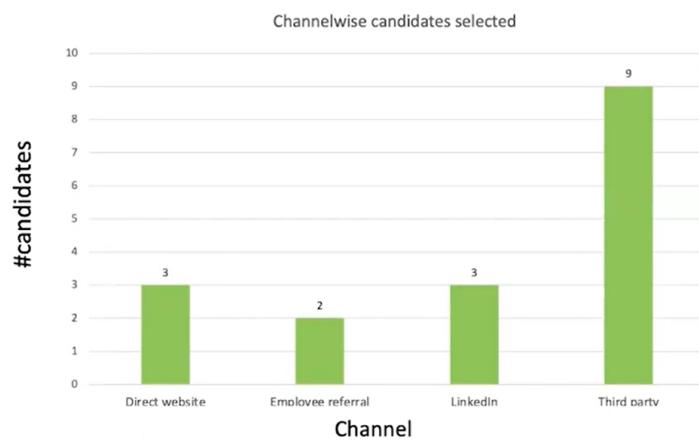


https://docs.google.com/spreadsheets/d/1QsWi0JAZ6ZRu1MITjFftiN18CYTO-HDd8Bs_si9PUxo/edit#gid=451466534

Channel effectiveness

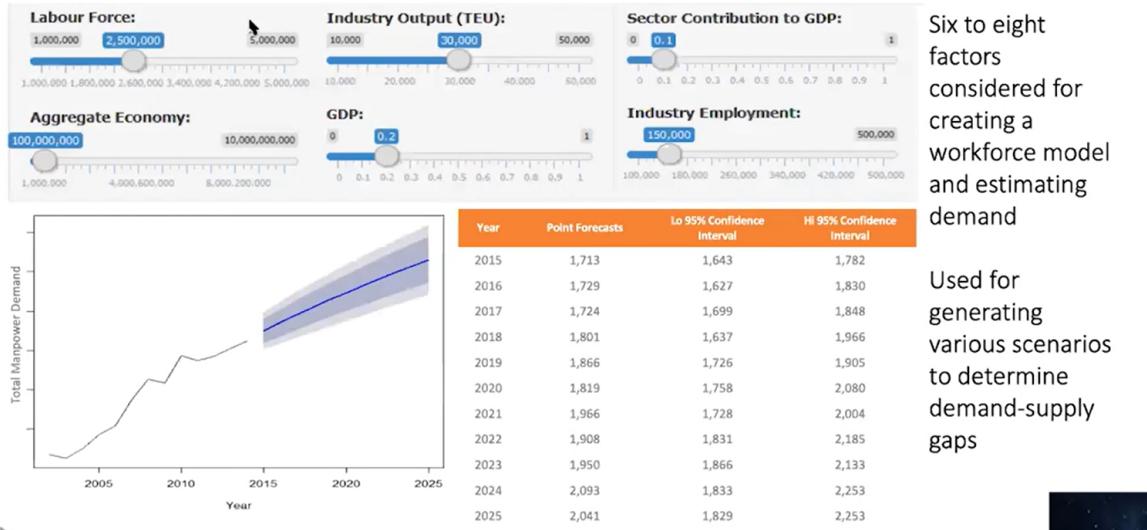


Channel-wise candidates selection matrix



Lecture 14 - Skills availability & role of HR

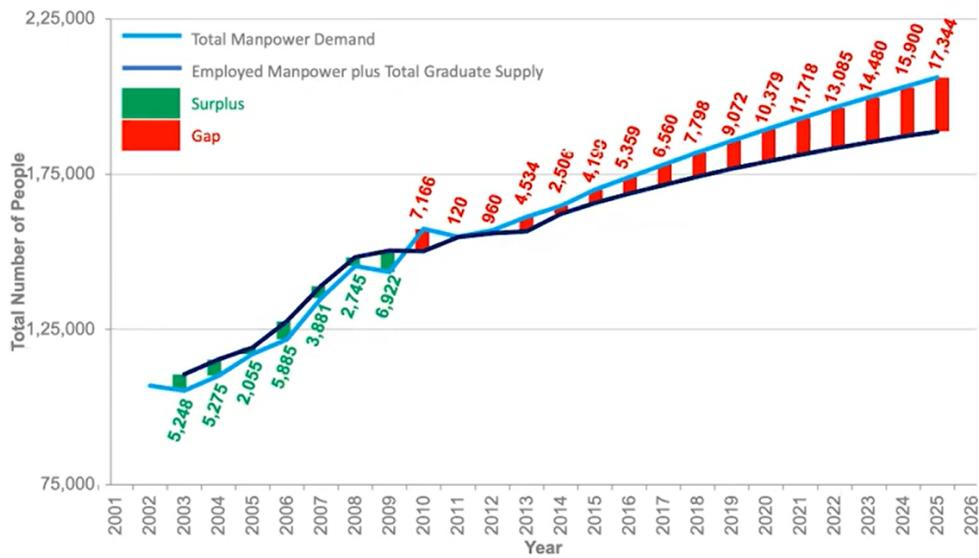
Workforce forecast model – Estimate demand



Six to eight factors considered for creating a workforce model and estimating demand

Used for generating various scenarios to determine demand-supply gaps

Workforce forecast model – Scenarios for identification of supply gaps





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Source: Mercer 2018 Global Talent Trends Report

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Week 10

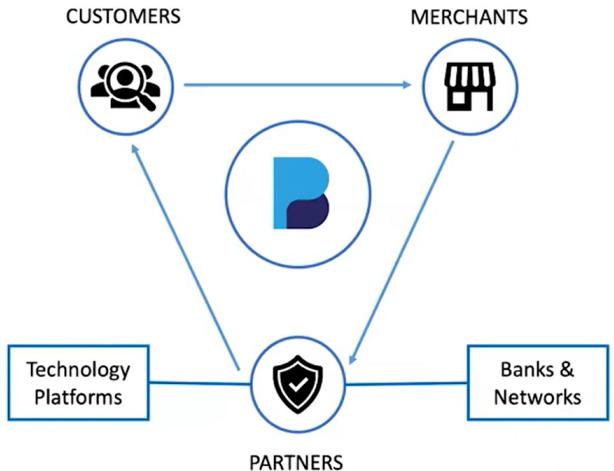
Lecture 1 - Introduction to Finance Industry and Fintech

Introduction to Fintech industry

Lecture 2 - Introduction to the payments industry and money flow

Case Study: PayBuddy Payments

- ✓ Online Payments Platform
- ✓ Split from PayBay in 2015 and became an Independent company.
- ✓ CEO: Michael
- ✓ Hosts a diverse portfolio of credit products like credit card, pay later etc.
- ✓ Facilitates money transfer service for free of cost between any two PayBuddy users.
- ✓ Stakeholders –
 - ✓ Customers (like you and me!)
 - ✓ Merchants (like Lifestyle, BigBazaar)
 - ✓ Technology Platforms (like VISA, Mastercard)
 - ✓ Banks (like SBI, ICICI)



Lecture 3 - Paybuddy case: credit product introduction

New Credit Offering by PayBuddy

- PB is launching a new credit offering called Pay in Installments (PII)

BUY NOW PAY LATER | 

 PayBuddy

Amazon Pay Later Availability

Available for purchases on mobile and desktop platform. Registration can be done only through mobile.

- For buying with Amazon Pay Later, the account should be "active."
- Not available for purchases with Exchange Offer.
- In case of multi-cart, No Cost EMI will be applicable on the purchase only when all items in the cart are eligible for No cost EMI.
- Available tenure options as per the purchase values.

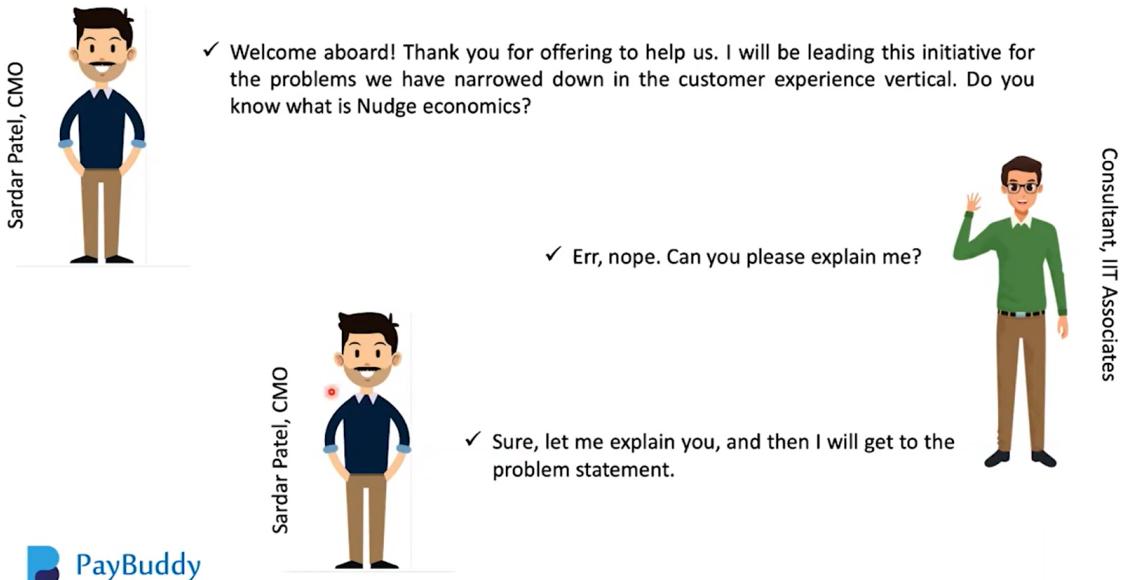
Tenure	Min amount	Max amount	
1 month	0	10k	Buy Now, Pay Next Month
3 month	3k	30k	Buy Now, Pay in EMIs
6 month	6k	60k	Buy Now, Pay in EMIs
9 month	9k		Buy Now, Pay in EMIs
12 month	9k		Buy Now, Pay in EMIs

Introduction to the Case Study

- Problem:

- Credit Marketing – Whom to target as the new customers?
- Credit Risk – How do we decide credit scoring and approval?

Customer Experience (owner Sardar Patel, Chief Marketing Officer)

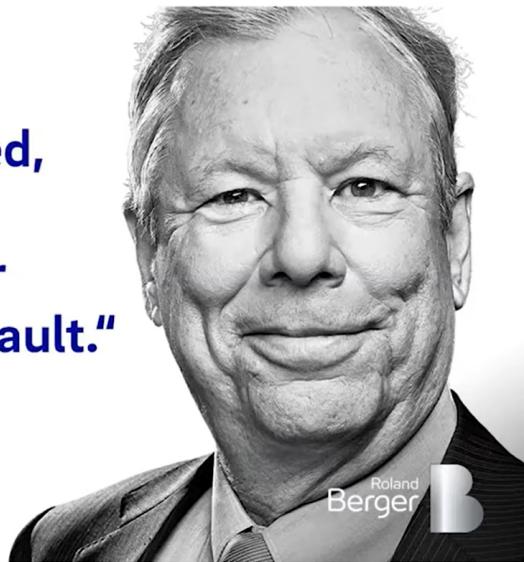


Lecture 4 - Nudge economics

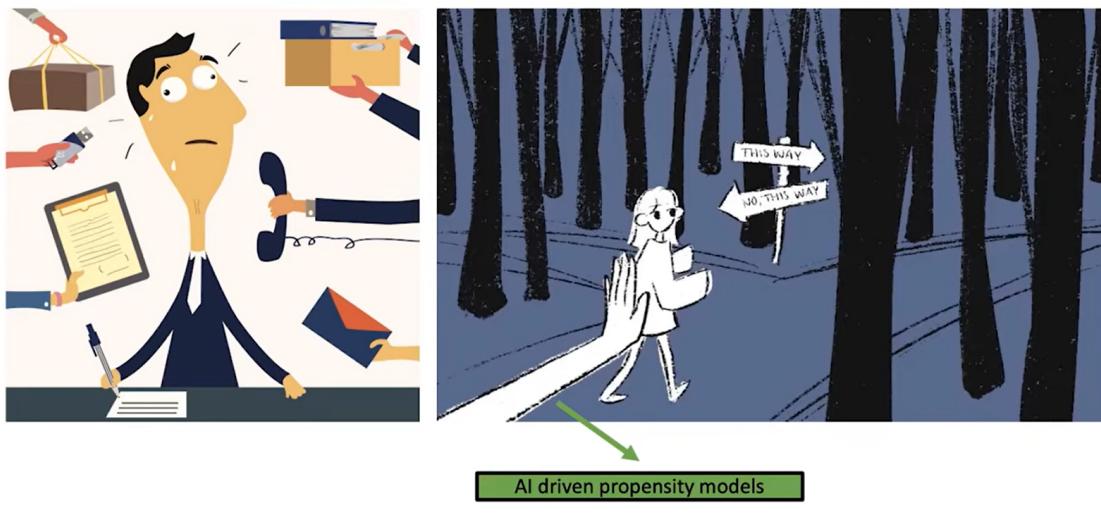
**"Customers are busy,
lazy and often confused,
they are surprisingly
likely to take whatever
option is made the default."**

RICHARD THALER
Behavioral economist and co-author of Nudge

Winner of Nobel Prize in Economics, 2017.



Nudge Economics: Choosing the default option



Lecture 5 - Paybuddy case: The main players and the dataset for credit marketing

Introduction to the Case Study

- Problem:
 - Credit Marketing – Whom to target as the new customers?
 - Credit Risk – How do we decide credit scoring and approval?

Lecture 6 - Review of Data and Basic Statistics

Working on Data

Lecture 7 - Segment analysis working

Working on Data

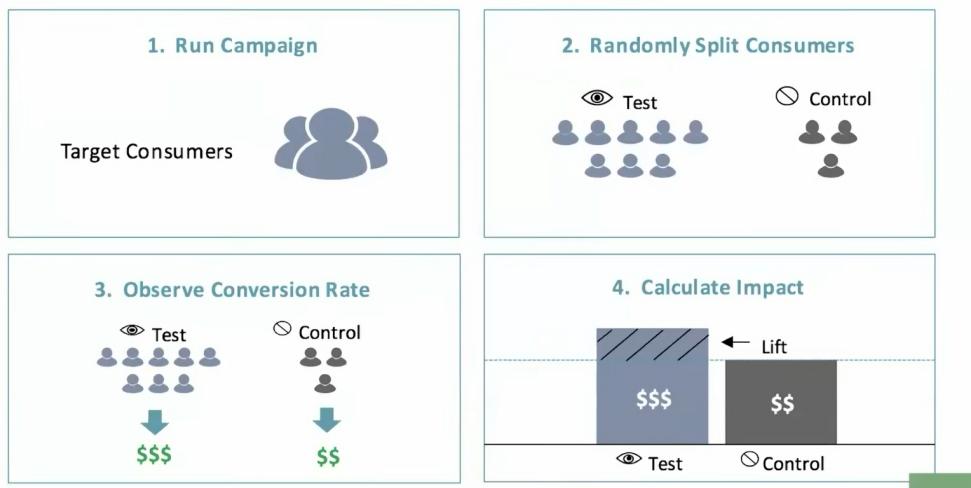
Lecture 8 - Presentation of factors that can be used for nudge

Analysis of results

Week 11

Lecture 1 - A/B Testing introduction

A/B Testing – The Gold Standard for Measurement



Lecture 2 - A/B Testing

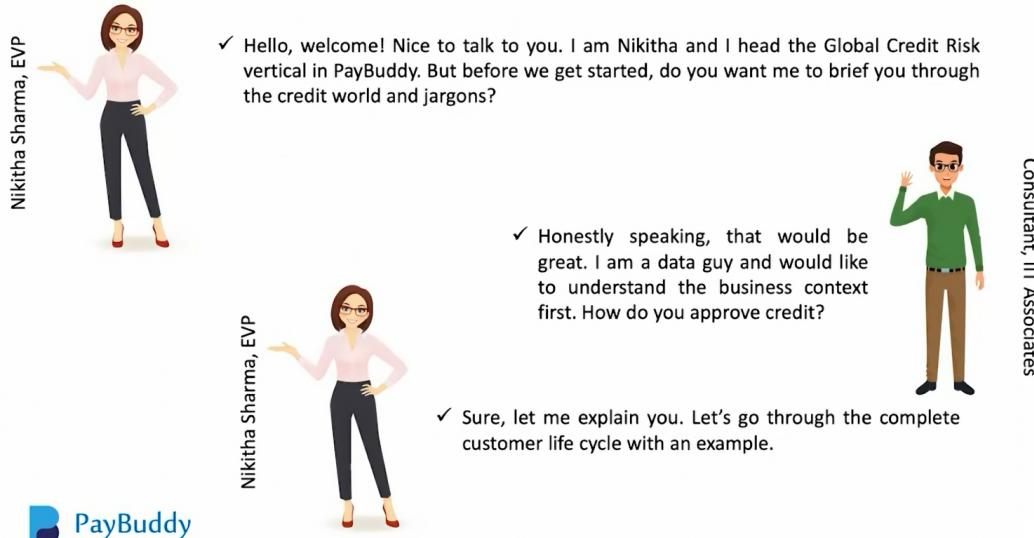
Calculations for dataset

Lecture 3 - A/B testing presentation

Presentations on working of the dataset

Lecture 4 - What is credit risk analysis

Credit Risk (owner Nikitha Sharma, EVP – Global Credit Risk)



Lecture 5 - Explanation of the credit risk dataset

Working and explanation on the dataset

Lecture 6 - Credit risk analysis: review of data

Problem Statement – Credit Risk (owner Nikitha Sharma, EVP – Credit Risk)



Nikitha Sharma, EVP

- ✓ Once we have offered a credit product to a customer, we need to closely track if the customer would default in paying her/his monthly installments (EMIs).
- ✓ From the data, can you help us understand which group of customers have high risk of default and which group of customers are highly creditworthy?
- ✓ This would help us plan our future credit approvals cautiously. Also helps in increasing credit approvals with lower risk of default.



Consultant, IIT Associates



Lecture 7 - Credit risk analysis: monthly trends

Calculations on the dataset

Lecture 8 - Credit risk analysis presentation

Working and explanation of the dataset

Week 12

Lecture 1 - How businesses operate

SUMMARIZING LEARNINGS FROM THE CASE STUDIES

LEARNINGS FROM THE 4 CASE STUDIES

- How businesses operate
- How Businesses are Managed
- What kind of data originates from business processes
- How to process data
- Using worksheets to organize data

HOW BUSINESSES OPERATE: LEARNINGS

Any business consists of multiple functions: sales and marketing, inventory management and logistics, production, purchase, finance and HR

Each function has multiple KPAs (Key Performance Areas)

- Achieving KPAs requires coordination with other functions

Every function monitors its own progress on a regular basis using dashboards

- Frequency varies – could be daily, weekly, monthly or even longer – depending on the KPA

Lecture 2 - How businesses are managed

HOW BUSINESSES ARE MANAGED: KEY LEARNINGS

Product Portfolio Management: analysis of revenue and sales volume

Inventory management: trade-off between fulfillment (no stock-outs) and working capital

External environment can impact business: Seasonality and business volatility needs to be managed

Planning and Scheduling is very important

- Planning smoothens out production volume and optimizes material purchases
- Scheduling helps to identify issues in upstream activities that could impact downstream tasks

A/B/C model for material management

Managing efficiency by looking at constituent factors

HOW BUSINESSES ARE MANAGED: KEY LEARNINGS

Enabling functions need to look ahead and plan

Channels help expand an organization's capabilities and gives flexibility to operations

Marketing can use Nudges can shape consumer behaviour

- Demographic data can be used to define rules for this

A/B testing can be used to gauge consumer response

Managing trade-off between risk and returns

- Risk can be evaluated using demographic data and historical profile of the consumer

Lecture 3 - Processing data from business processes using spreadsheets

WHAT KIND OF DATA ORIGINATES FROM BUSINESS PROCESSES: KEY LEARNINGS

Data is typically stored in databases, that are typically linked together using an Enterprise Resource Planning (ERP) system

Data is sometimes captured digitally at source (Fabmart, Paybuddy) but must often be entered manually (Ace Gears, Tech Enterprises)

- What data to capture and how requires deep understanding of the underlying process

ERP typically captures raw data only which can be extracted as tables

- Data elements could be structured or unstructured
- HR data tends to be unstructured

Data could be "dirty" – mistakes, or could have missing elements

- Requires data cleaning

Data must be processed in various ways in order to extract meaningful insights

HOW TO PROCESS DATA : KEY LEARNINGS



HOW TO PROCESS DATA : KEY LEARNINGS

SKU	01/04/21			02/04/21				
	Open Stock	Sales	Incoming	Closing Stock	Open Stock	Sales	Incoming	Closing Stock
F01	50	14	7	43	43	9	9	43
F02	30	13	4	21	21	5	4	20
F03	18	8	5	15	15	5	4	14
F04	20	1	2	21	21	1	3	23
F05	13	2	3	14	14	0	3	17
F06	6	0	2	8	8	3	2	7
F07	10	4	2	8	8	1	2	9
F08	2	1	1	2	2	0	1	3
F09	2	0	1	3	3	1	1	3
F10	2	0	1	3	3	0	1	4

Ledger Analysis to detect Stock-outs



Trend plotting to enable resource planning

HOW TO PROCESS DATA : KEY LEARNINGS

SALES DETAILS (GEAR ASSEMBLIES)	Average Sales Price (Oct 2020 - March 2021)	Direct Materials	Direct Labour	Production Overhead	Cost of Goods Sold	Gross Margin %	Expected Margin %
Gear Assembly 3 (BS4/6)	625.20	152	95	165	412.00	213.2	34.1% Yes
Gear Assembly 4 (BS4/6)	515.89	130	65	145	340.00	175.9	34.1% Yes
Gear Assembly 5 (BS4/6)	352.06	82	35	115	232.00	120.1	34.1% Yes
Gear Assembly 6 (BS4/6)	205.00	60	25	45	130.00	75.0	36.6% Yes

Unit level profitability to improve operational efficiency



Reorder point and safety stock to ensure smooth operations

HOW TO PROCESS DATA : KEY LEARNINGS

Channel	Average_c Normalised_A % of total						Rank
	Percentag e_count	count_per_ week	verage_count	application _per_week	Normalised score	Total score	
Direct website	0.2037	2.4000	0.9231	0.6282	0.9285	2.6835	1
Employee referral	0.2010	2.4000	0.9231	0.5584	1.0000	2.6826	2
LinkedIn	0.2141	2.6000	1.0000	0.5366	0.9111	2.6618	4
Third Party	0.3812	1.8000	0.6923	0.6849	0.9138	2.6722	3

Converting unstructured to structured data

Generating rules to automate decision making

Ranking options using weighted scores

Some Other Learnings

USING WORKSHEETS TO ORGANIZE DATA

Basic functions in worksheets such as sum, max, min, average

Sorting and filters

Vlookup to pull data from one table into another

Pivot tables to consolidate and slice data

Charting tables using line graphs, bar charts, pie charts, scatter plots etc

BDM

Introduction to

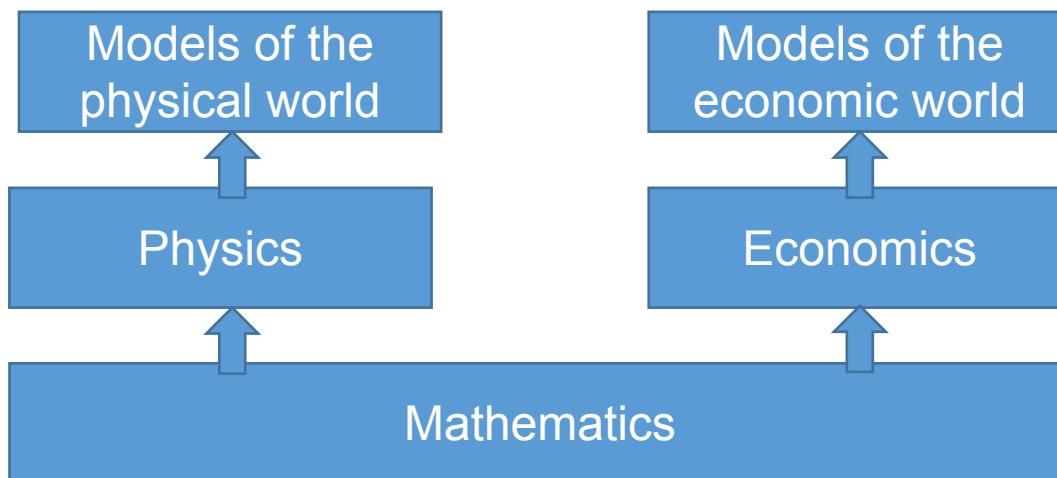
Economics

Need for an underlying method of modeling

- Where do we start if we have to understand what companies do?
- What model do we use to interpret the data that is generated from their operations?
- What does the consumption data indicate in terms of future consumption trends?
- What does the data about trade in goods and services tell us?

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- What model do we use to interpret the data that is generated from their operations?
- What does the consumption data indicate in terms of future consumption trends?
- What does the data about trade in goods and services tell us?



Economics tries to create mathematical models that can be used to explain the economic behaviour of people and firms

Trade creates value



Punjab

Punjab produces excess wheat
that they cannot consume locally



Tamil Nadu

Tamil Nadu produces makes more
mobile phones than what is needed locally

Trade creates value



Punjab

Punjab produces excess wheat
that they cannot consume locally

People in Punjab need mobile phones
which are not made locally

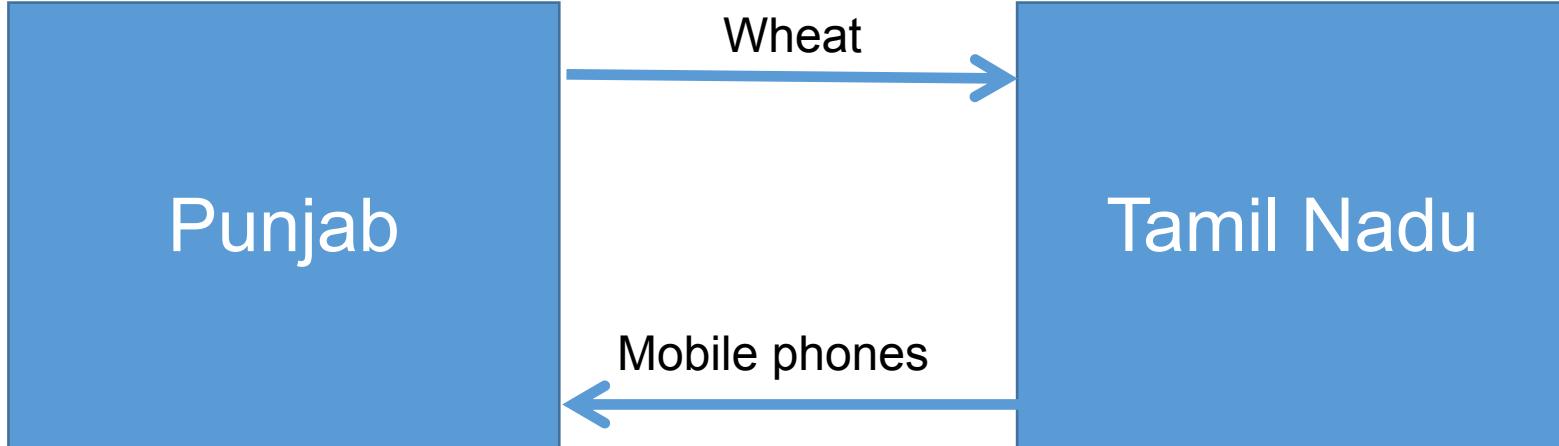


Tamil Nadu

Tamil Nadu produces makes more
mobile phones than what is needed locally

People in Tamil Nadu need wheat which is
not grown in adequate quantities locally

Trade creates value



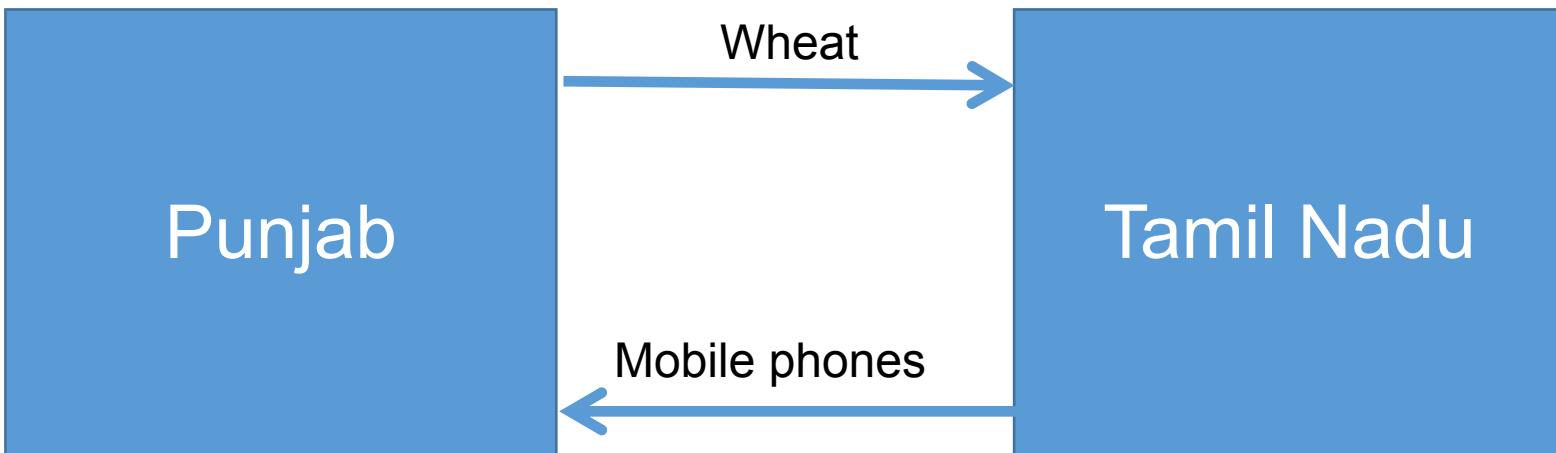
Punjab produces excess wheat that they cannot consume locally

People in Punjab need mobile phones which are not made locally

Tamil Nadu produces makes more mobile phones than what is needed locally

People in Tamil Nadu need wheat which is not grown in adequate quantities locally

Trade creates value



Punjab has very little value for
the excess wheat

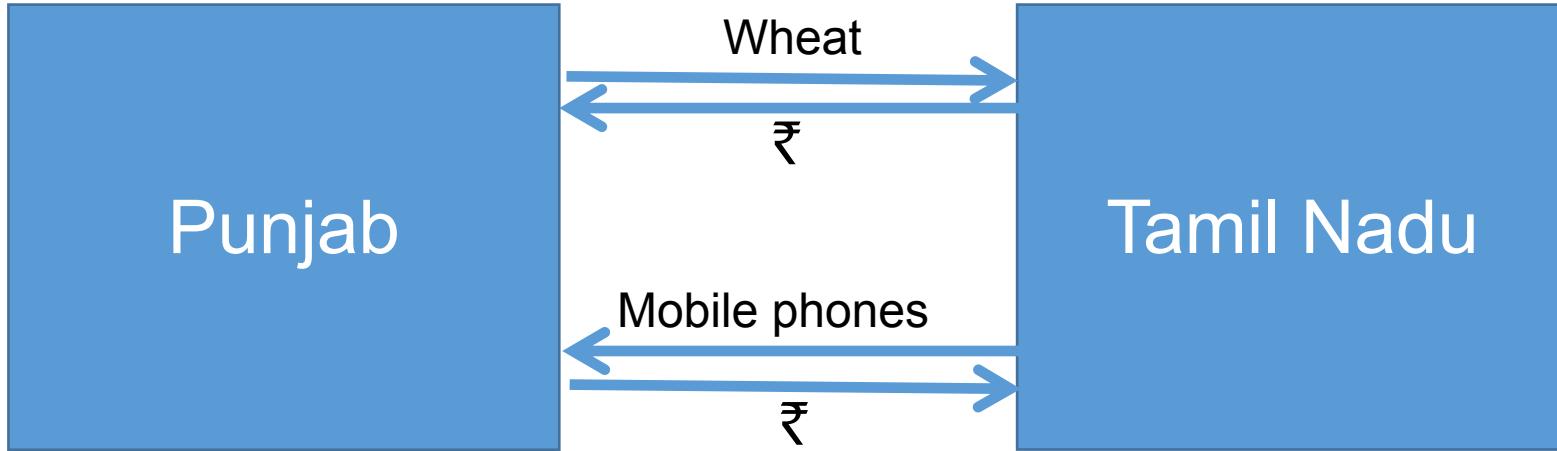
Wheat → Tamil Nadu values wheat highly

Punjab values mobile phones highly

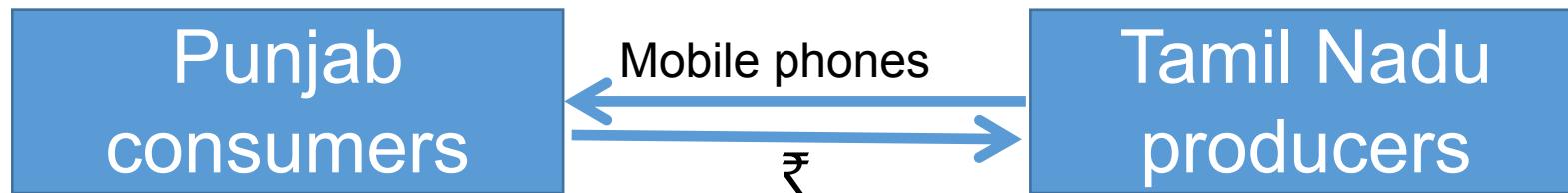
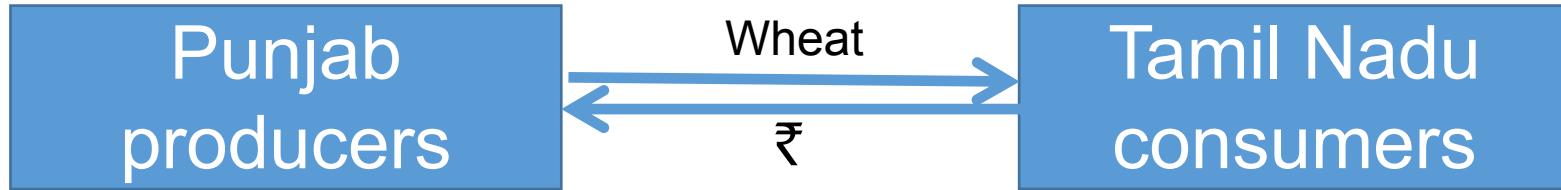
Mobile phones ← Tamil Nadu has very little value
for the excess mobile phones

The barter trade between Punjab and Tamil Nadu increases value for both

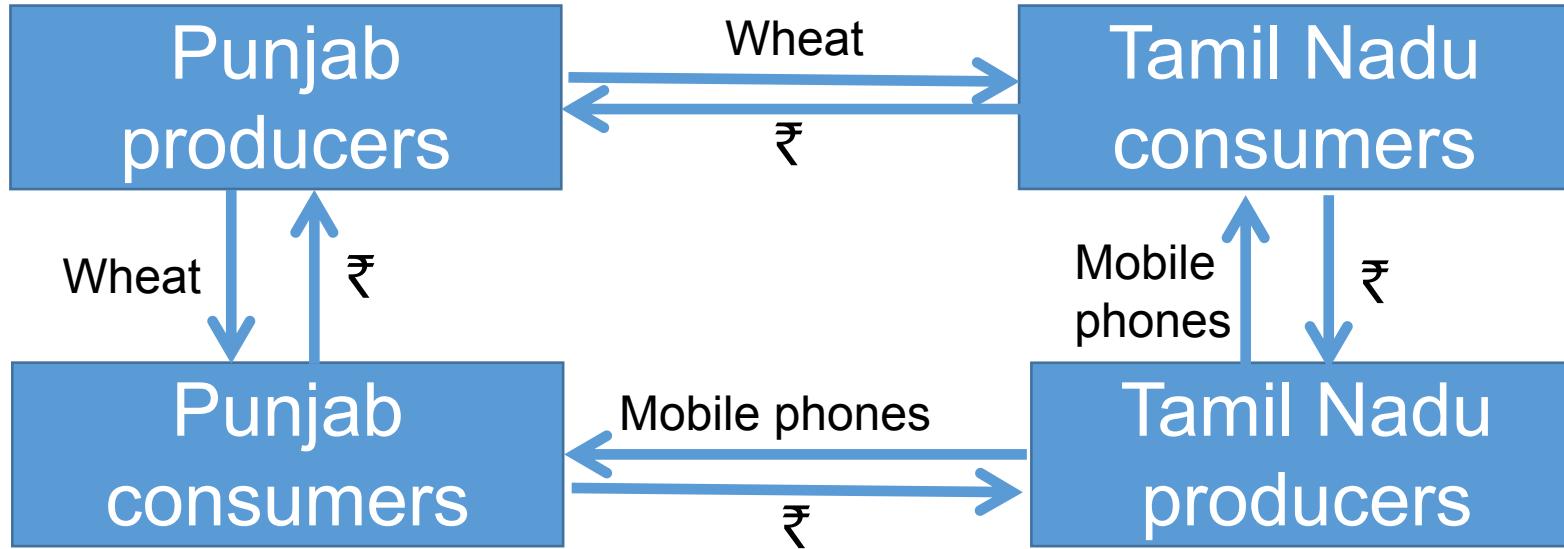
Trade is settled using money



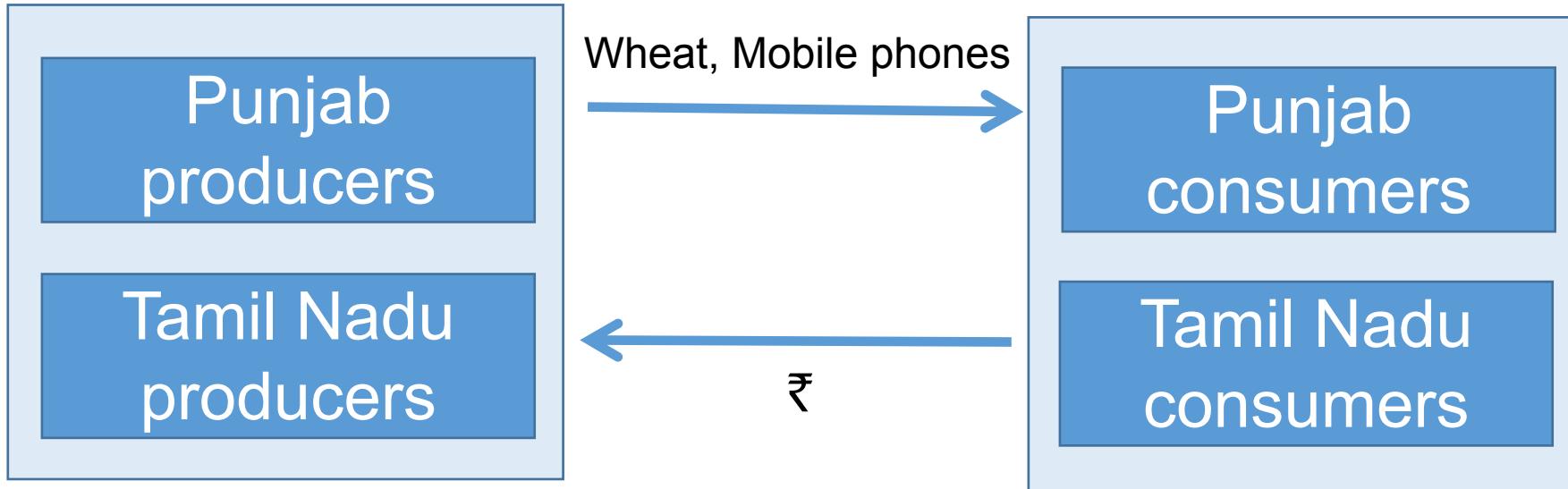
Producers and Consumers



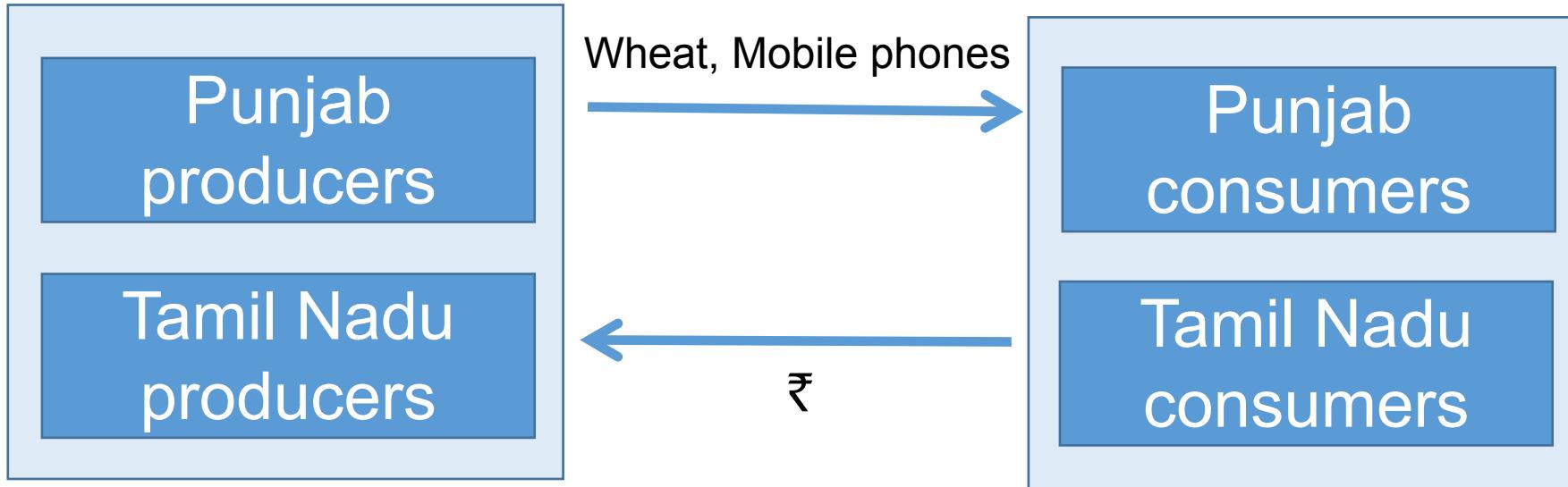
Producers and Consumers



Producers and Consumers

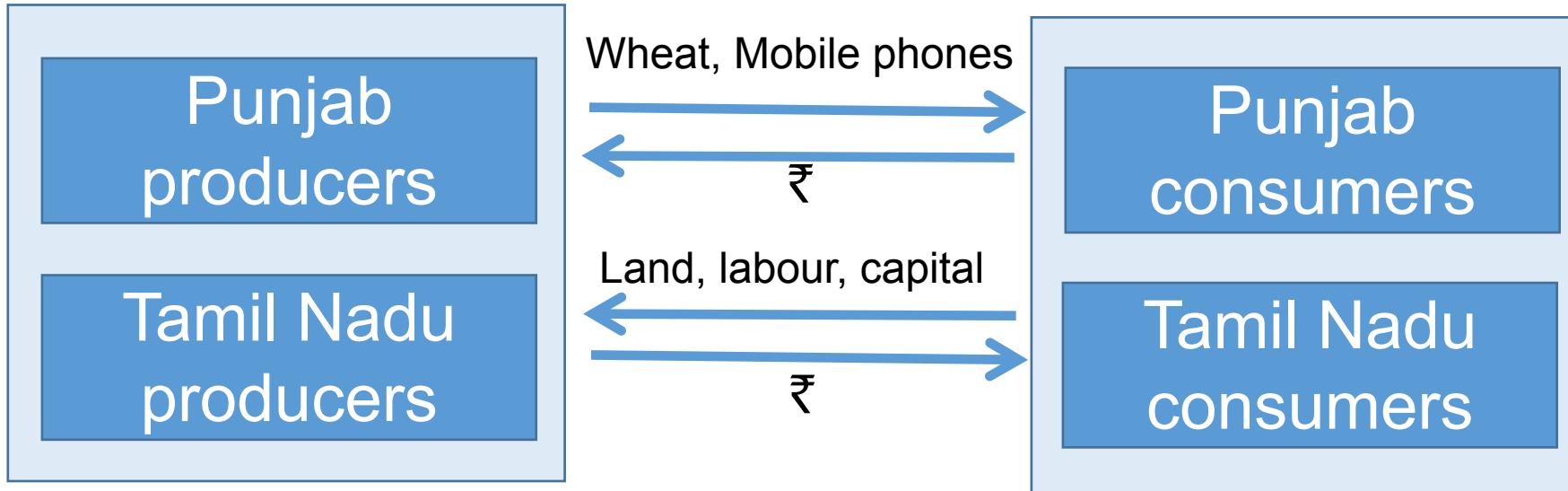


Producers and Consumers



Where do the consumers get their ₹?

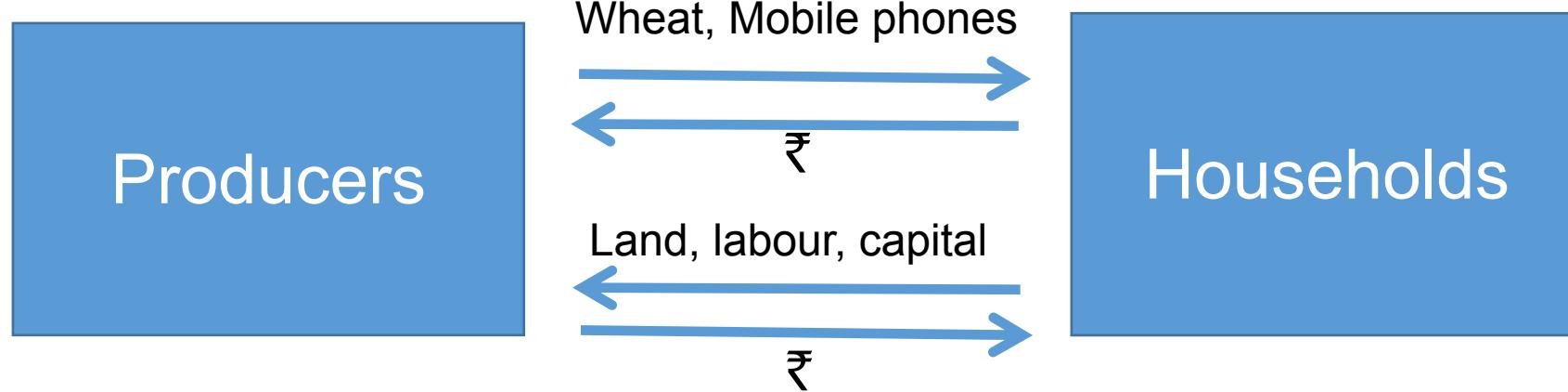
Producers and Consumers



Producers and Consumers



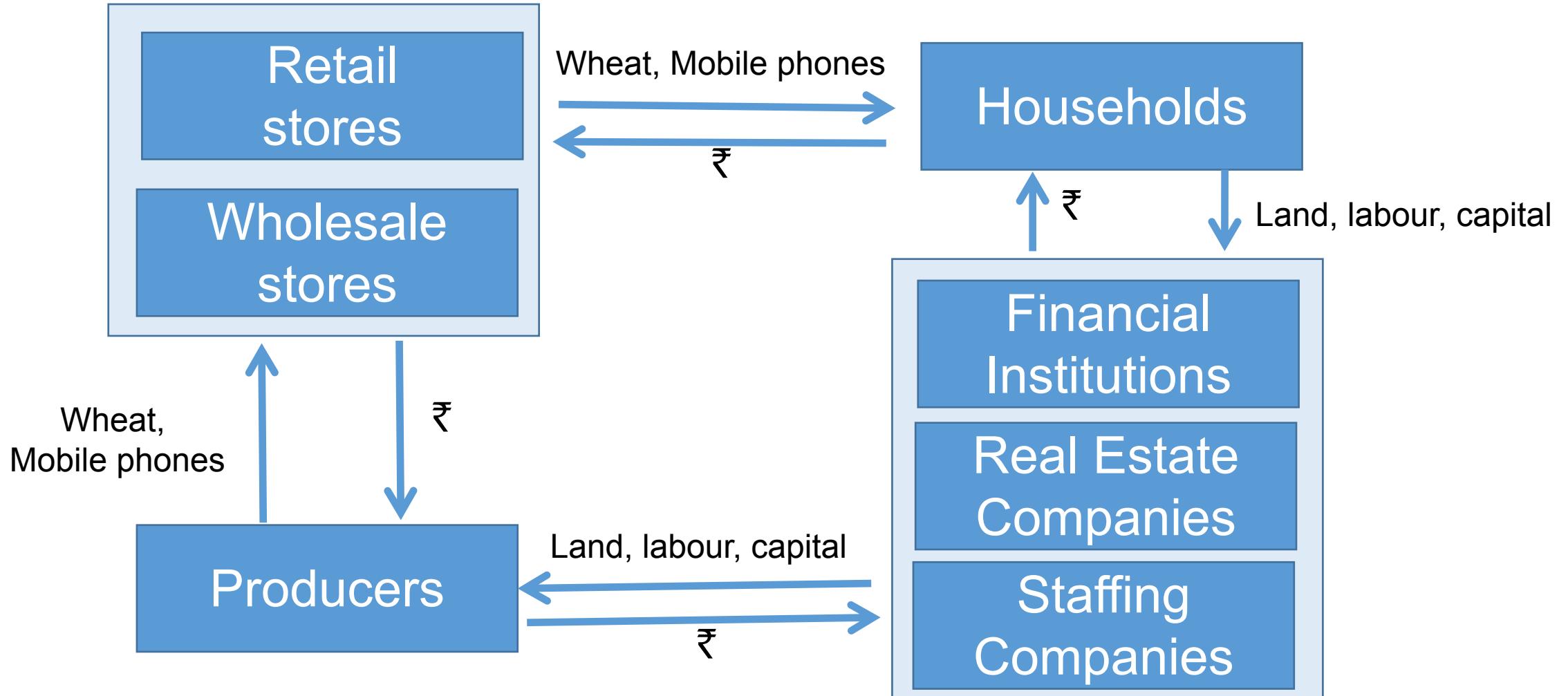
Household consumption



Wheat is used to make food for all the people in the house

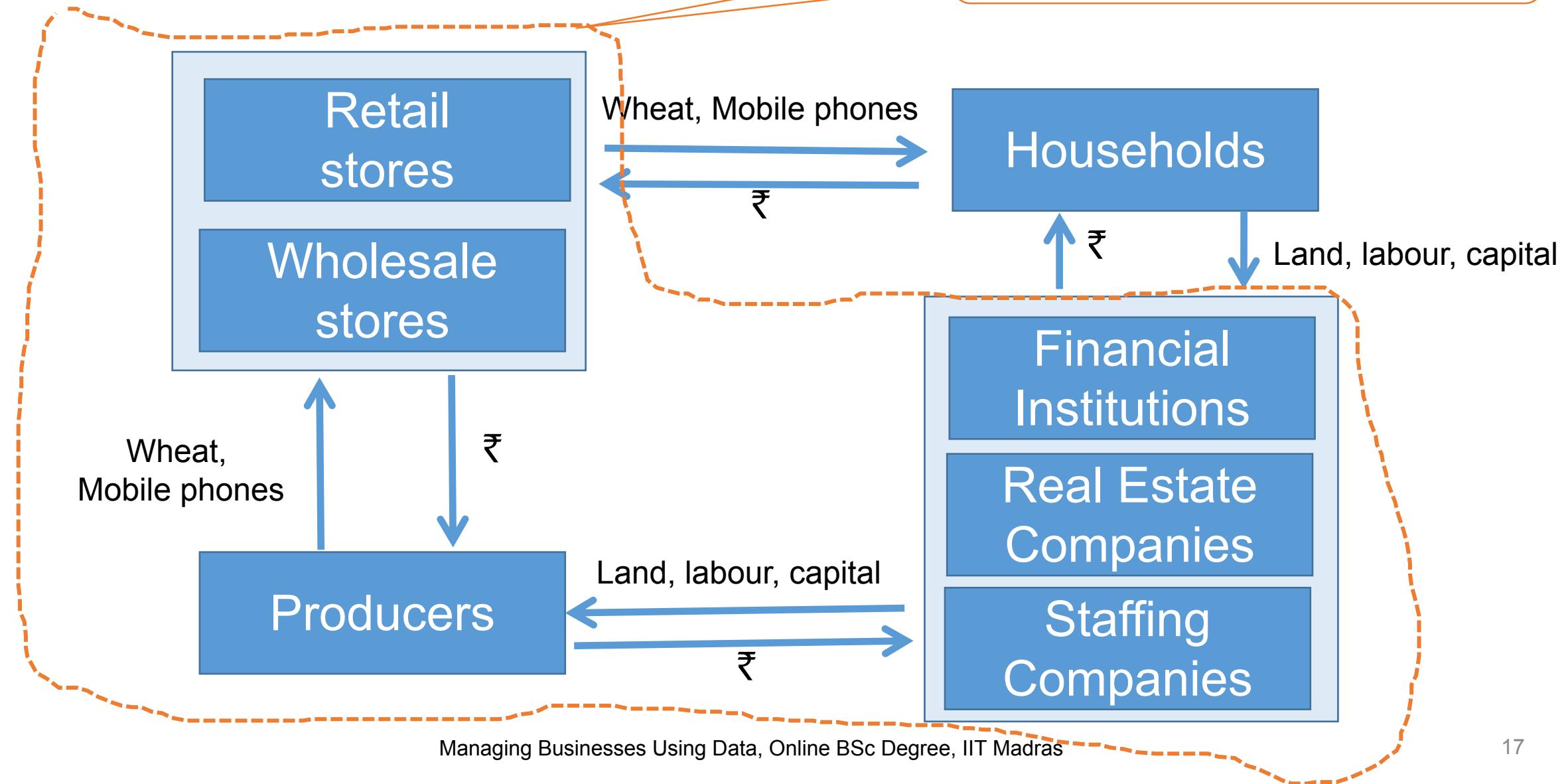
Many items that we consume are for all the people in our house, not only for ourselves

Need for intermediaries

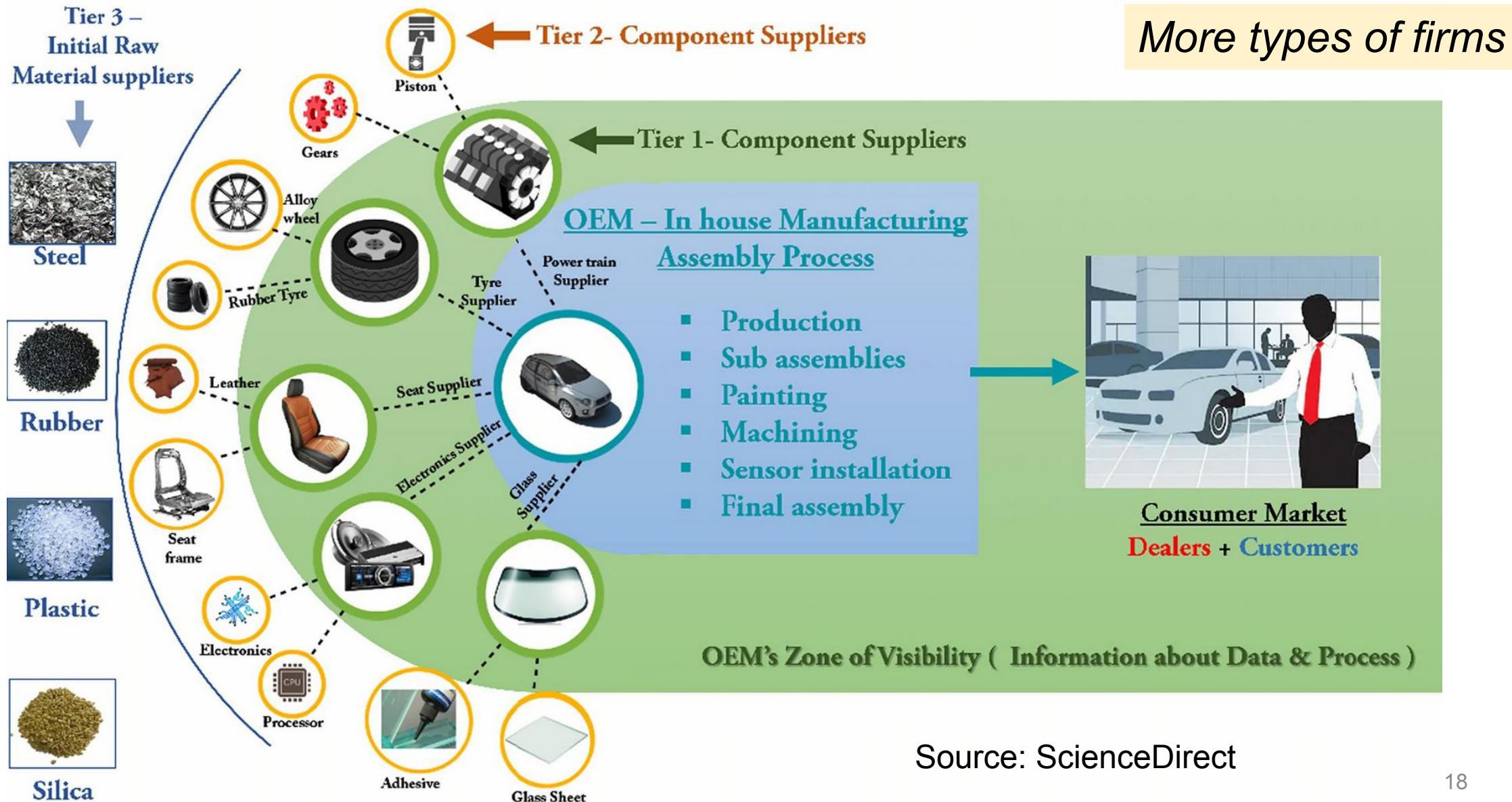


Need for intermediaries

All these entities are called firms

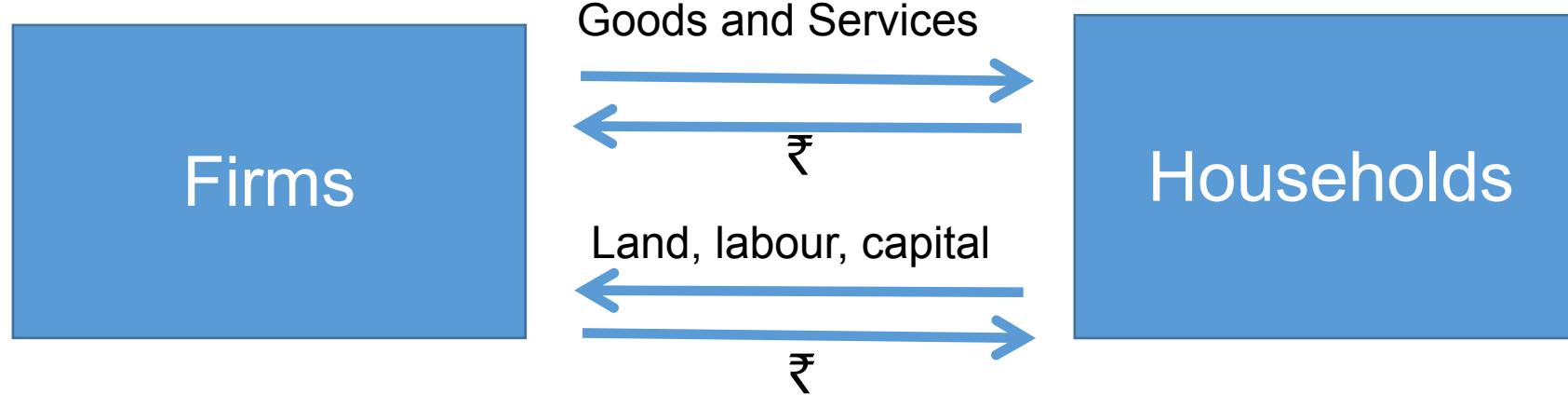


Production value chain - e.g. cars

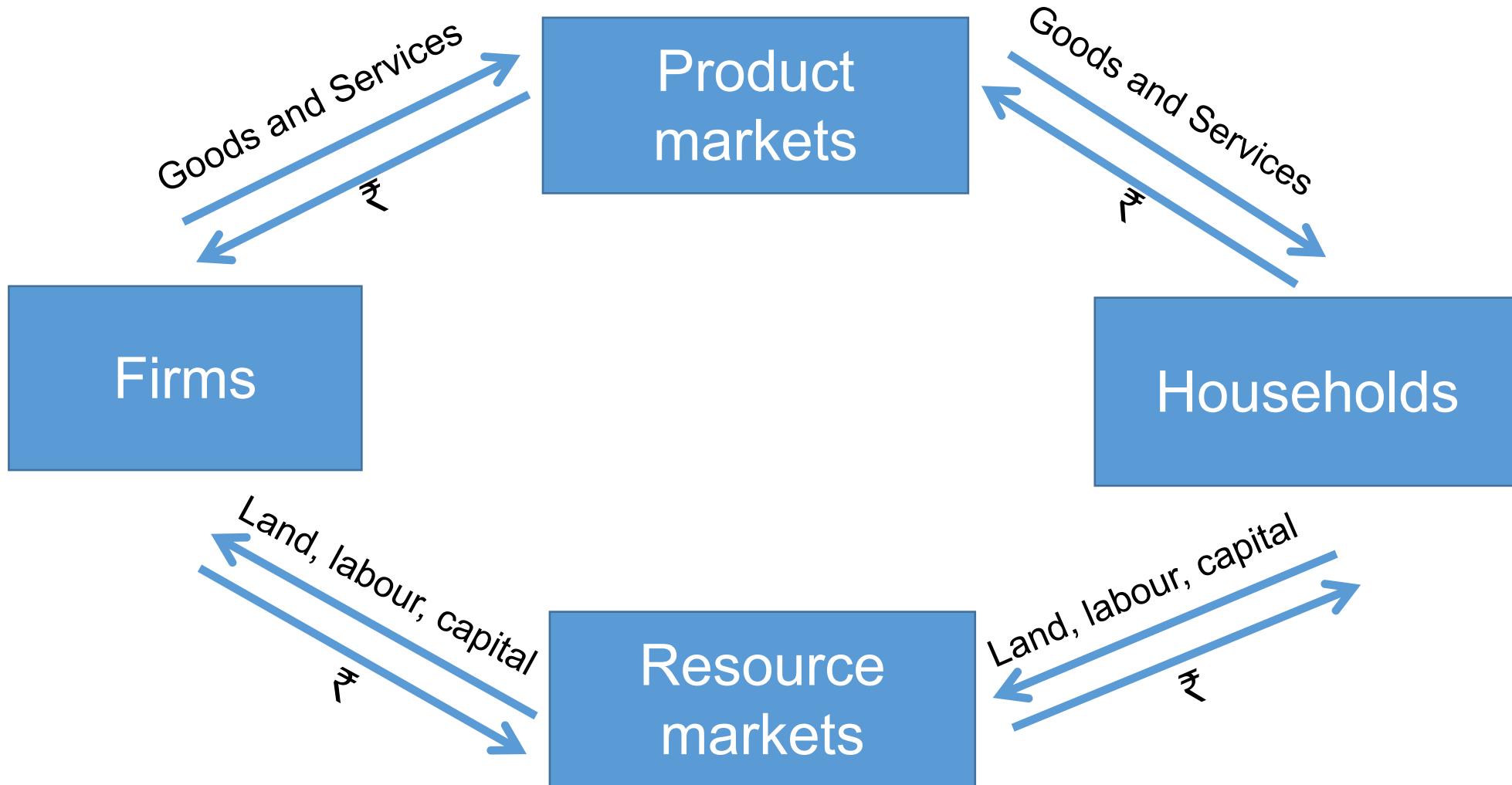


Source: ScienceDirect

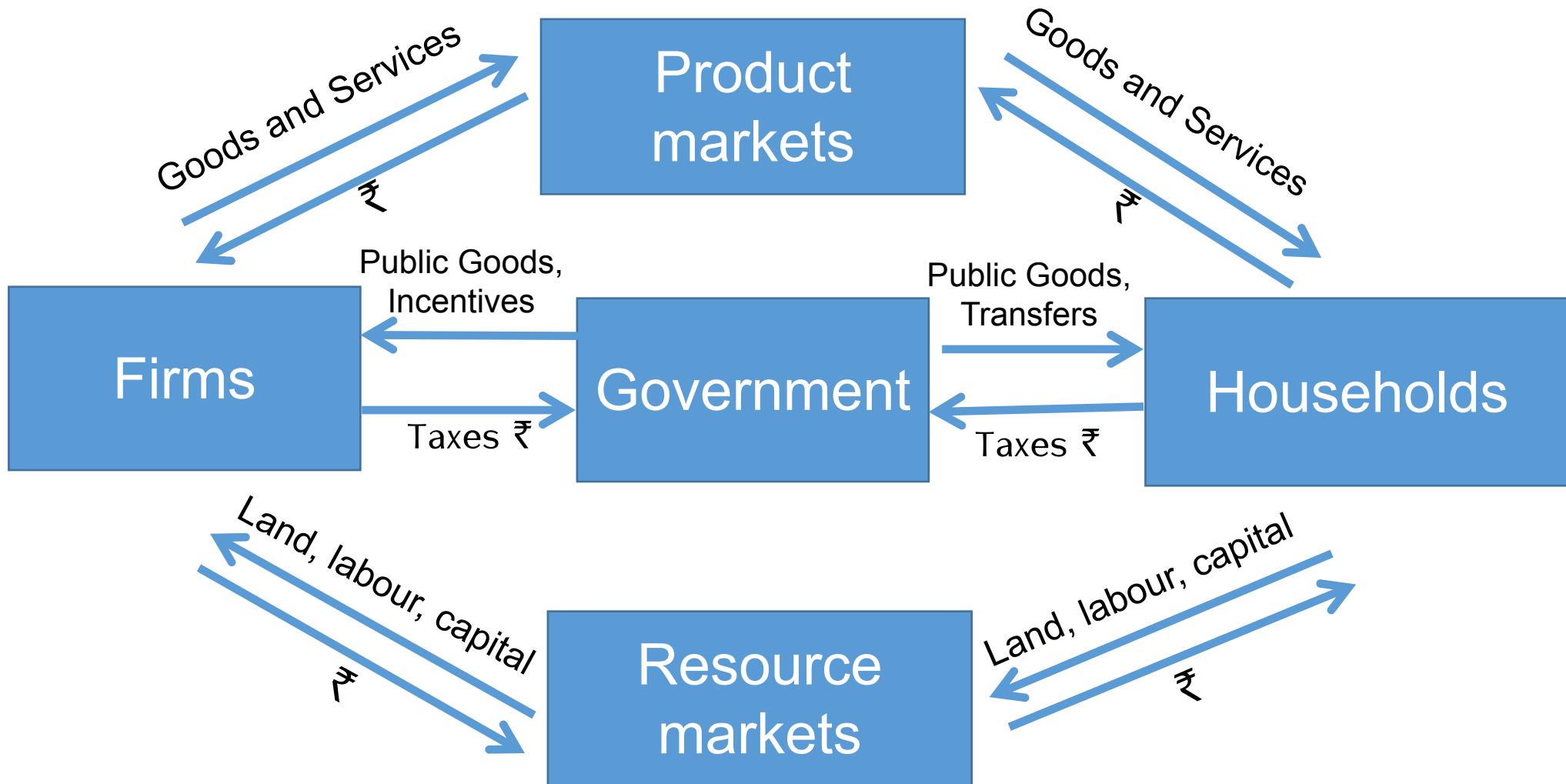
Circular flow model



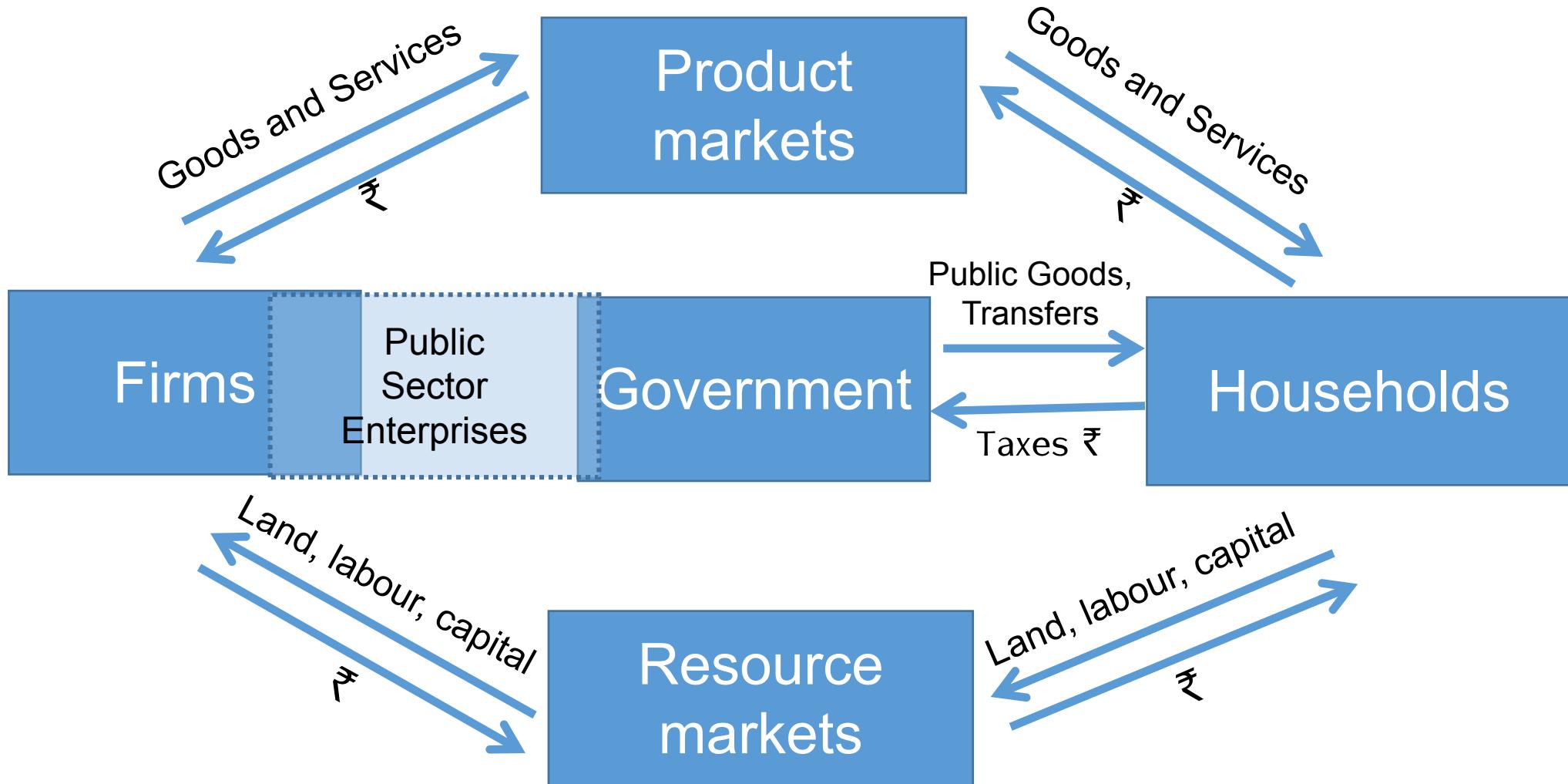
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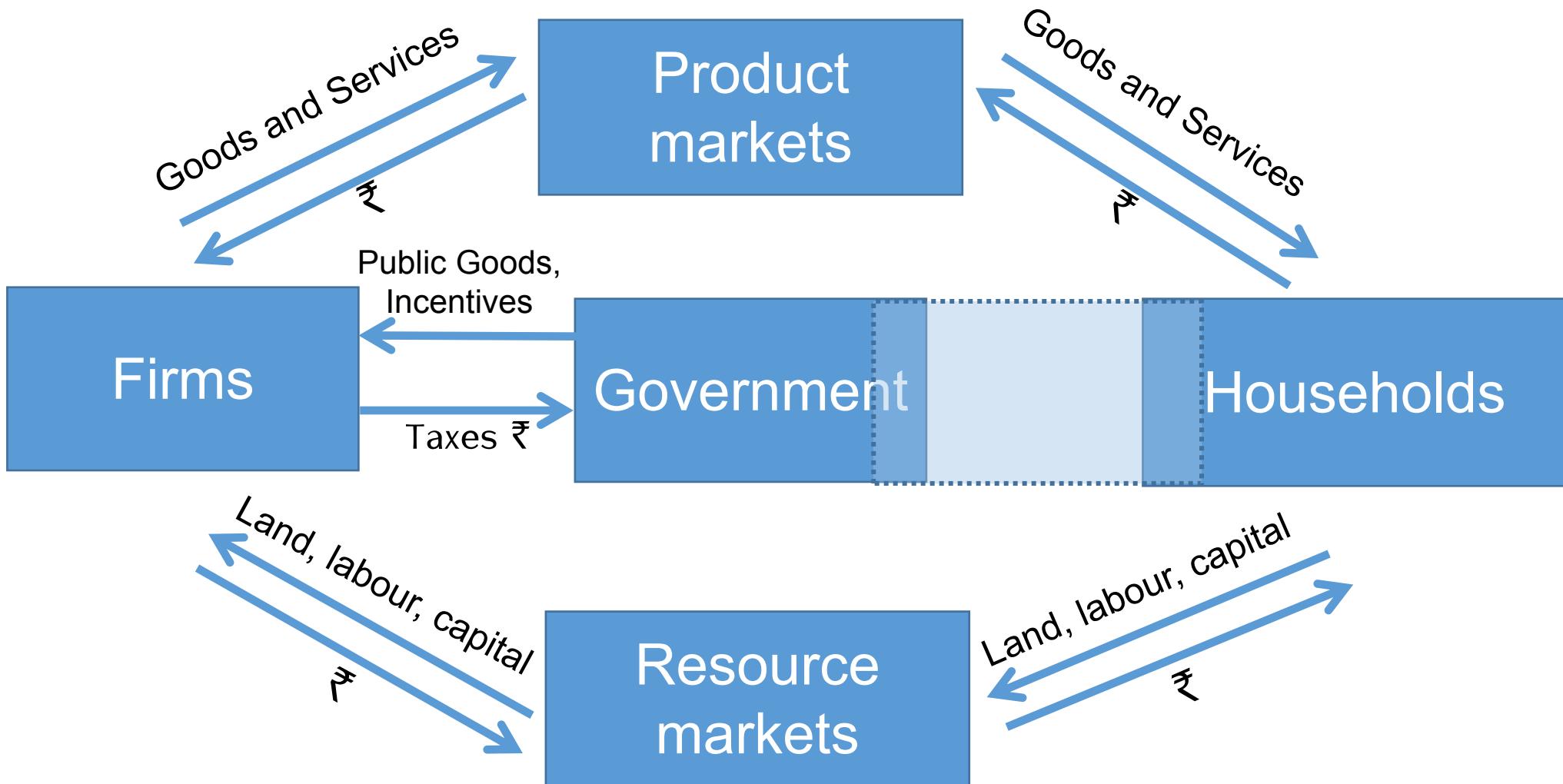
Role of the government



Government as a producer/firm



Government as a consumer

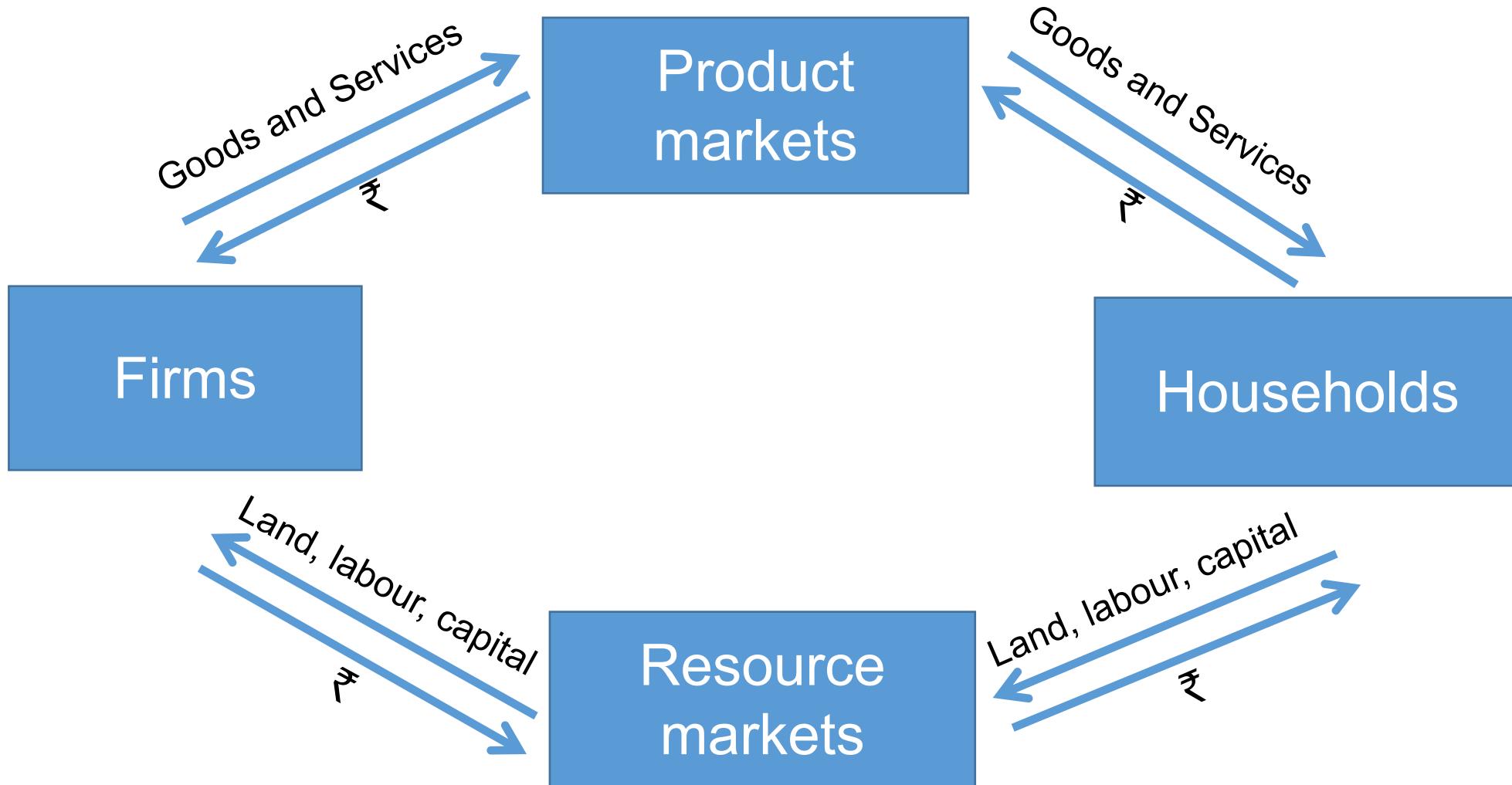


End of Intro

BDM: Introduction to Economics

The law of demand and supply

Circular flow model

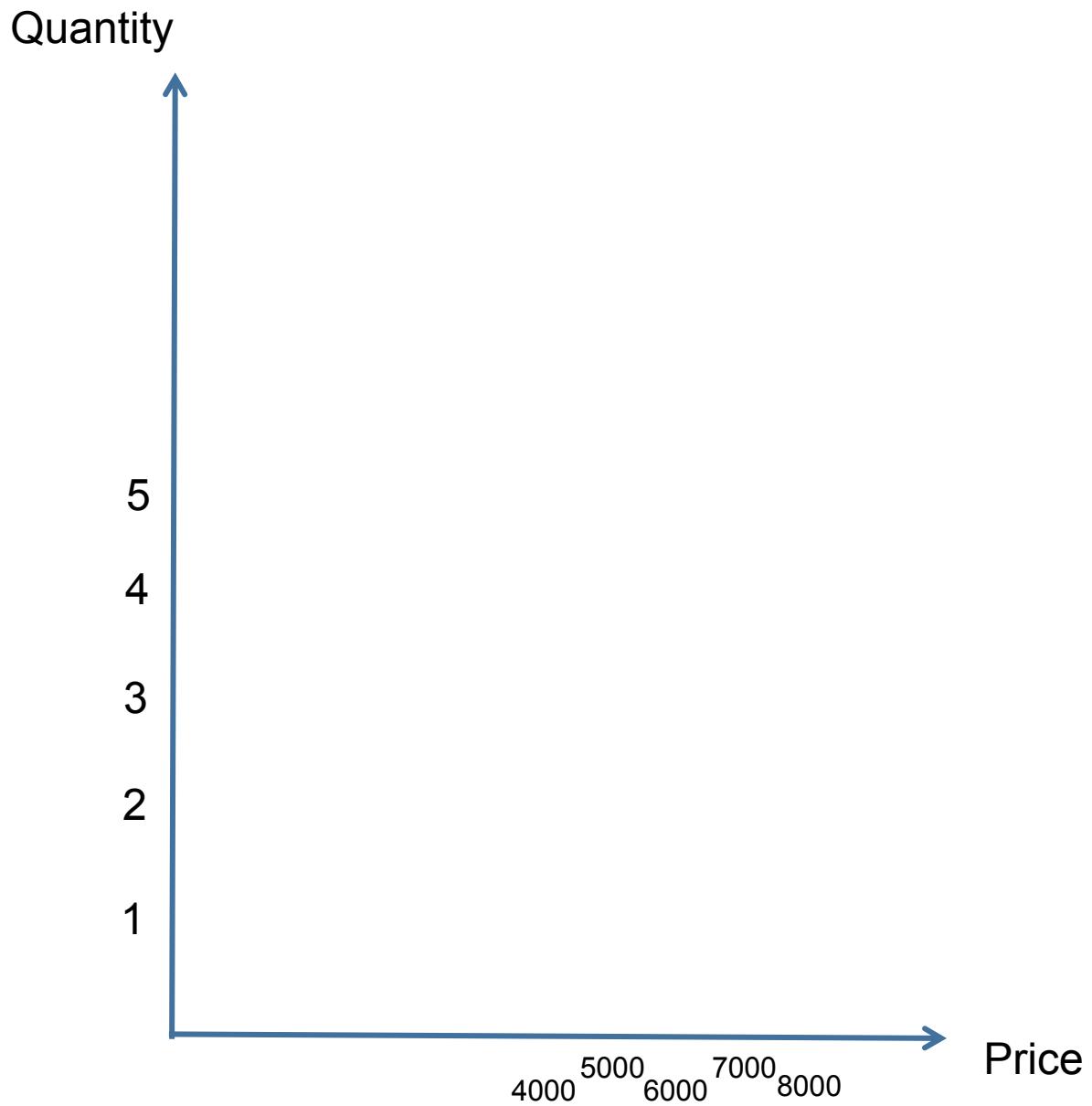


Willingness to pay

- Single customer who is willing to pay Rs 8000 for a smart phone.
- If there is any producer who is willing to sell a phone below Rs 8000, then one phone will be sold in the market

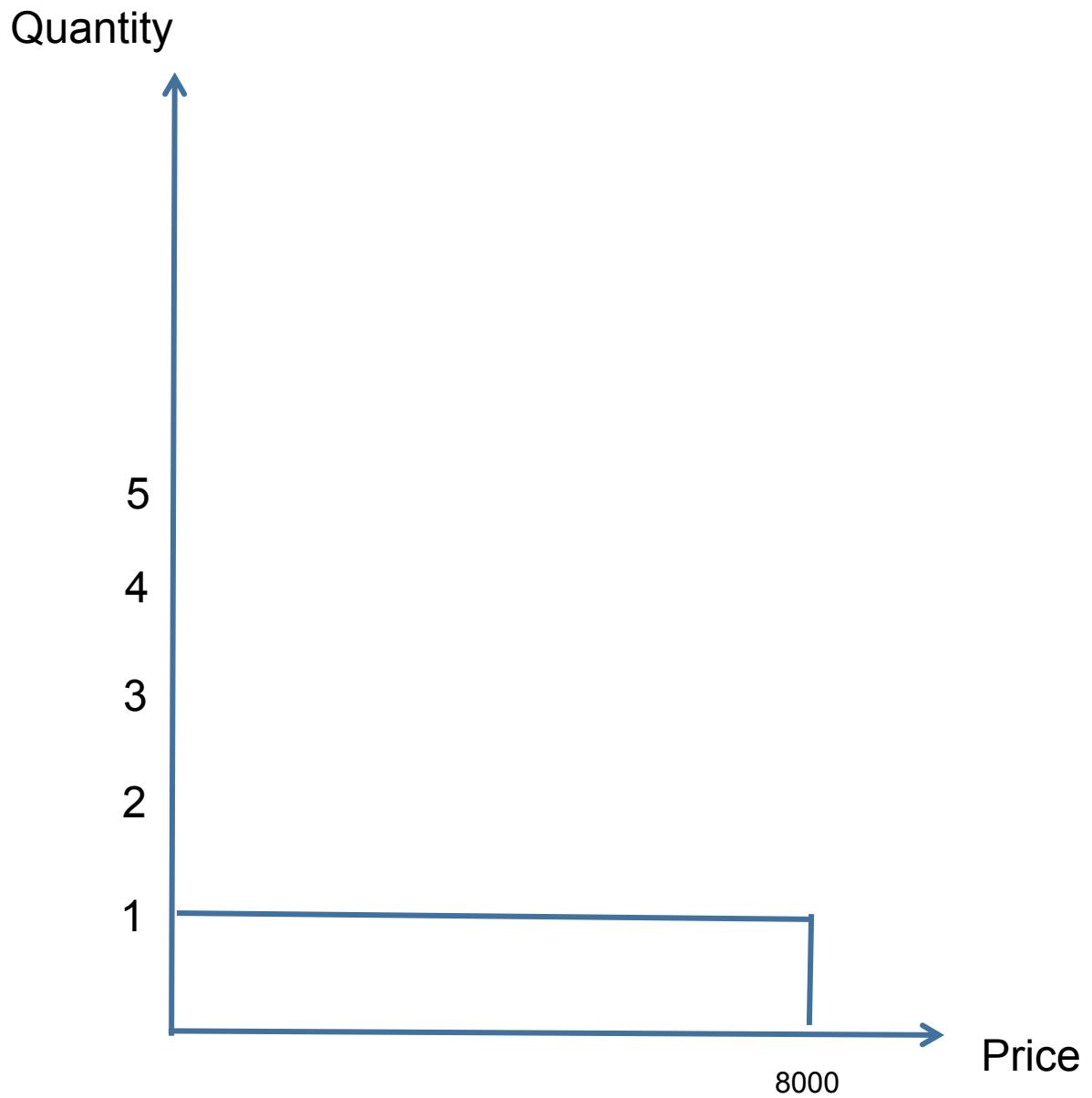
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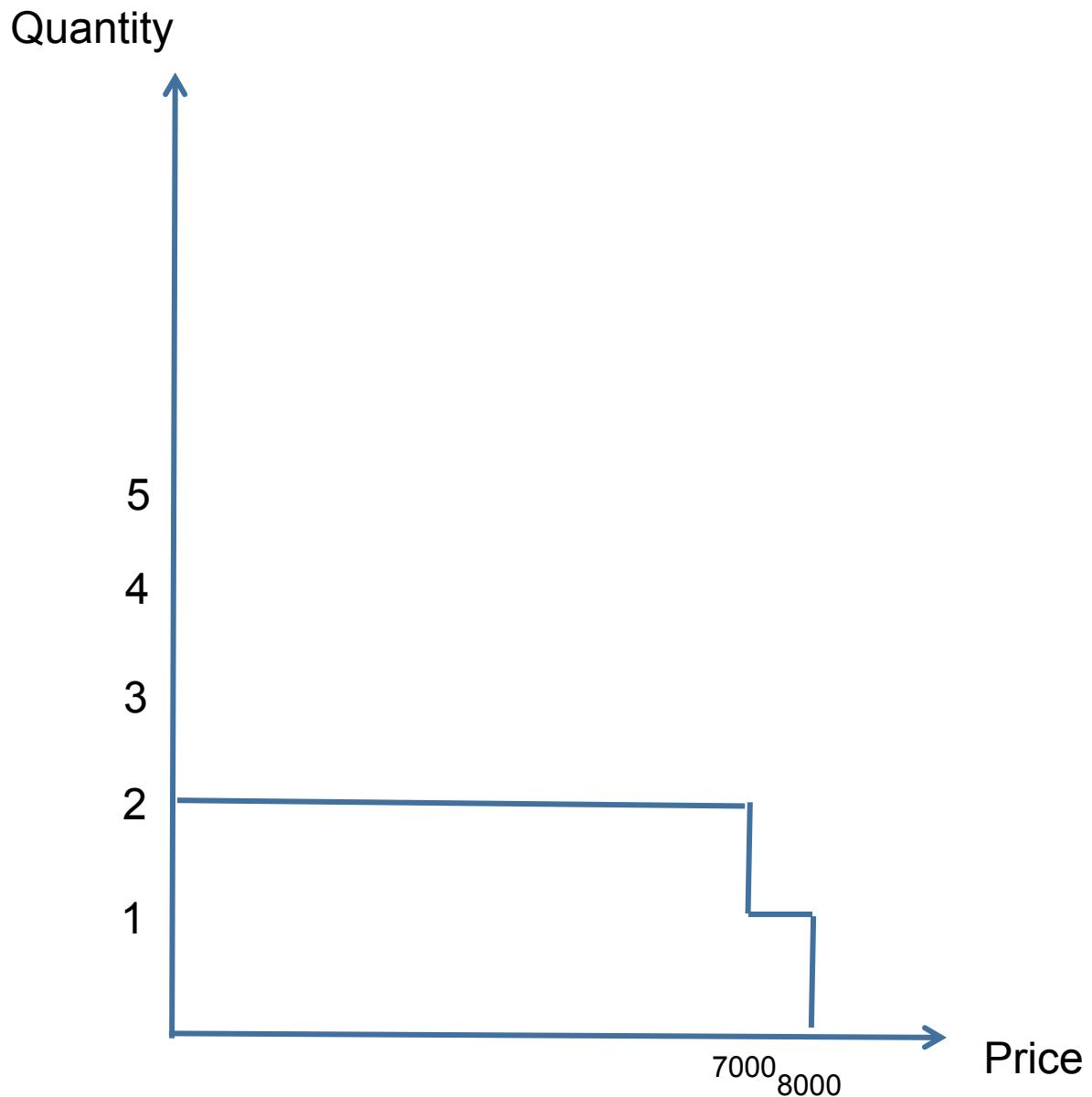
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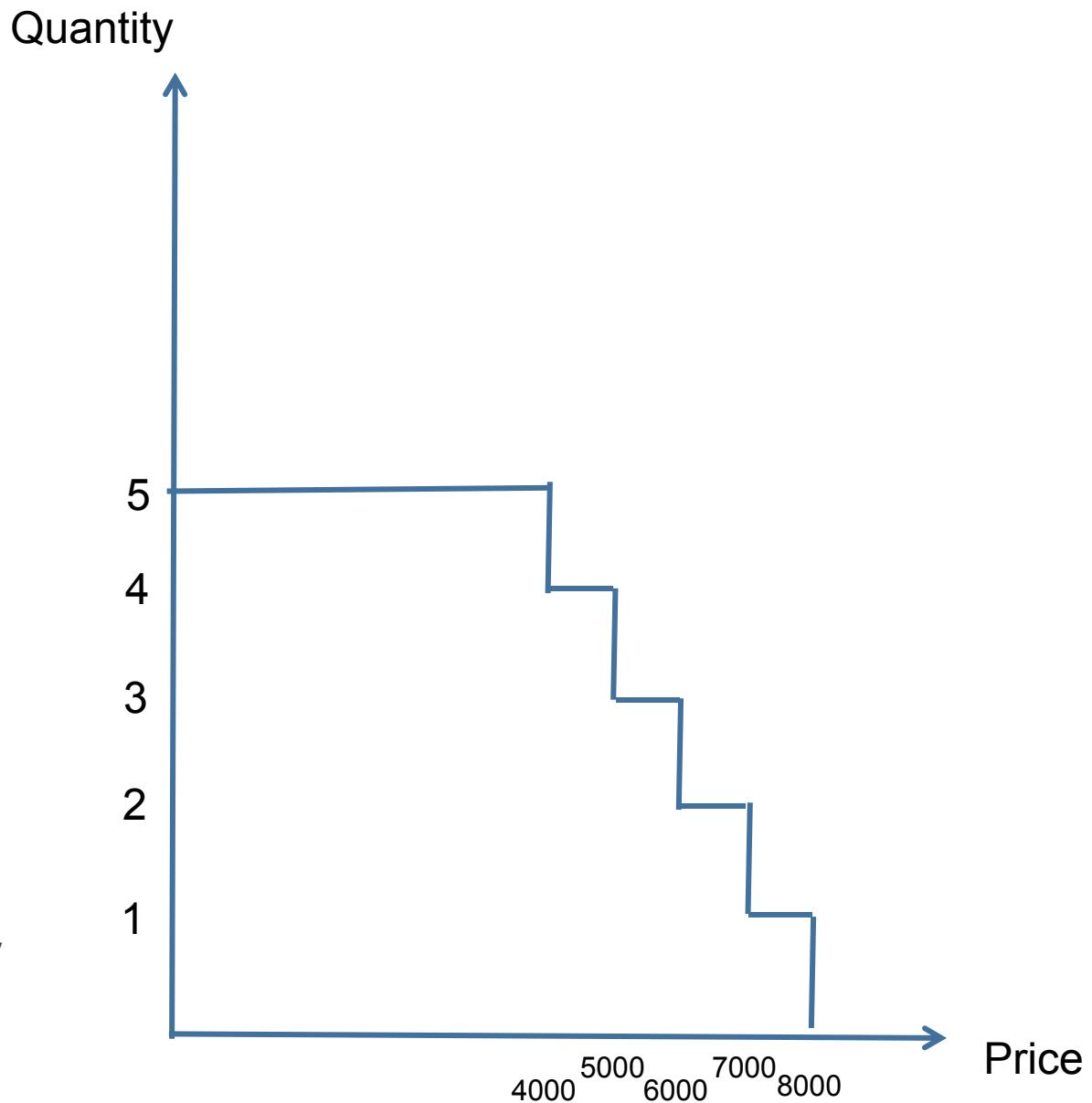
Willingness to pay

- Single customer who is willing to pay Rs 8000 for a smart phone.
- If there is any producer who is willing to sell a phone below Rs 8000, then one phone will be sold in the market
- If there is another customer who is only willing to pay Rs 7000, then:
 - two phones will be sold in the market only if the price is below Rs 7000.
 - between 7000-8000, only one phone will be sold
 - above 8000, no phones will be sold



Willingness to pay

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- If there is another customer who is only willing to pay Rs 7000, then:
 - two phones will be sold in the market only if the price is below Rs 7000.
 - between 7000-8000, only one phone will be sold
 - above 8000, no phones will be sold
- If there are 5 customers with willingness to pay:
 - at Rs 4000, 5000, 6000, 7000, 8000 respectively
 - then the demand for phones will be as shown in the figure



Demand vs Price

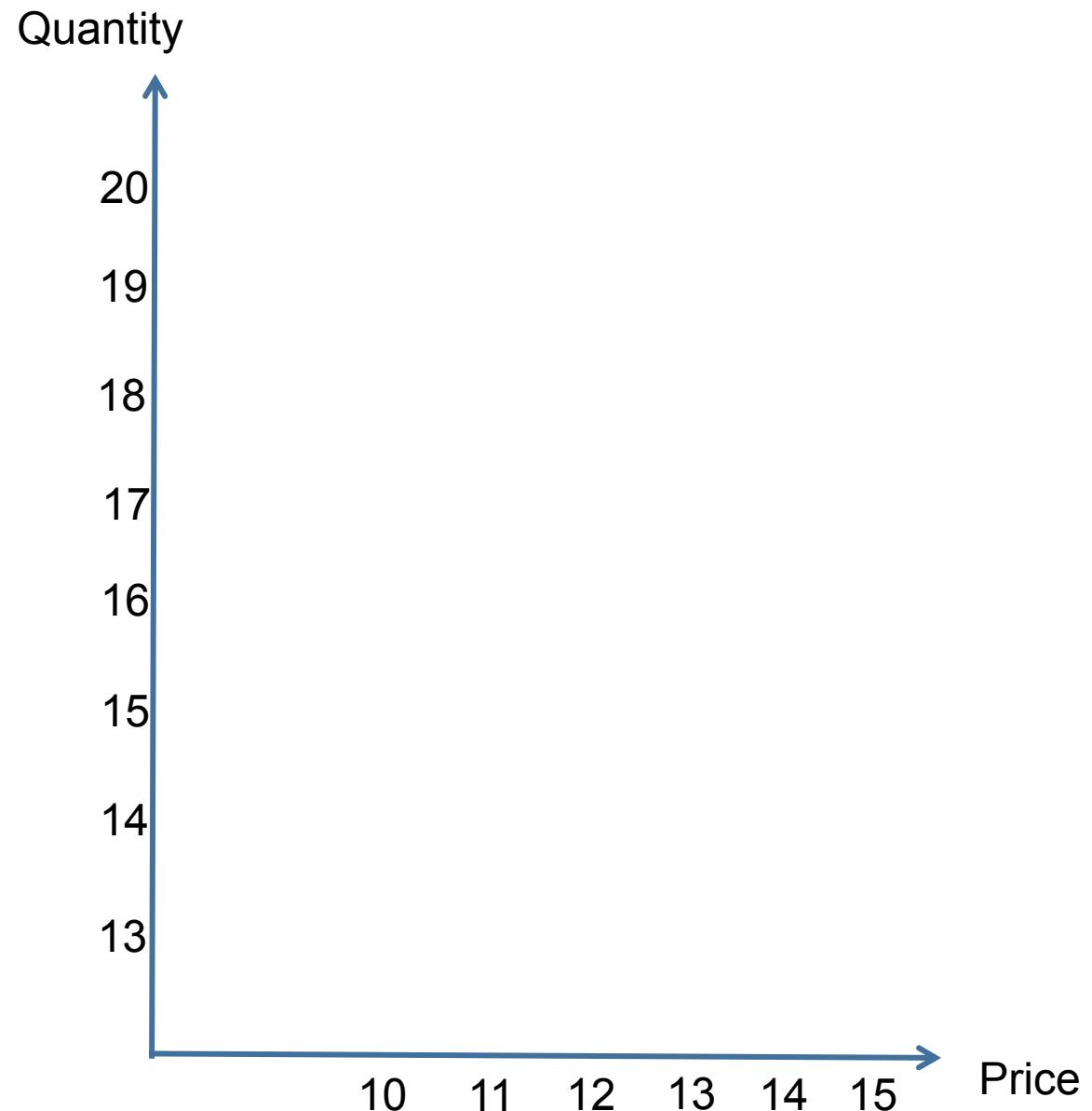
- The amount of wheat that a single customer will buy at different prices is shown in the table below:

Price in Rs/Kg	Quantity (kg)
10	20
11	18
12	16
13	15
14	14
15	13

Demand vs Price

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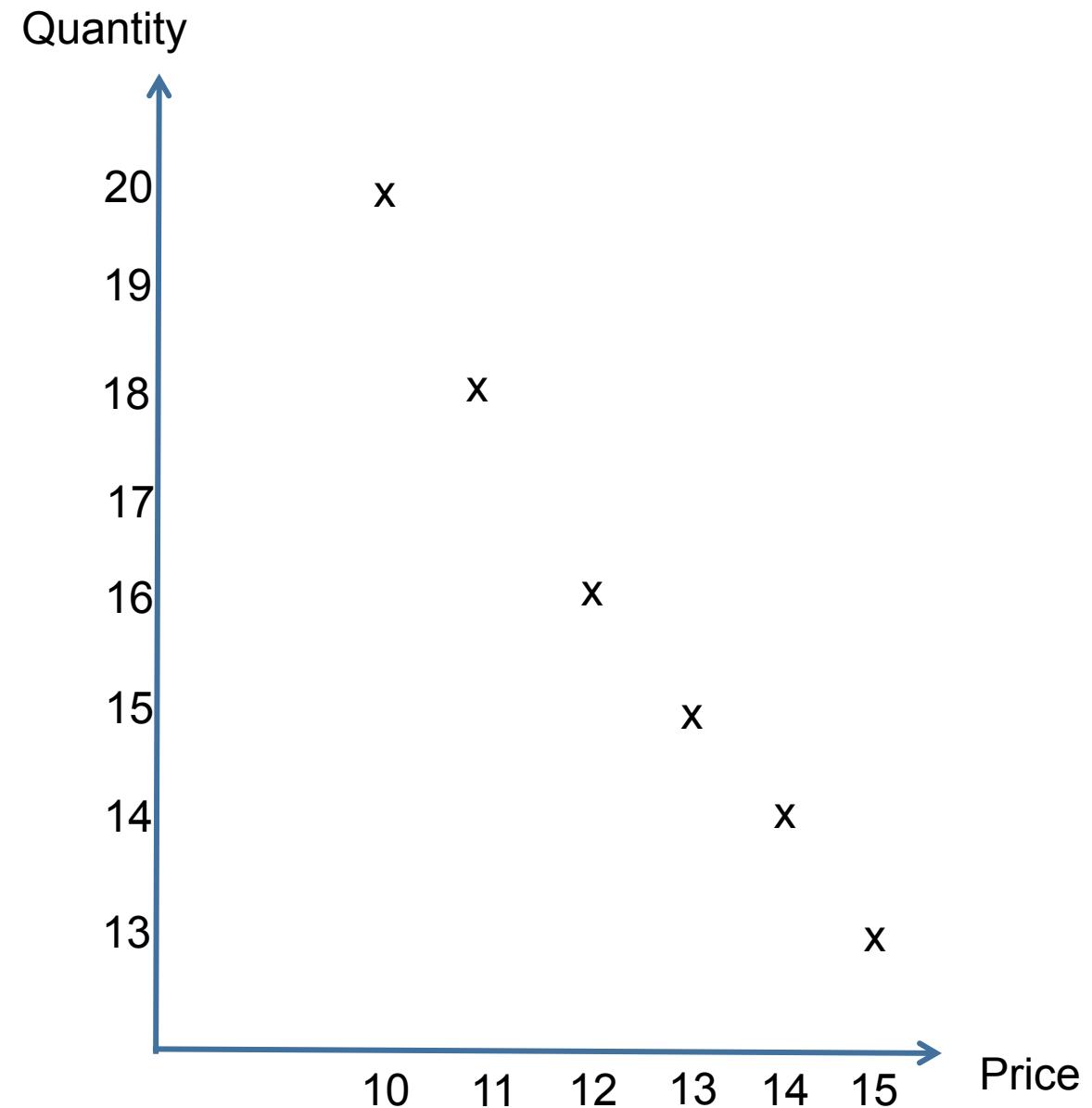
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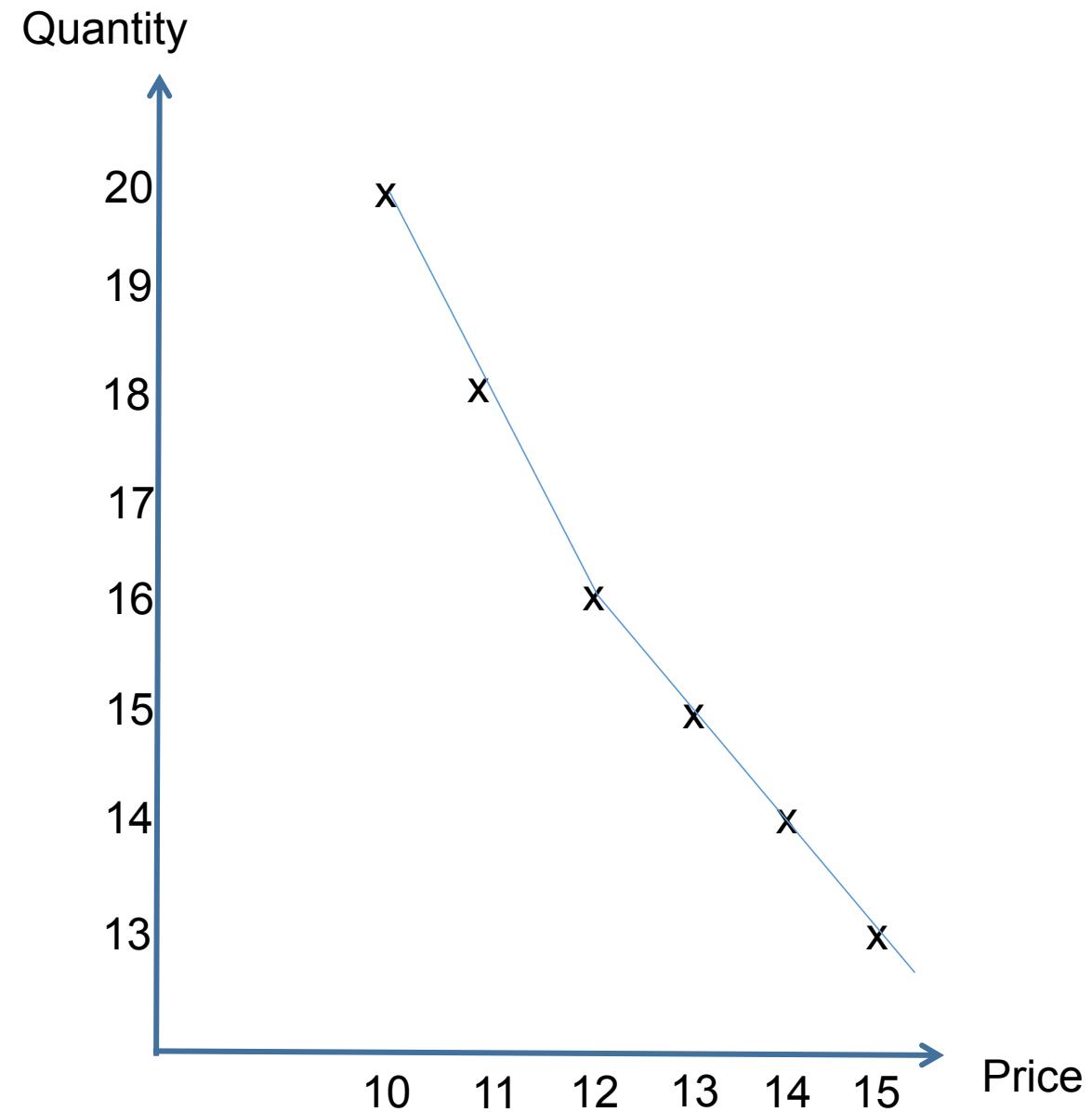


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Price $\uparrow \Rightarrow$ Demand \downarrow
Price $\downarrow \Rightarrow$ Demand \uparrow



Supply vs Price

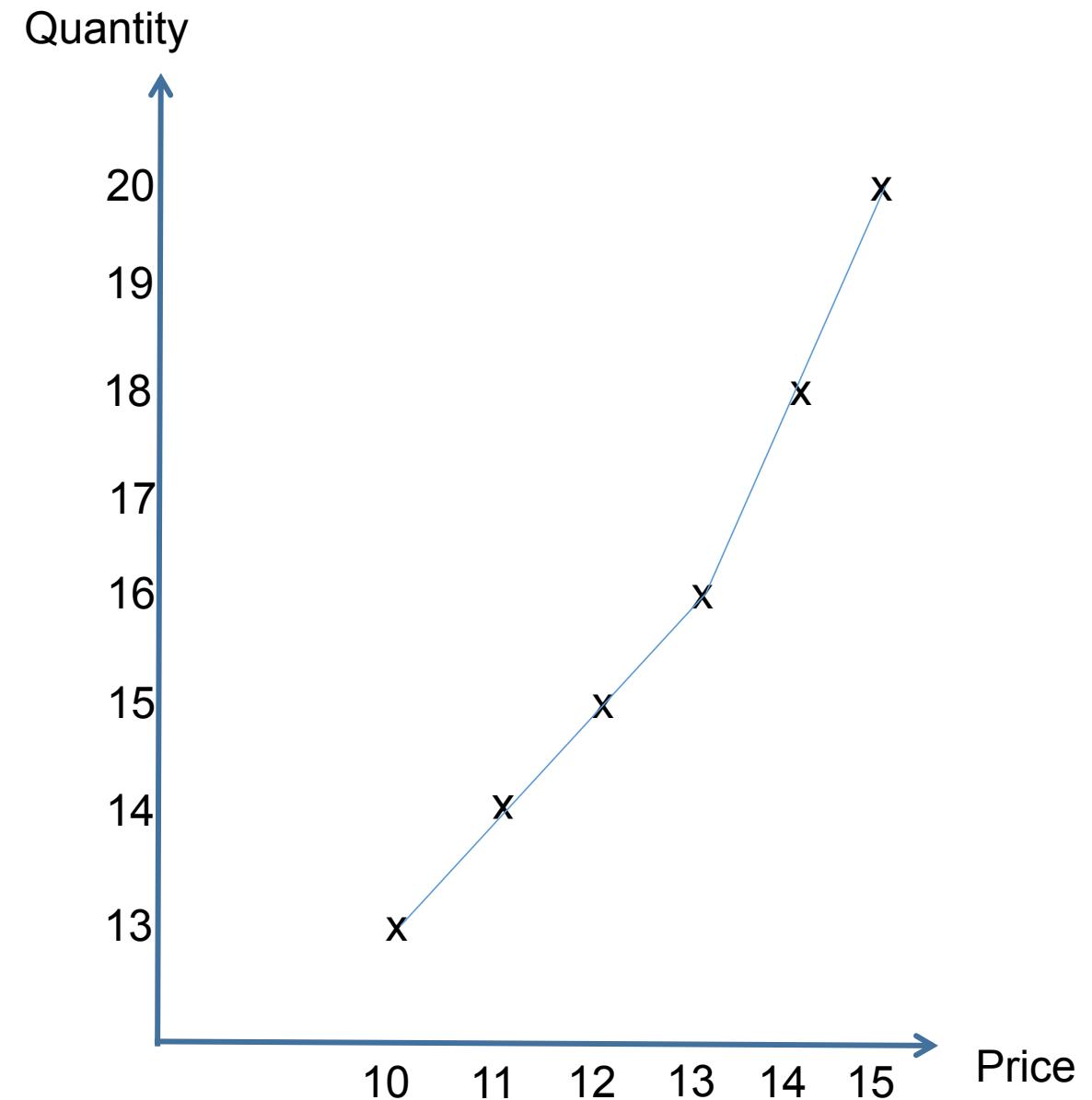
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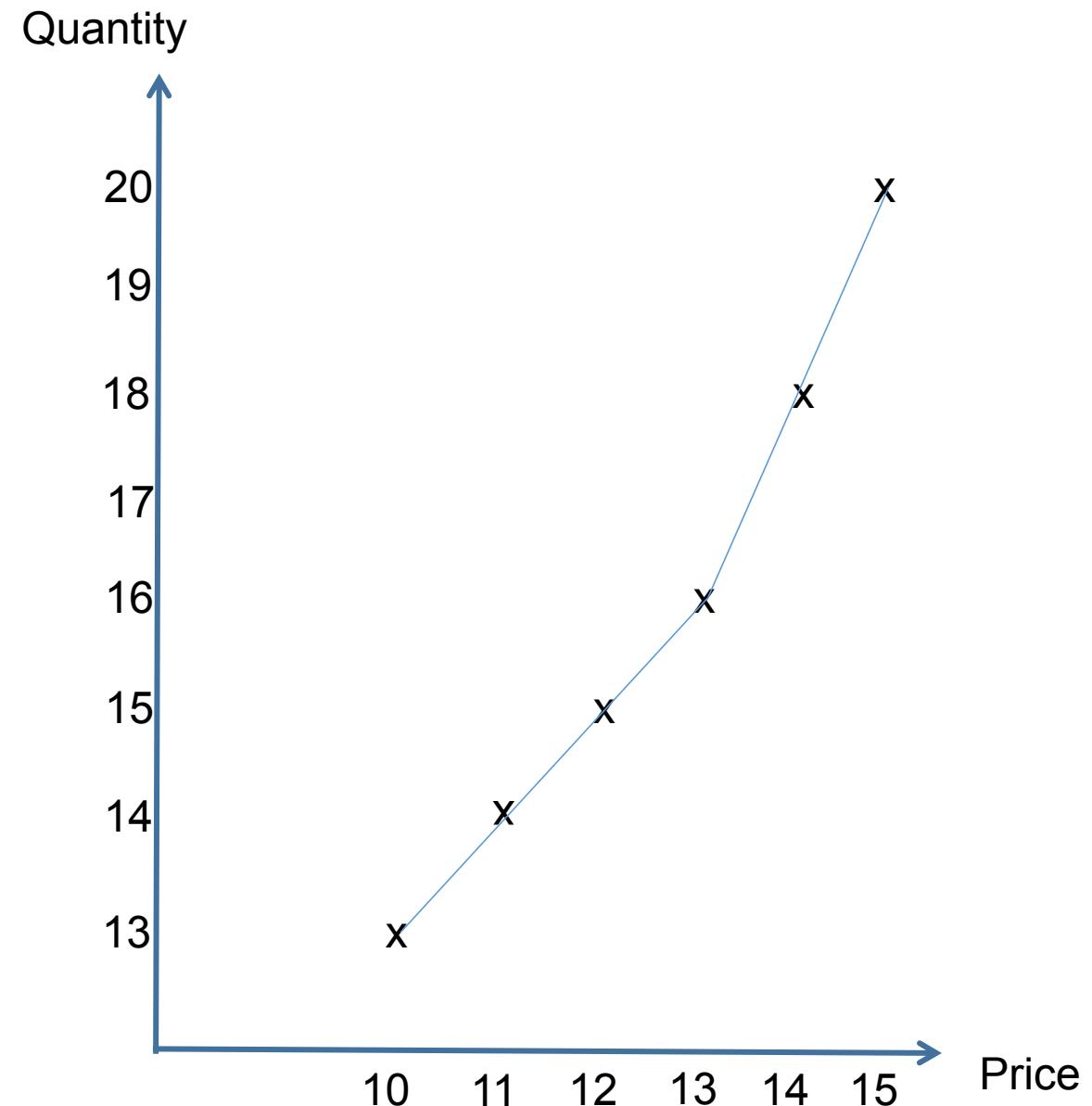


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15	20

Price $\uparrow \Rightarrow$ Supply \uparrow
Price $\downarrow \Rightarrow$ Supply \downarrow



Demand Vs Supply

- The combined table showing demand and supply at each price point is shown below:

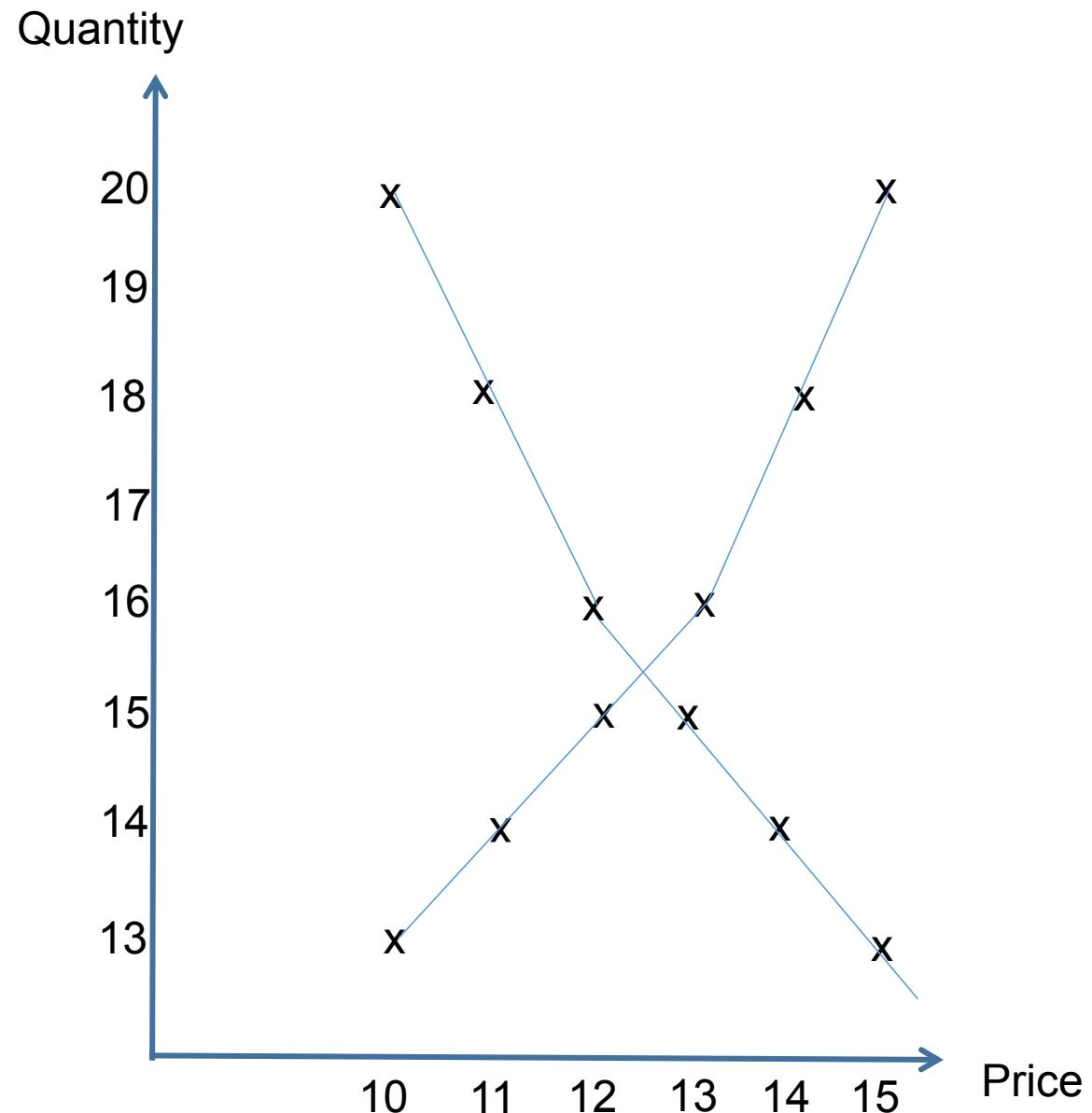
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Price $\uparrow \Rightarrow$ Demand \downarrow & Supply \uparrow
Price $\downarrow \Rightarrow$ Demand \uparrow & Supply \downarrow

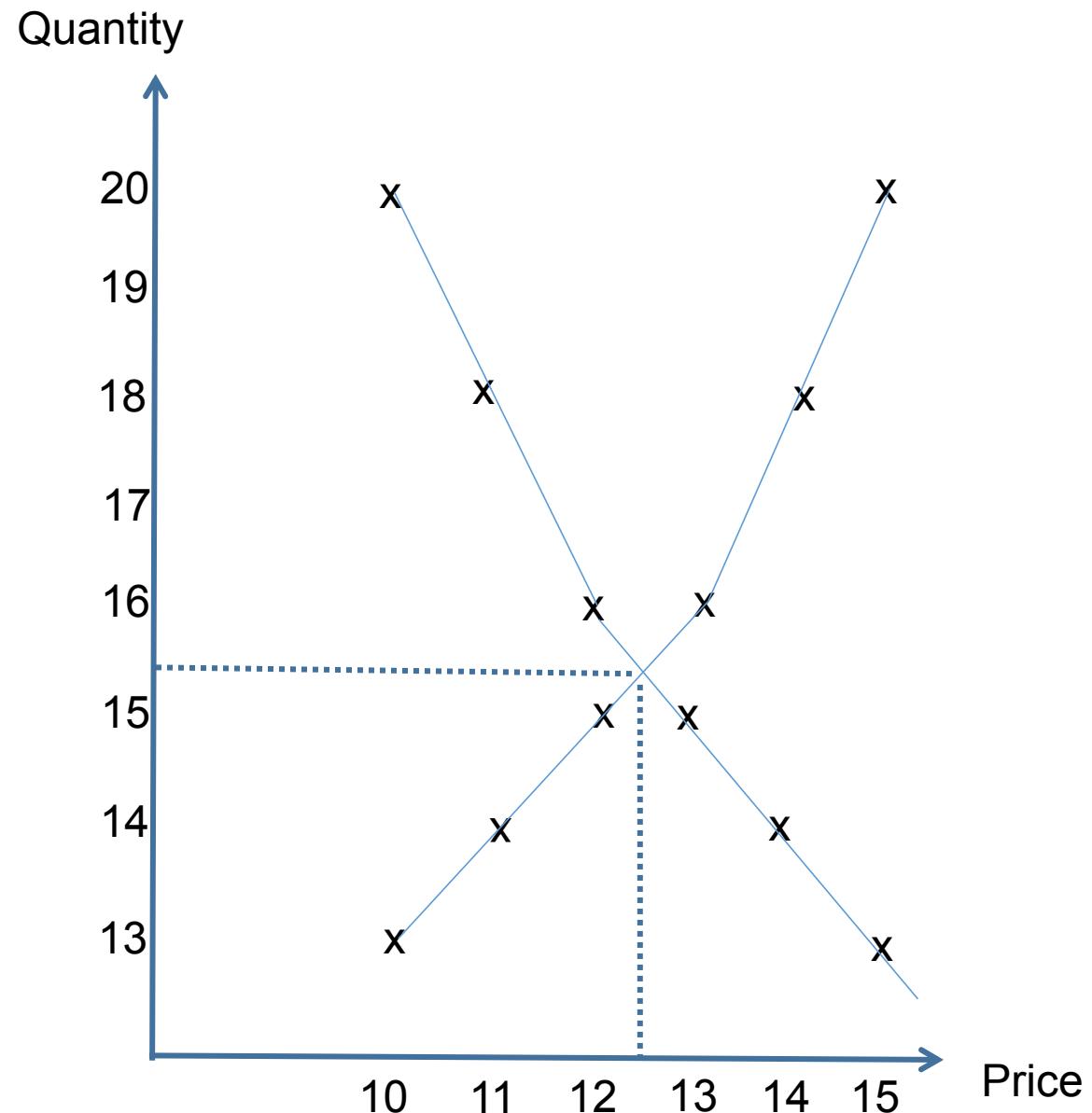


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*Equilibrium price = Rs 12.5
Equilibrium quantity = 15.5 Kg*

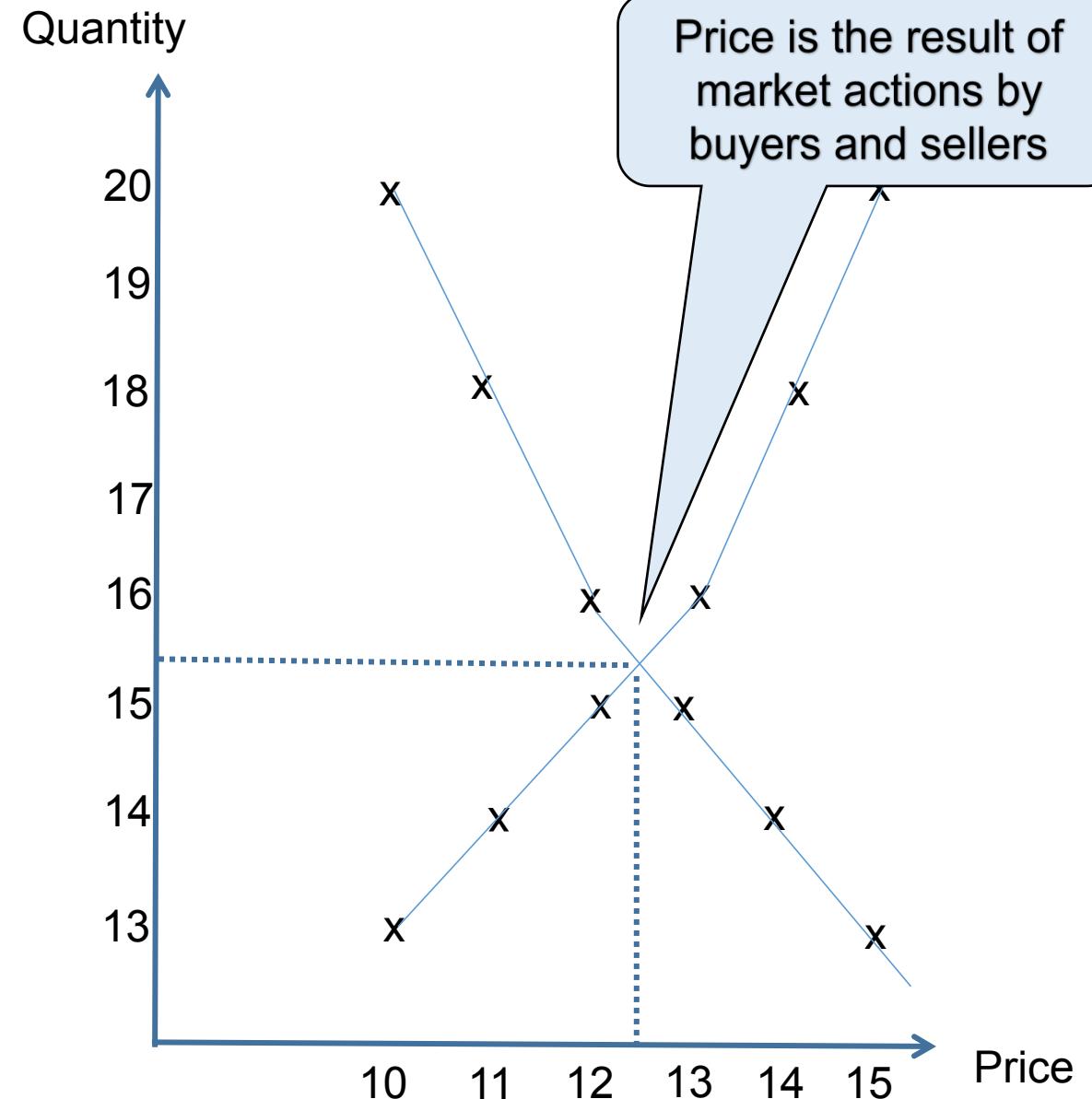


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Price Vs Demand

- Quantity based discount table: if customer buys higher quantity, the seller is willing to offer a lower price - as shown in the table below:

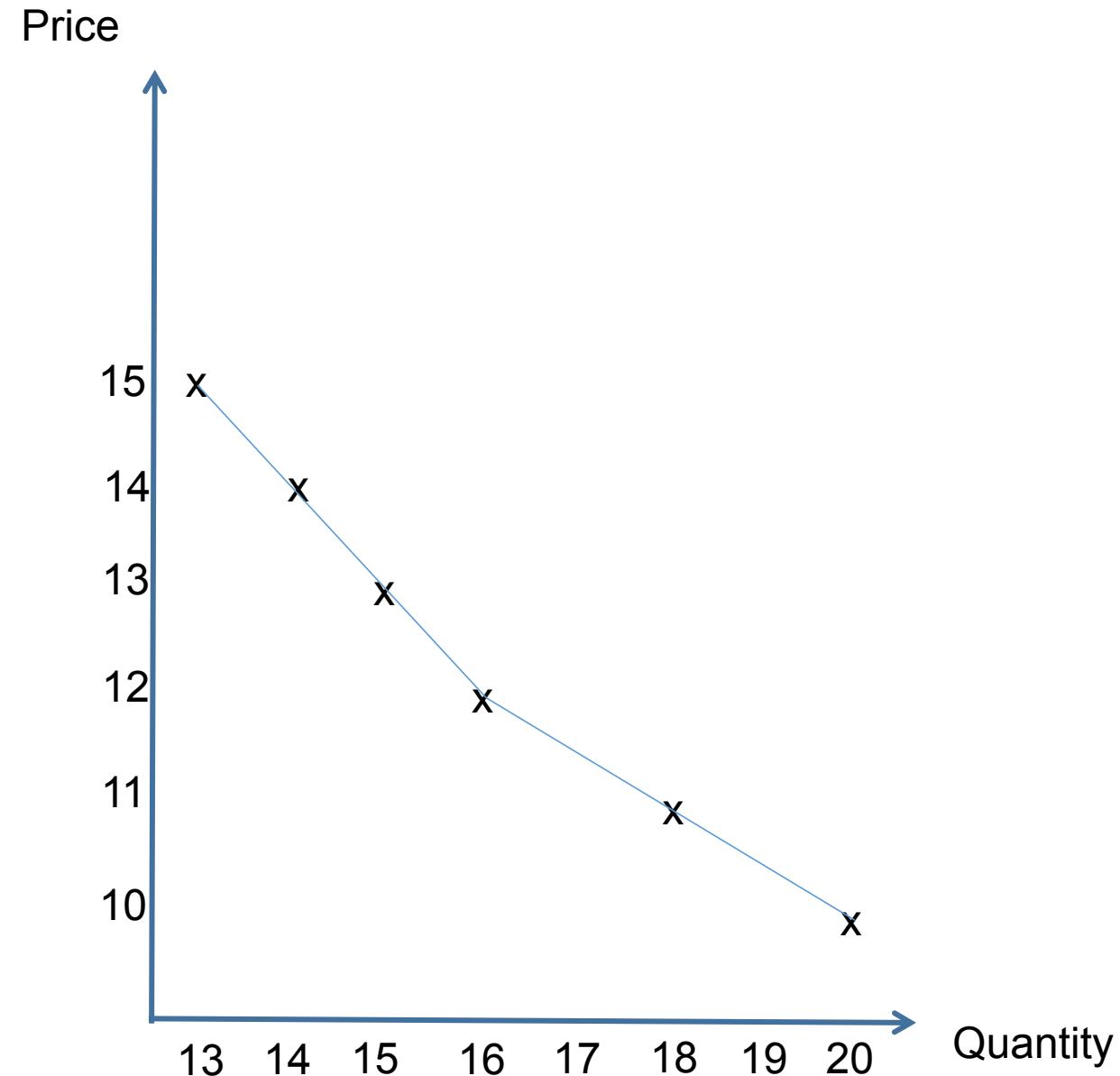
Quantity (kg)	Price in Rs/Kg
20	10
18	11
16	12
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14	14
13	15

Which is why we sometimes represent price as a result of demand

Price Vs Demand

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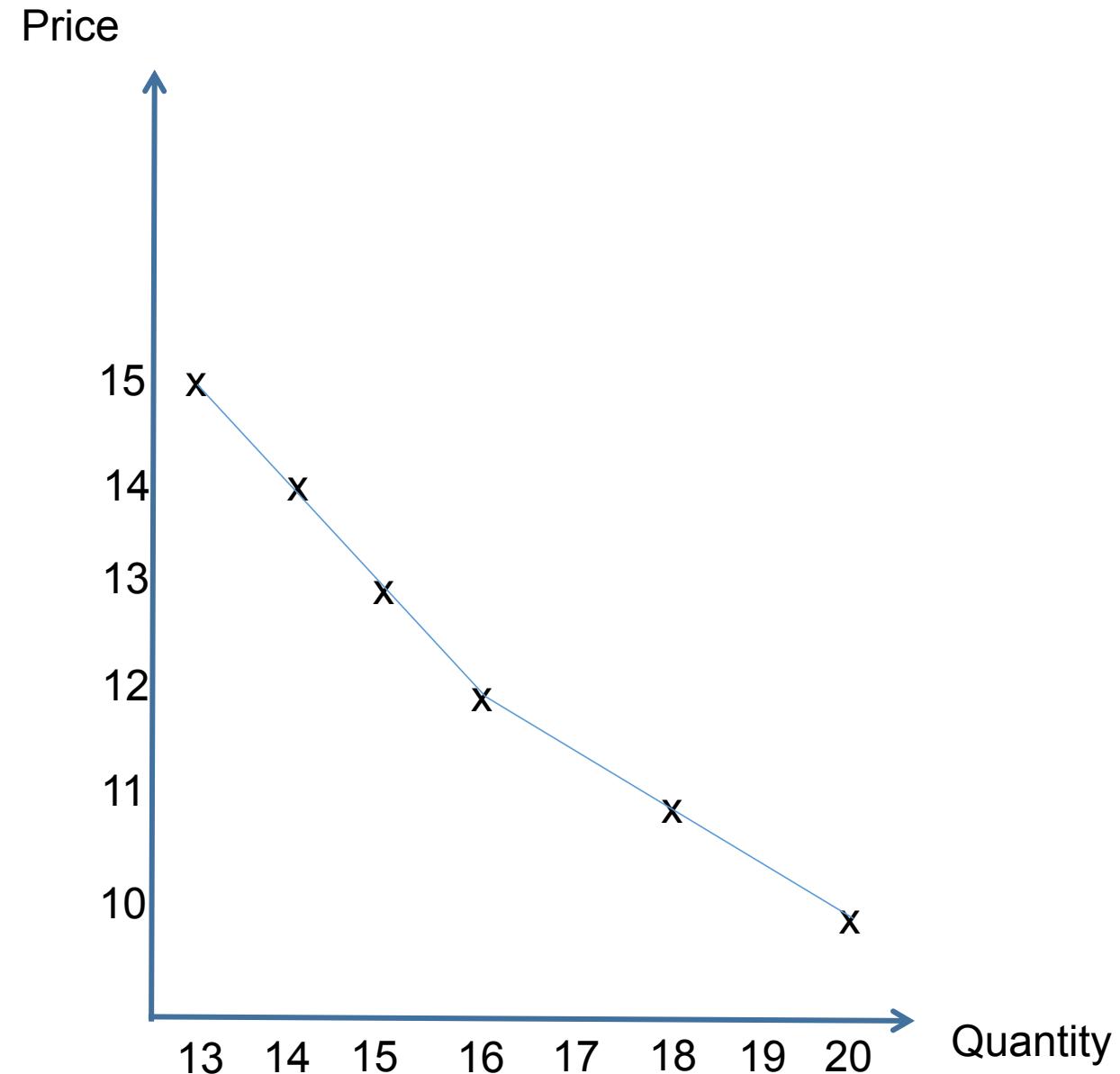


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Effect of income

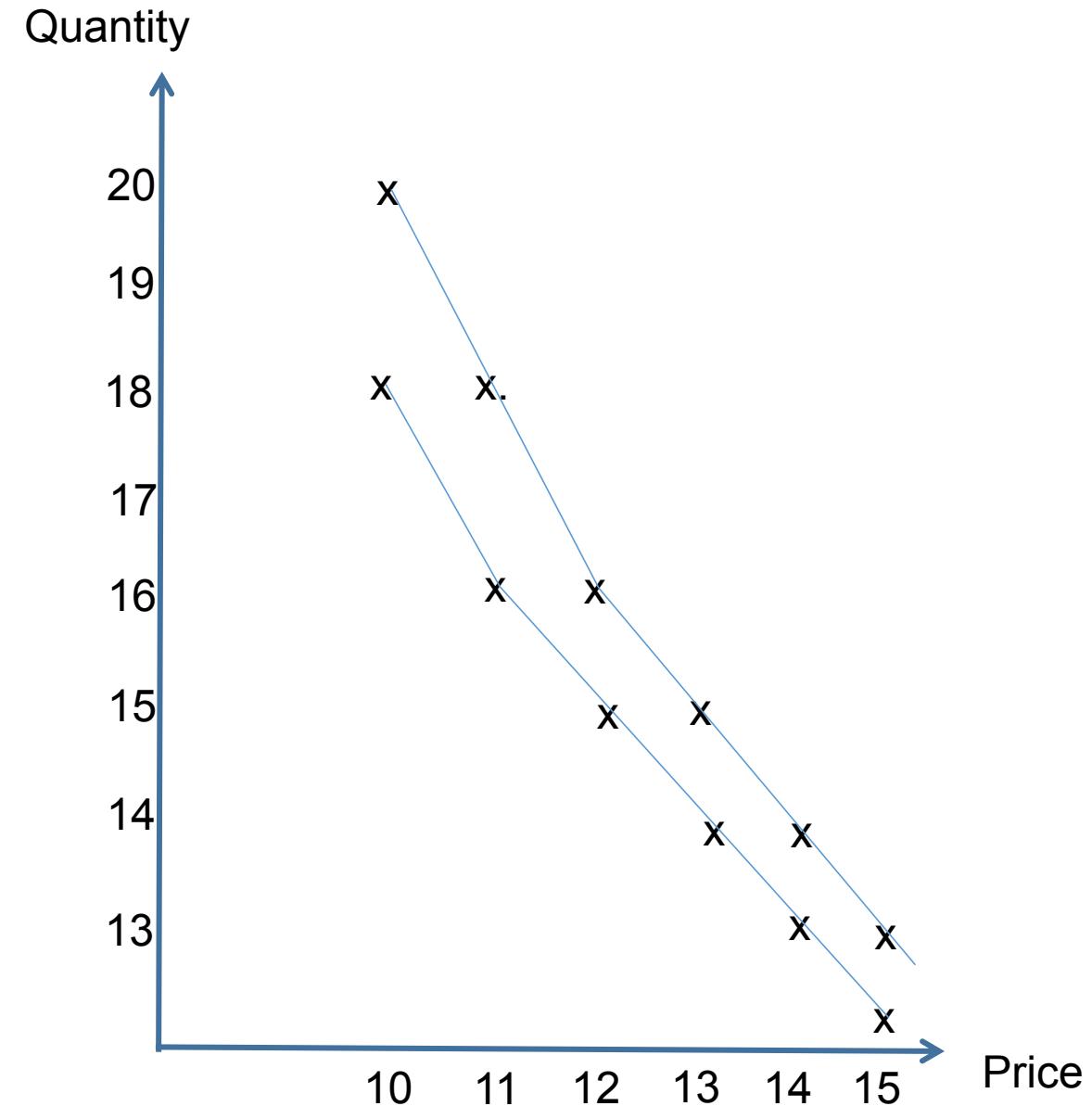
- The amount of wheat that two customers with slightly different incomes will buy at different prices is shown in the table below:

Price in Rs/Kg	Quantity High income (kg)	Quantity Low income (kg)
10	20	18
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12	16	15
13	15	14
14	14	13
15	13	12

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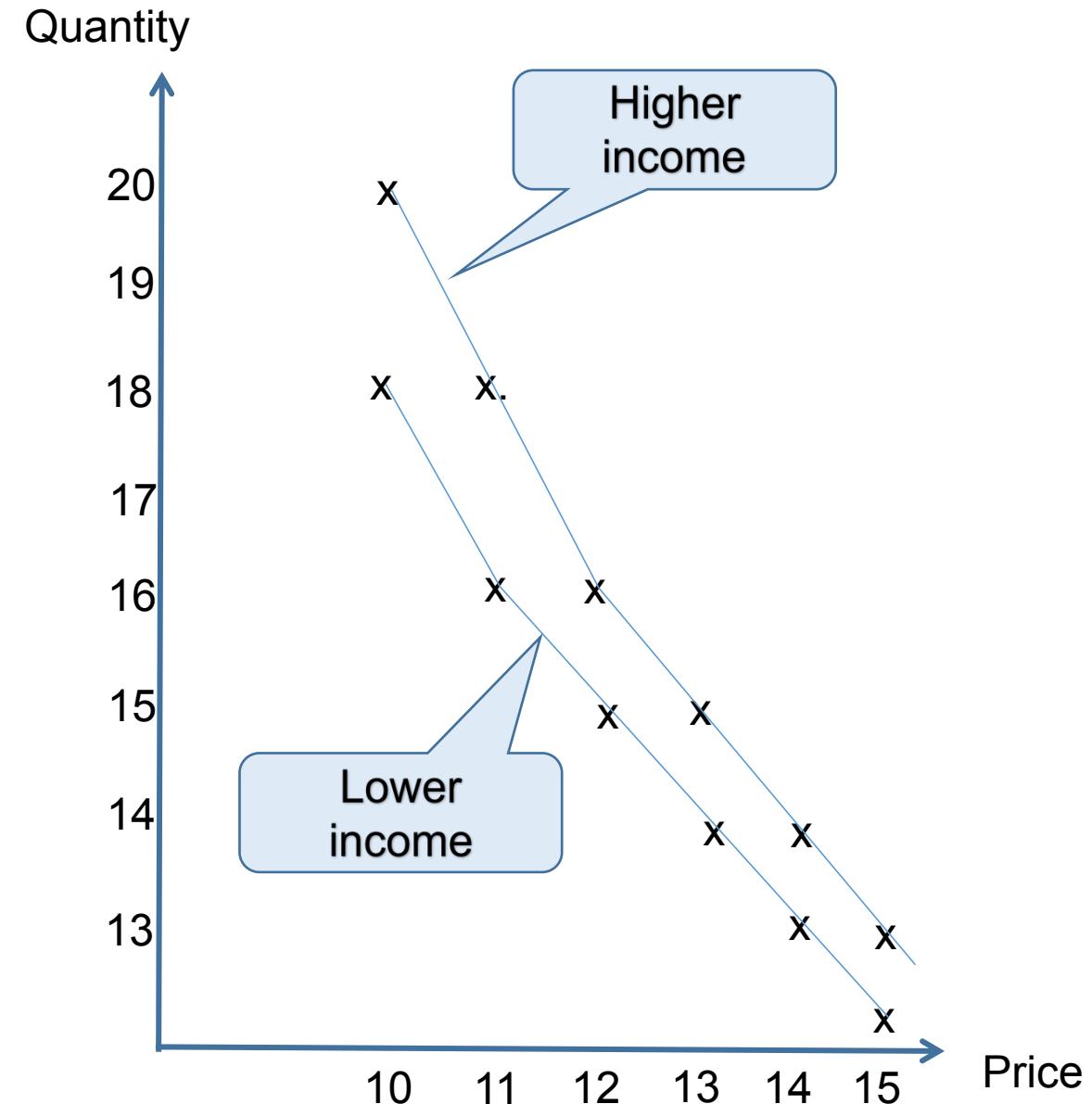


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Effect of income

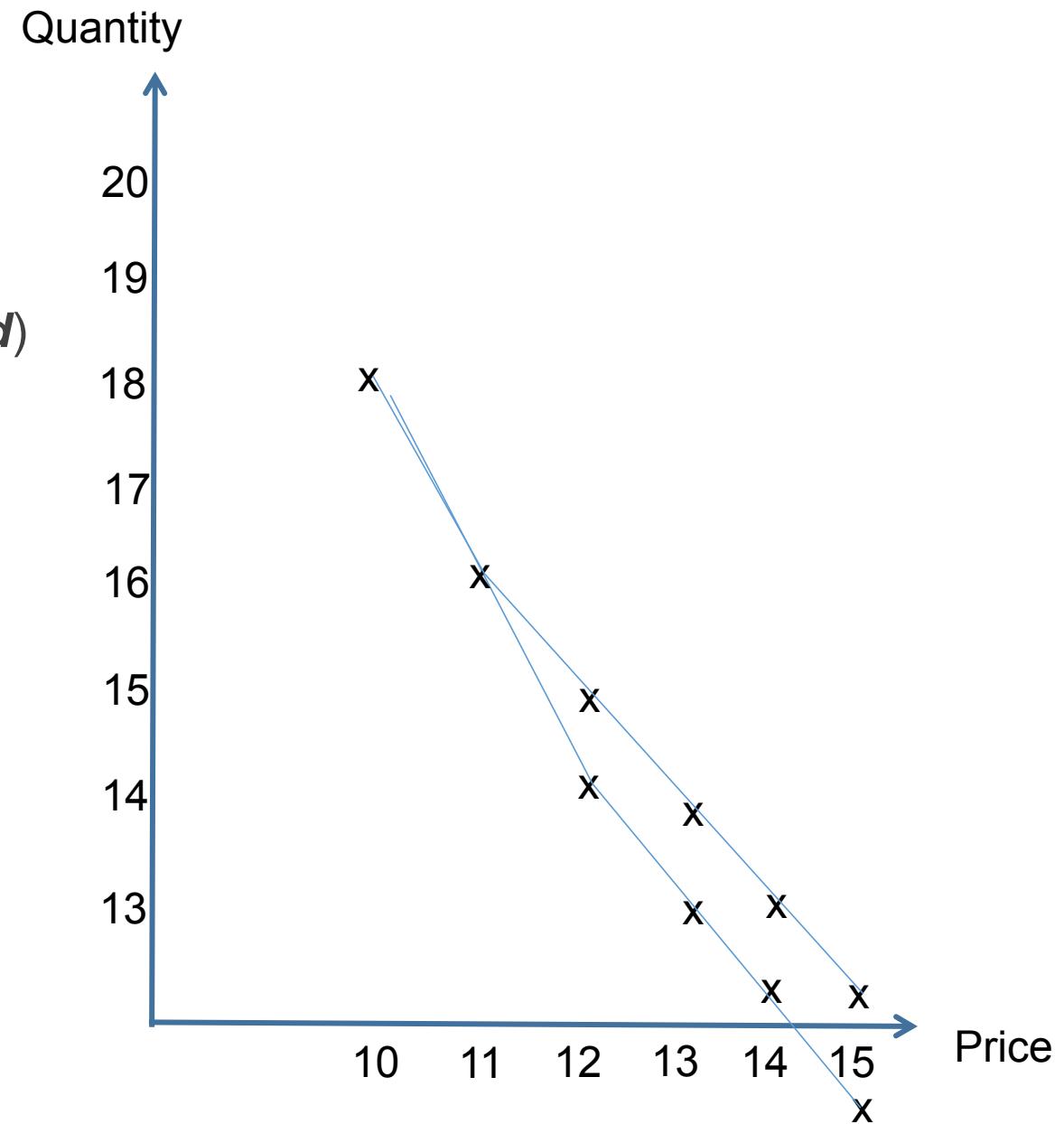
- It is also possible that at higher income, customers may choose to buy rice rather than wheat, in which case demand for wheat may fall (if this happens, wheat is called an *inferior good*)

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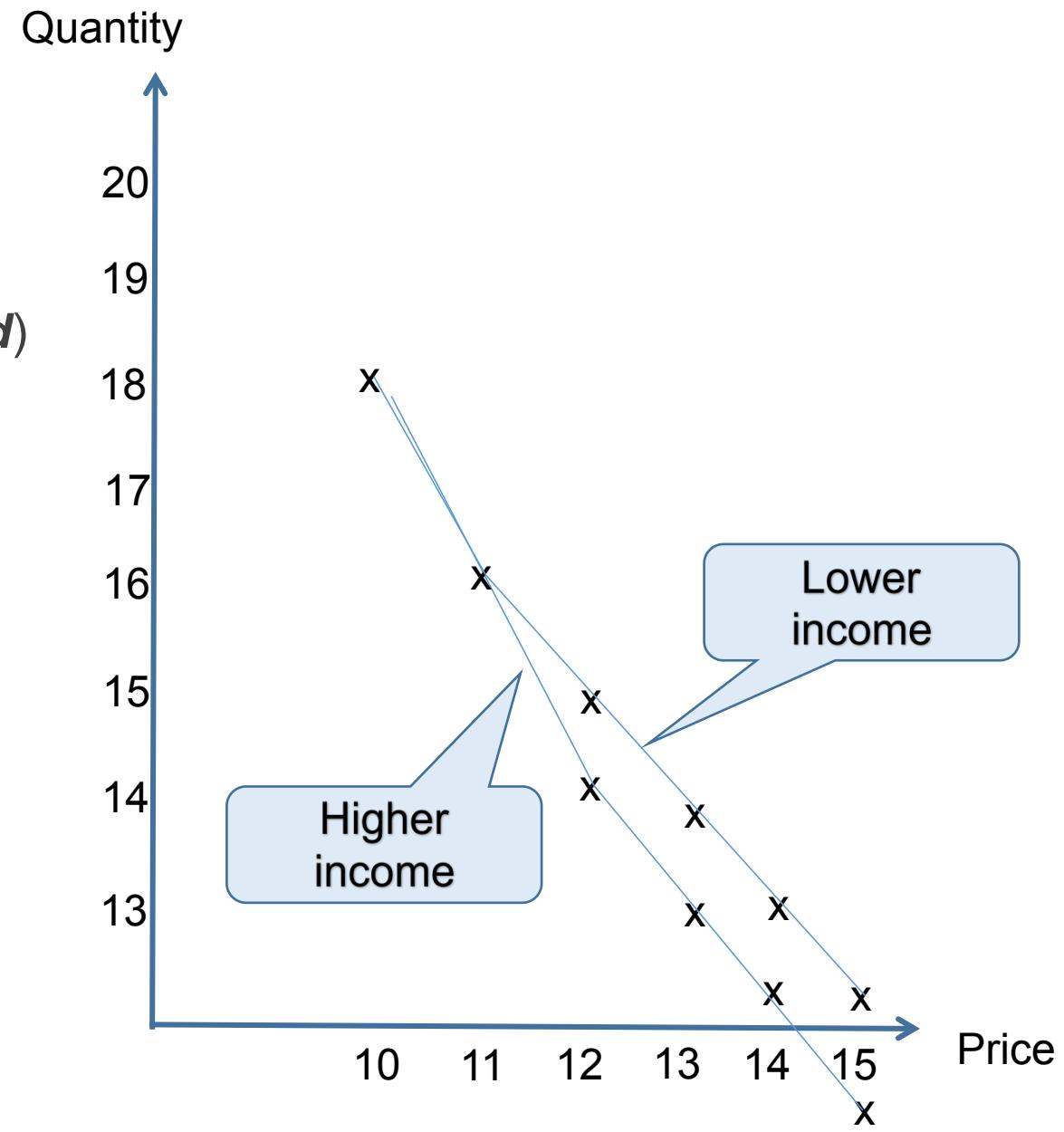


Effect of income

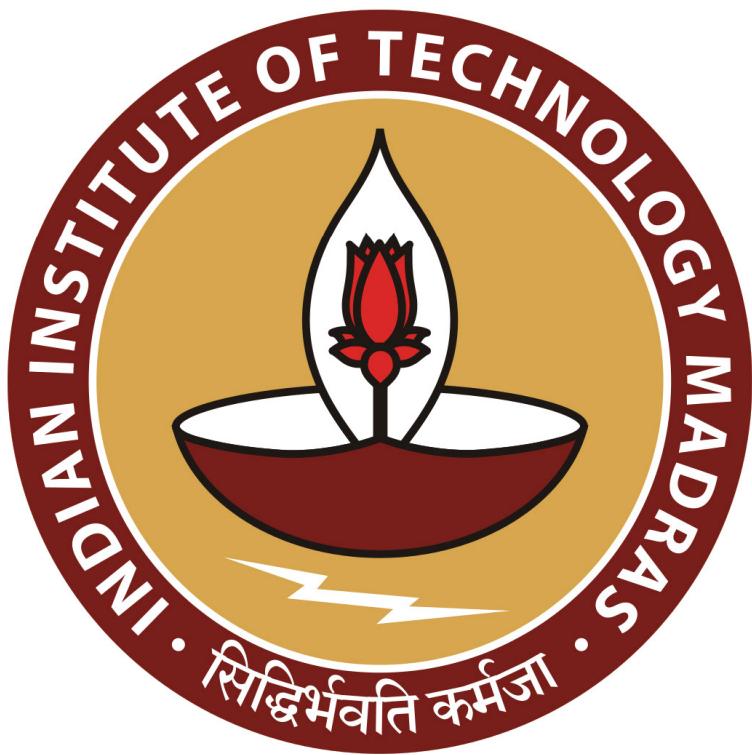
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Income $\uparrow \Rightarrow$ Demand \downarrow
Income $\downarrow \Rightarrow$ Demand \uparrow



End of Intro



IIT Madras

ONLINE DEGREE

Managing Businesses Using Data

G Venkatesh, M Sureshbabu, Milind Gandhe



Cast Study Guests:

Omkar (Flipkart), Sivakumar (Astrazeneca), Varsha (Mercer), Venkat (Paypal)

Learning objectives

- Understand the business context:
 - consumption patterns
 - micro-economic concepts underlying demand and supply
- Analyse firm-level and industry-level data
- Discover how businesses operate, and how they are actively managed using data dashboards
- Get a handle on the data that originates from business processes
- Identify the techniques used to represent and structure this data
- Gain skills on the use of worksheets to organise, interpret and present data
- These are to be delivered through a mix of:
 - conceptual lectures
 - case study presentations
 - spread sheet working illustrations
 - mini assignments
 - course project

Course contents integrate topics from many sources

Introduces business management through the lens of a data scientist

- Micro and macro economics
 - Finance and accounting
 - Marketing and Strategy
 - Production
 - Management Information Systems
-
- No single text book reference for the course



Weeks 1-2: Micro economics

- Week 0: Introduction to the course. Tutorial on spreadsheets: Excel & Google sheets
- Week 1: Consumption and demand
 - Micro & Macro economics: the role of data
 - production, consumption and exchange
 - consumption baskets
 - sources of consumer survey data
- Week 2: Micro-economic concepts:
 - Utility: cardinal vs ordinal, indifference curves
 - Demand and supply curves, changes in demand and elasticity
 - production cost, cost curves
 - Make vs buy decisions
 - production quantity decisions

Weeks 3-4: Firm data analysis

- Week 3: Firm level strategies and performance data:
 - Pricing strategies
 - Analysis of firm performance - key ratios
- Analysis examples:
 - Ultratech
 - Page Industries
 - Nestle
 - TCS
- Week 4: Analysing industry level data:
 - Industry definition and classification codes, IIP and PMI
 - Market structure and concentration
 - Porter's five forces
 - Analysis examples:
 - Cement industry
 - Textile industry
 - FMCG industry
 - IT industry

Assignment: Prepare report on the sales and profit trends of a company (and its competitive position)
Each student will be assigned a company for the purpose of this assignment



Case study 1 - Fabmart (E-Commerce)

- Week 5:
 - Introduction to E-Commerce
 - Fabmart case introduction
 - explanation of data set & questions to be answered
 - revenue pareto, volume pareto
 - scatter plot of sales and revenue, revenue trend
- Week 6:
 - Sales analysis: organisation of distribution centre
 - analysis of sales trends
 - average days of inventory
 - ledger: avoiding stockouts
- **Assignment:** Prepare sales and inventory analysis report for a specific data set

Case study 2 - Ace Gears (Manufacturing)

- Week 7:
 - introduction to the manufacturing sector
 - context of the automotive industry during the years 2019-2021
 - monthly information on sales, production, inventory and costing
 - revenue trend analysis
 - portfolio management
- Week 8:
 - regional sales analysis: sales agent planning
 - production scheduling
 - scrap analysis
 - unit level profitability analysis
 - raw material re-ordering and safety stock
- Assignment: Prepare report on revenue trends, unit level profitability and operational efficiency using a specific data set

Case study 3 - Tech Enterprises (HR)

- Week 9:
 - introduction to HR as a function
 - introduction to the Tech Enterprises case
 - internal sourcing, ranking of internal candidates
 - job descriptions
 - sourcing channels and their analysis
 - recruitment process and onboarding

Assignment: Prepare report on ranking of candidates according to specified criterion given a specific candidate profile list

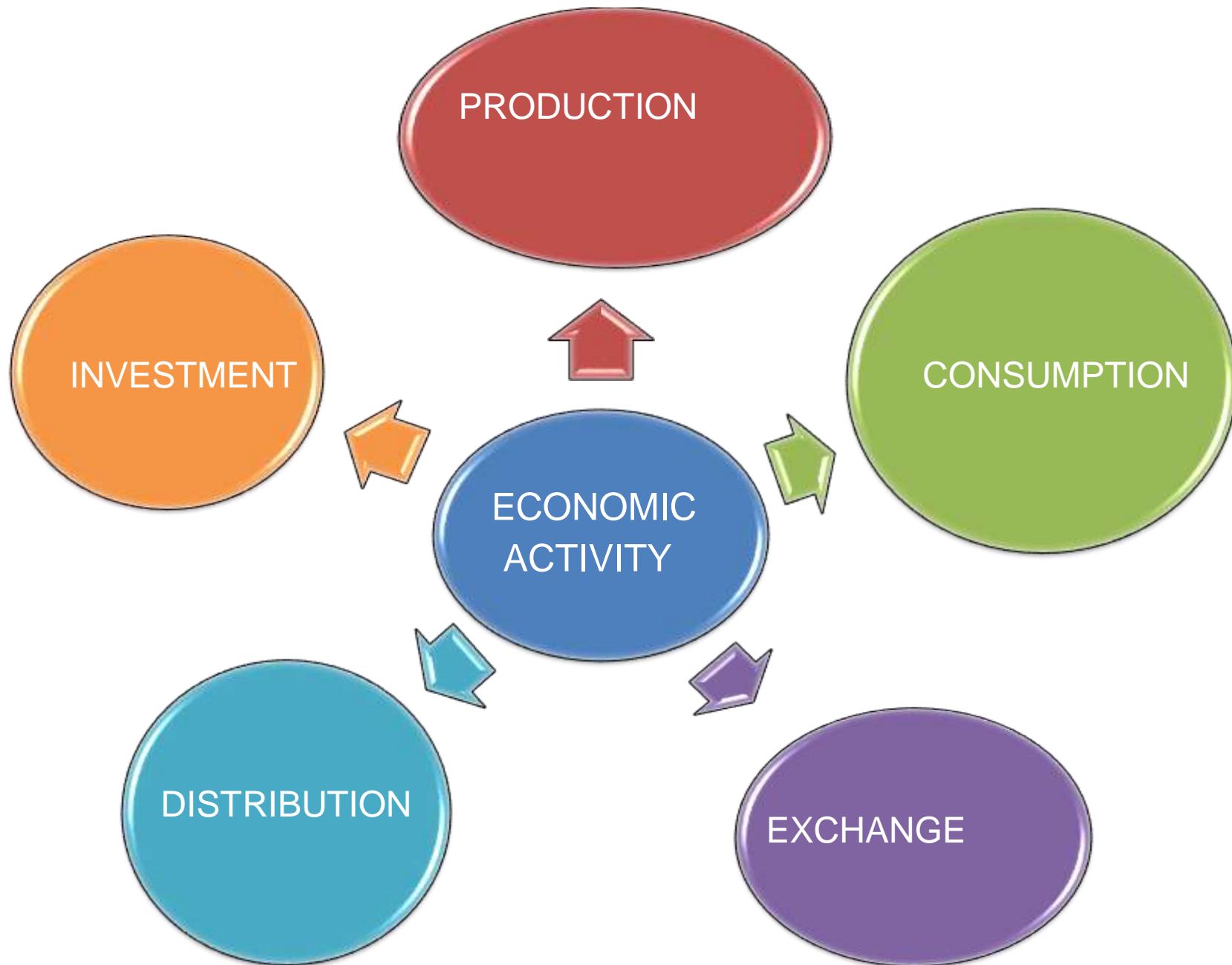


Case study 4 - PayBuddy (FinTech)

- Week 10:
 - introduction to Finance Industry and Fintech
 - payment processing and money flow
 - new credit product introduction
 - nudge economics
 - payment transaction and customer data set
 - identifying rules to target the appropriate customers
- Week 11:
 - introduction to A/B testing
 - analysis of the A/B testing data
 - credit risk evaluation
 - risk-return tradeoffs
- **Assignment:** Prepare report on recommendation rules, A/B testing, credit risk evaluation using a specific data set

•

Consumption and Demand



Production

- Production is the process of converting raw materials into useful good/service. Goods/services become useful as they acquire utility value in the process of production.
- Producers have limited capital resources while they have a wide range of goods and services to choose from for their firms and factories to produce .
- With the given prices of inputs they choose such combinations which minimise cost of production so that they earn maximum profit.

Consumption

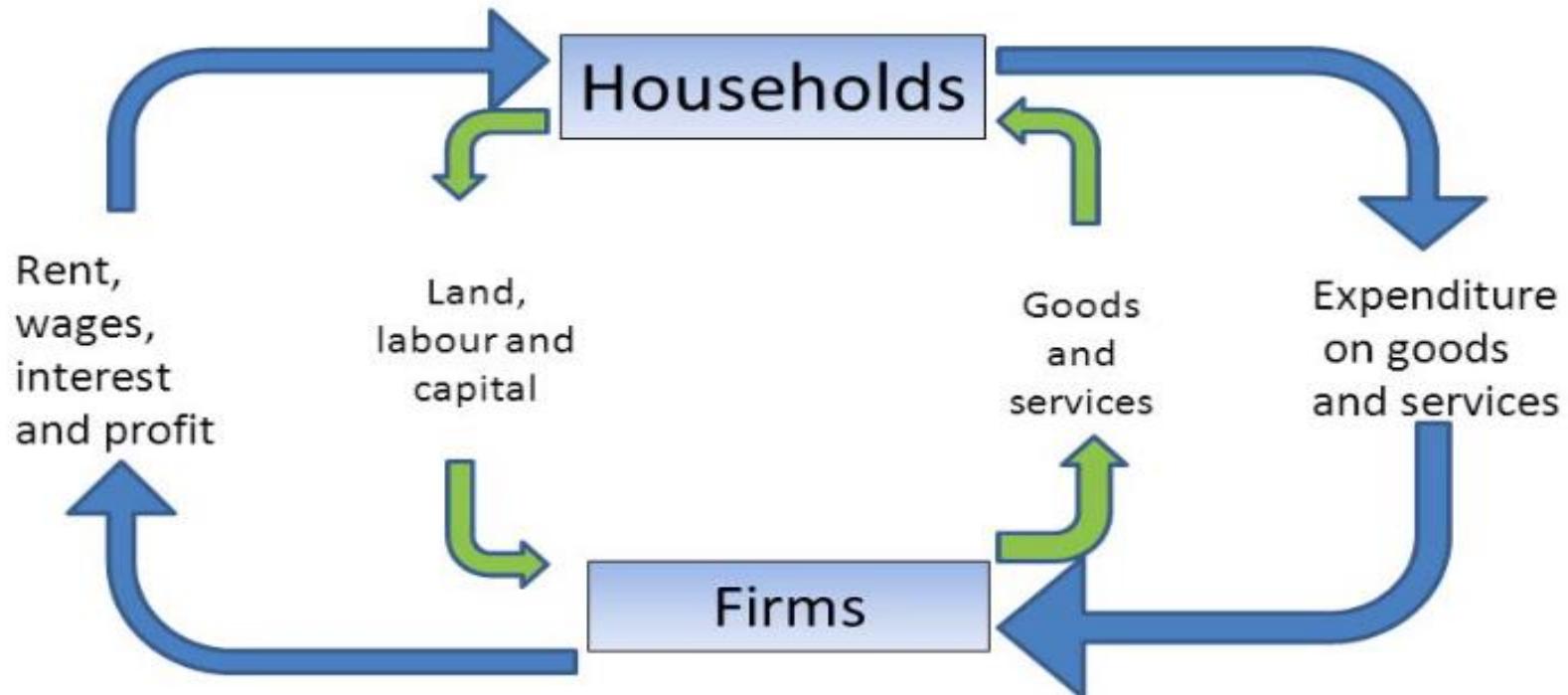
- **Consumption** is that economic activity which is concerned with the use of goods and services for the direct satisfaction of individuals and collective wants.
- A **consumer** is a person who consumes goods and services for the satisfaction of his/her wants.
- Consumption activity is the base of all production activities.
- **There would not be production if there was no consumption**

- As a consumer people have limited means (income) while their wants are unlimited.
- Study of consumption behaviour is concerned with the question “How people use their given /limited means for the purchase of different goods and services, so that their satisfaction is maximised?
- In Consumption Theory we formulate a set of standard relationships explaining how consumers tend to behave.

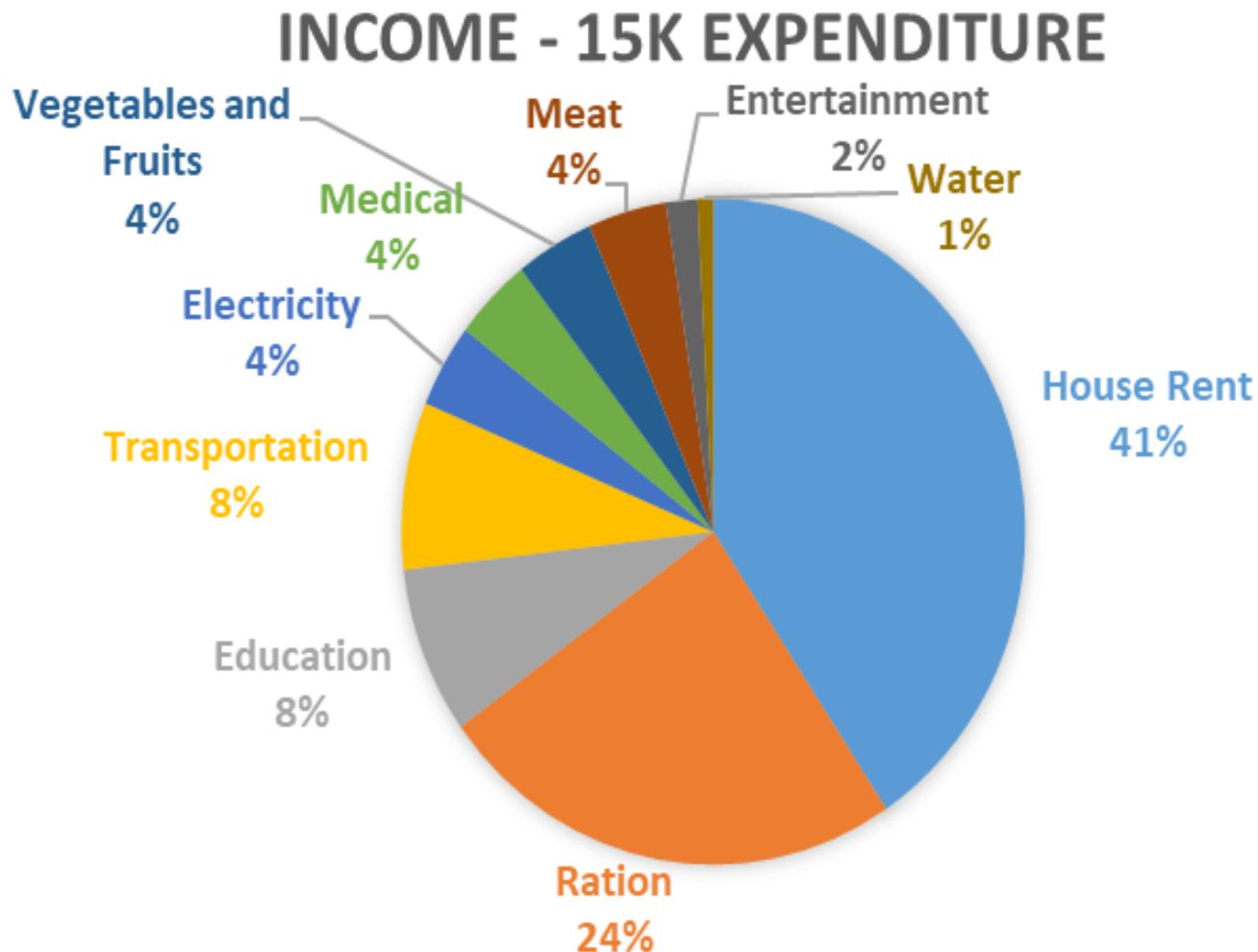
Exchange

- Exchange is that economic activity which is concerned with sale and purchase of commodities.
- In simple terms barter or buying and selling

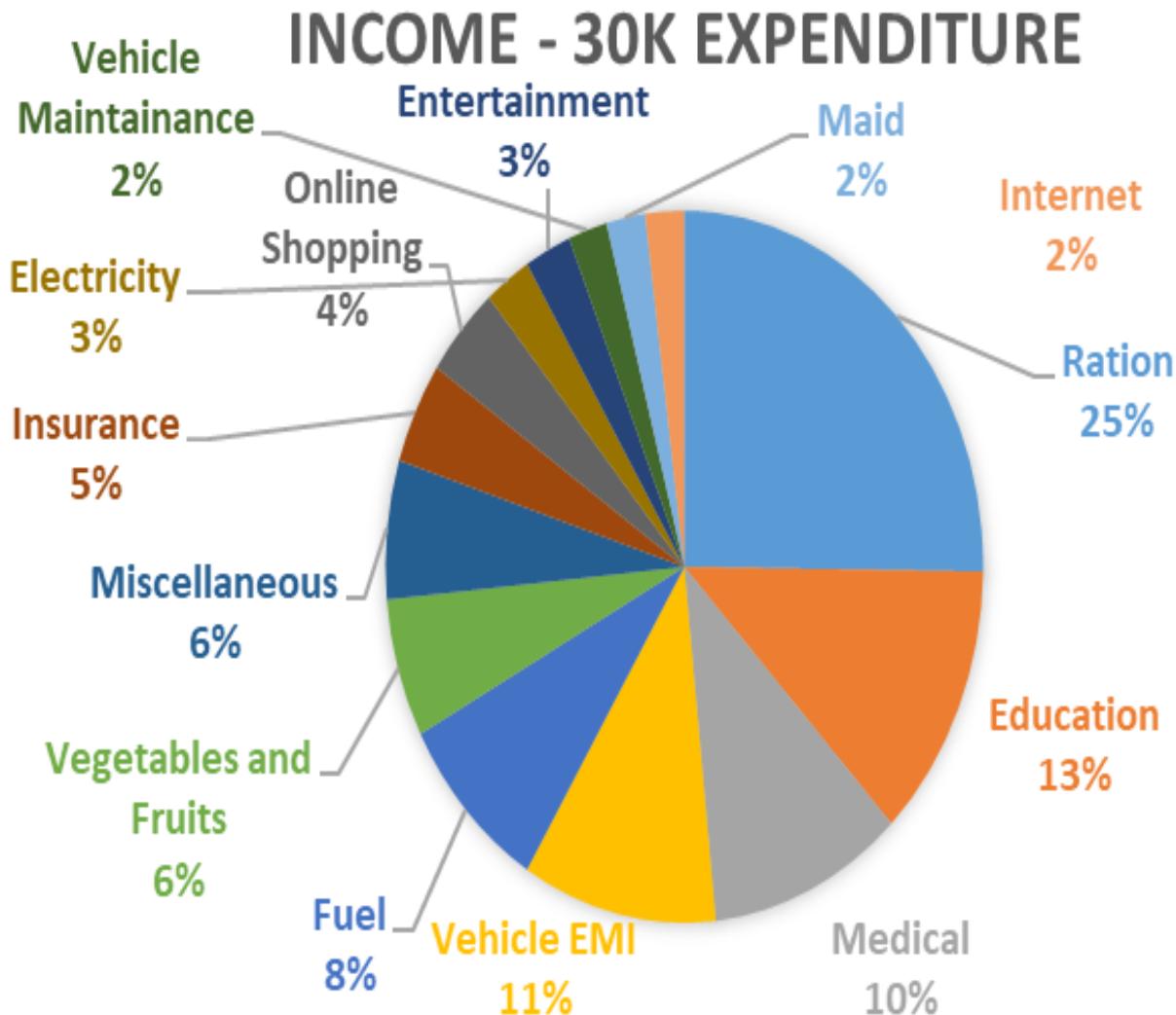
The circular flow of income



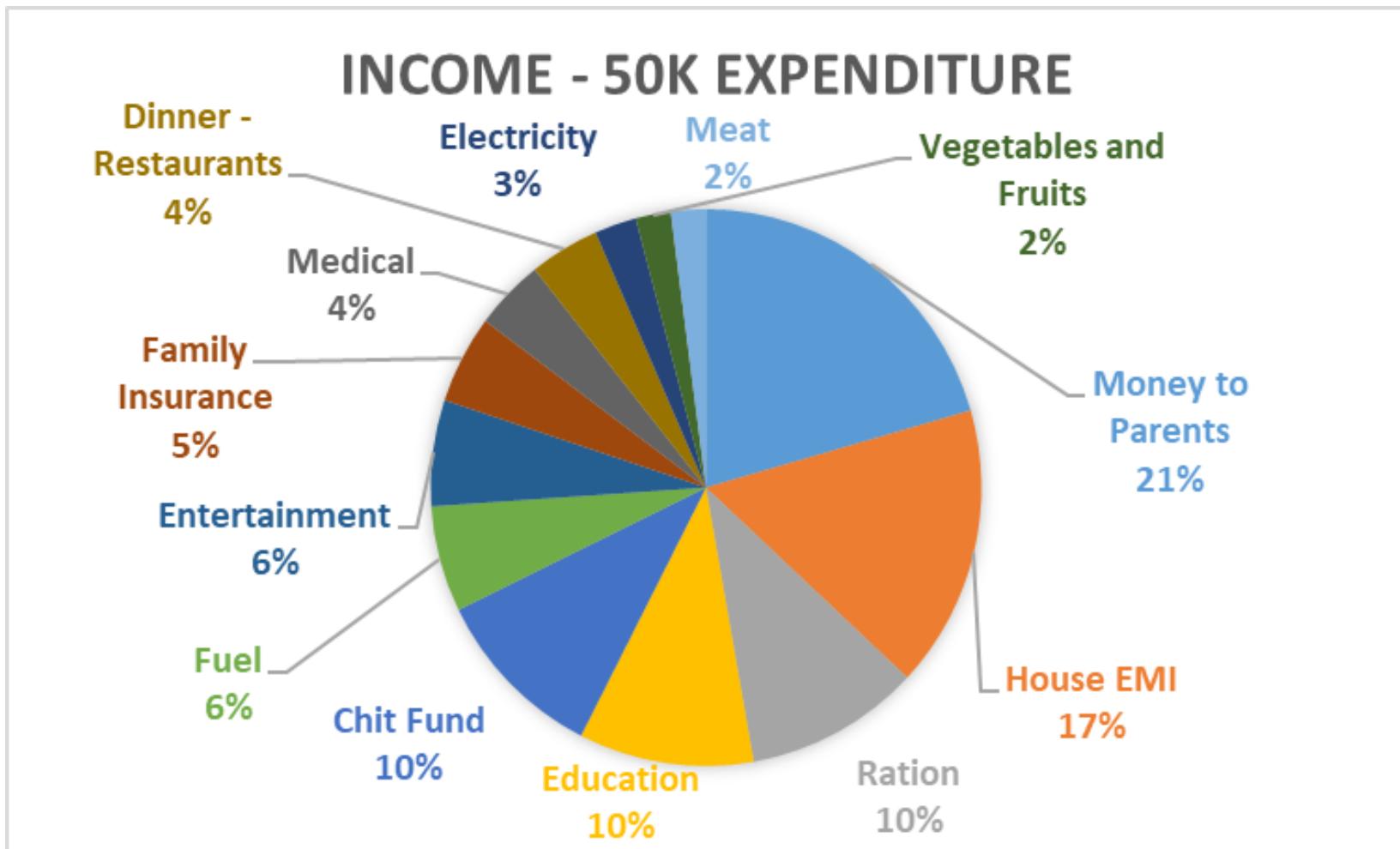
Representing consumption:
A typical consumption basket (income Rs. 15000)



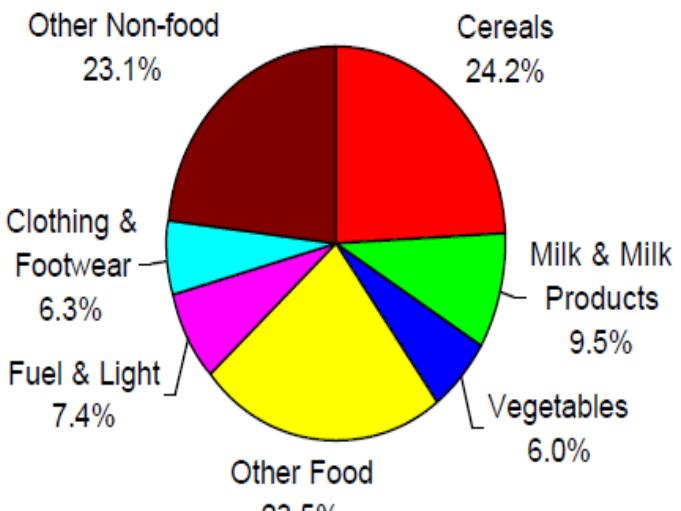
Representing consumption: A typical consumption basket (income Rs. 30000)



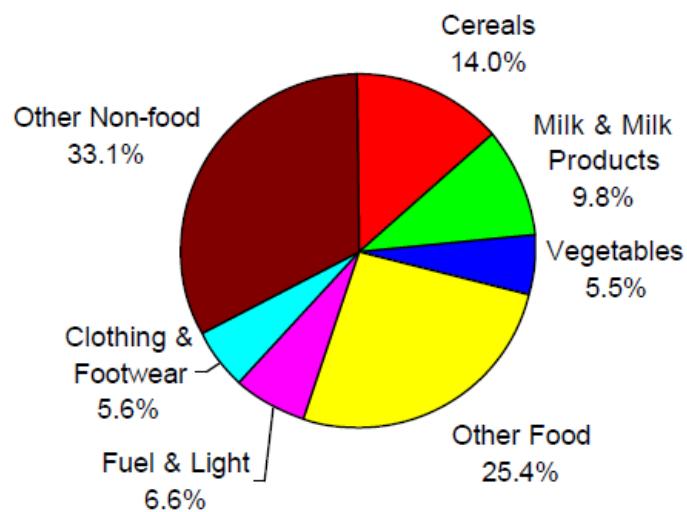
Representing consumption:
A typical consumption basket (income Rs. 50000)



Data on consumption: Composition of consumer expenditure, 1993-1994



Rural



Urban

Source: NSS 50th round, Key results on household consumer expenditure, 1993-1994

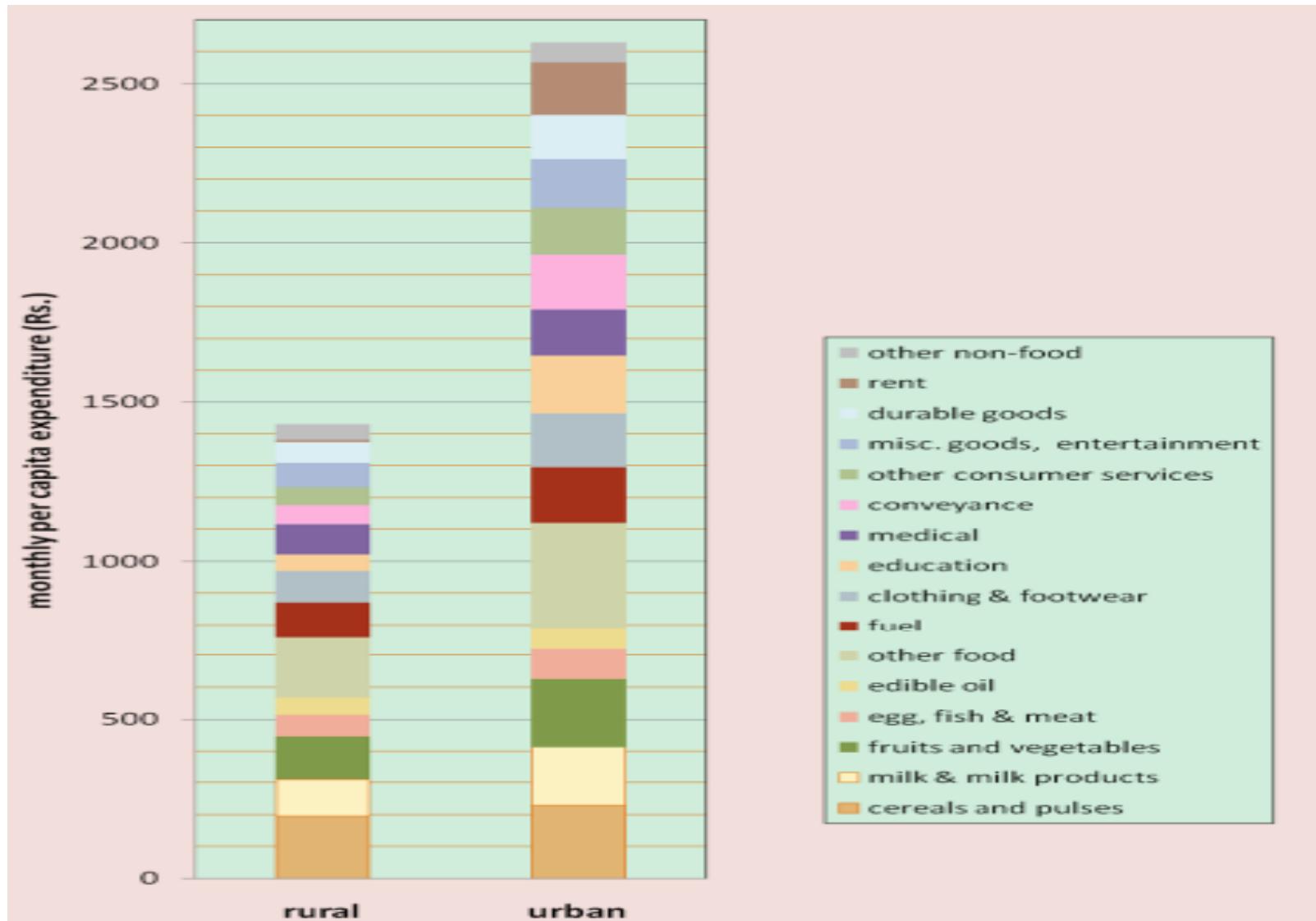
Table T9: Trends in percentage composition of consumer expenditure since 1993-94

item group	rural					urban				
	share in total consumer expenditure in									
	1993-94	1999-2000	2004-05	2009-10	2011-12	1993-94	1999-2000	2004-05	2009-10	2011-12
(1)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
cereals	24.2	22.2	18.0	15.6	12.0	14.0	12.4	10.1	9.1	7.3
gram	0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1
cereal substitutes	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1
pulses & products	3.8	3.8	3.1	3.7	3.1	3.0	2.8	2.1	2.7	2.1
milk & products	9.5	8.8	8.5	8.6	9.1	9.8	8.7	7.9	7.8	7.8
edible oil	4.4	3.7	4.6	3.7	3.8	4.4	3.1	3.5	2.6	2.7
egg, fish & meat	3.3	3.3	3.3	3.5	3.6	3.4	3.1	2.7	2.7	2.8
vegetables	6.0	6.2	6.1	6.2	4.8	5.5	5.1	4.5	4.3	3.4
fruits & nuts	1.7	1.7	1.9	1.6	1.9	2.7	2.4	2.2	2.1	2.3
sugar	3.1	2.4	2.4	2.4	1.8	2.4	1.6	1.5	1.5	1.2
salt & spices	2.7	3.0	2.5	2.4	2.4	2.0	2.2	1.7	1.5	1.7
beverages, etc.	4.2	4.2	4.5	5.6	5.8	7.2	6.4	6.2	6.3	7.1
food total	63.2	59.4	55.0	53.6	48.6	54.7	48.1	42.5	40.7	38.5
pan, tobacco, intox.	3.2	2.9	2.7	2.2	2.4	2.3	1.9	1.6	1.2	1.4
fuel & light	7.4	7.5	10.2	9.5	9.2	6.6	7.8	9.9	8.0	7.6
clothing & bedding	5.4	6.9	4.5	4.9	6.3	4.7	6.1	4.0	4.7	5.3
footwear	0.9	1.1	0.8	1.0	1.3	0.9	1.2	0.7	0.9	1.2
misc. g. & services	17.3	19.6	23.4	24.0	26.1	27.5	31.3	37.2	37.8	39.7
durable goods	2.7	2.6	3.4	4.8	6.1	3.3	3.6	4.1	6.7	6.3
non-food total	36.8	40.6	45.0	46.4	51.4	45.3	51.9	57.5	59.3	61.5
total expenditure	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

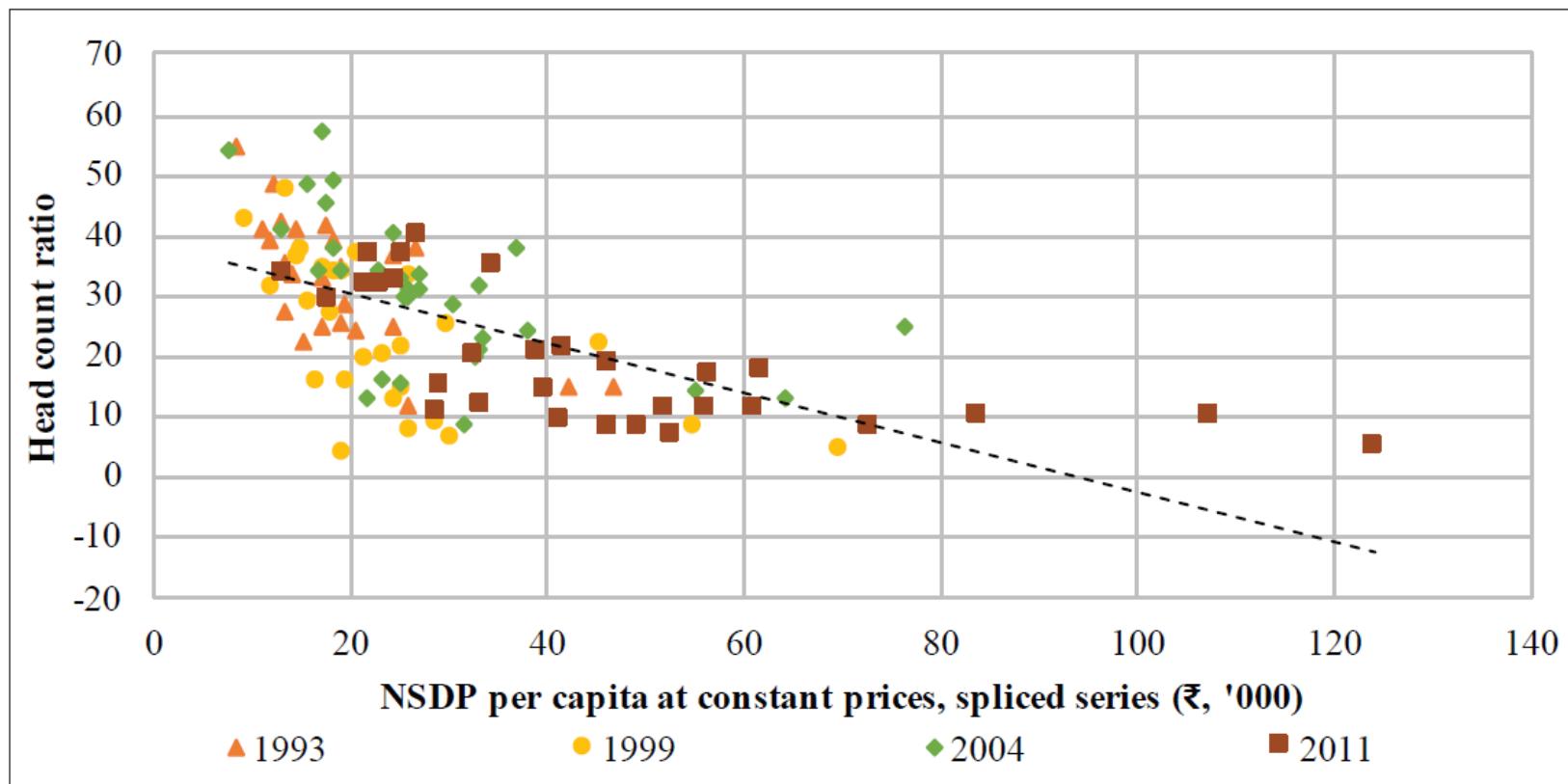
URP estimates shown except for 1999-2000, for which only MRP estimates are available.

Source: NSS 68th round, Key indicators of household consumer expenditure in India, 2011-2012

Breakup of average rural and urban Monthly Per-capita Consumption Expenditure, 2011-2012



Relationship between income (NSDP per capita at constant prices) and poverty (Head count ratio) in Indian states



Source: Survey calculations based on MoSPI data on NSDP and official poverty estimates of erstwhile Planning Commission.

Reference: Economic Survey, 2020-21

What drives consumers' choice? Utility

- When economists talk about consumer choice, what they are referring to is the combination of goods and services a consumer purchases.
- To understand how a household will make its choices, economists look at what consumers can afford, as shown in a **budget constraint** and the **total utility** or satisfaction derived from those choices.
- **Utility** is the term economists use to describe the satisfaction or happiness a person gets from consuming a good or service.
- For example: Mr. Raj obtains utility from consuming T-shirts and consuming movies. Like all consumers, we assume Raj wishes to choose the combination of T-shirts and movies that will provide him with the greatest total utility,

Prices

- The fact that goods have value can be ascribed ultimately to the limitations in the world's material endowment.
- That is why goods have prices; if they were available in unlimited supply they would be free.
- Price usually serves as the rationing device whereby their use is kept down to the available supply.
- In a market economy the relationship between the price of a good and the quantity supplied depends on the cost of making it, and that cost, ultimately, is the cost of *not* making other goods. The market mechanism enforces this relationship.

Surveyed over
234,000
households

Consumer Pyramids Household Survey

A continuous survey to measure household well-being in India

A longitudinal survey

large panel of sample households surveyed repeatedly over time

A fast-frequency survey

survey conducted comprehensively thrice every year

Wave in progress

23rd

May-Aug
2021

Response rate (%)

53.57

3-wave avg.
62.67

Updated on: Jul 1 2021 6:00AM

A fast-frequency portrayal of living standards of Indian households

People of India_{dx}

The People of India database provides a moving kaleidoscope of the attributes and peculiarities of the Indian people.

Aspirational India_{dx}

Explore household assets and amenities, household sentiments, their perceptions and decisions regarding purchase of assets or to make investments.

Income Pyramids_{dx}

Enables the study of seasonality of household incomes, volatility of incomes, growth in incomes, changing composition of household incomes and a lot more.

Consumption Pyramids_{dx}

Consumption Pyramids fills a serious gap in the official Indian statistical system. It delivers fast-frequency data on consumption expenditure of households.

Kaushik Krishnan 28 Jun 2021

The uneven expansion of electricity in India: Summary

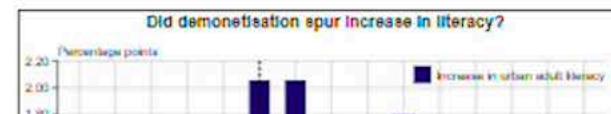
Mahesh Vyas 24 Jun 2021

Limitations? Sure. But Bias?
Nope.

Kaushik Krishnan 17 Jun 2021

Stories from Wave 22: Data Availability

Kaushik Krishnan 17 Jun 2021



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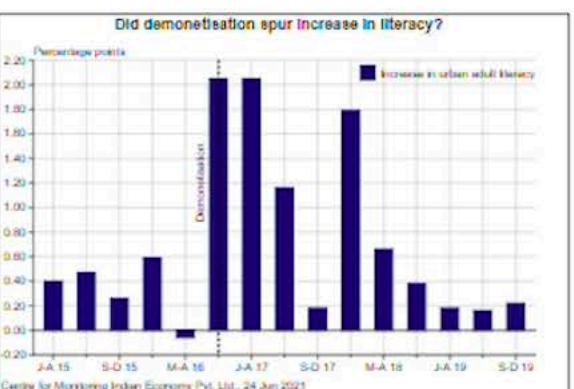
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[Stories from Wave 22: Data Availability](#)

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[Understanding CMIE's CPHS Employment Data](#)

Kaushik Krishnan 16 Jun 2021

[Stories From Wave 22:](#)

The video is now available on YouTube for anyone to watch.

What was presented?

Wave 22 of the Consumer Pyramids Household Survey was conducted from January 1, 2021 to April 30, 2021. Record-level data from Wave 22 was made available to subscribers on May 1, 2021. We discussed 3 stories about the data and 3 stories from the data of Wave 22.

1. Stories about the data of Wave 22

1. **A larger sample:** CPHS now has a household sample of over 176,000 households across the country. This is over 2,000 households higher than the sample size in Wave 21. We plan to continue to expand the CPHS sample in the ongoing Wave 23.
2. **A higher response rate:** The response rate in Wave 22 was 73.44 percent. This is the highest it has been since the Covid-19 pandemic began. This also coincides with an increase in face-to-face interviews. 97.59 percent of all interviews in Wave 22 were conducted in person. Of the 26.66 percent of households that did not respond in Wave 22, the majority of them were not visited due to logistical and operational constraints. Household refusal to participate continues to remain low at just 1.46 percent.
3. **Well balanced survey execution:** Accompanying the increased response rate, Wave 22 was a well balanced survey. We maintained our desired rural-urban balance and did well against the state-wise balance dictated by the survey. We have also checked for balance in terms of covering various income-, occupation- and education-groups in the survey. Though the survey design does not explicitly require balance among these groups, a well executed survey that claims to be representative of India should do so. Comfortingly we find that CPHS has

groups, a well executed survey that claims to be representative of India, should do so. Comfortingly, we find that CPHS has maintained balance on all these groups in Wave 22.

2. Stories from the data of Wave 22

1. **Depressed incomes:** We showed evidence that while incomes have risen since the pandemic, the average monthly income for January 2021 for India households was still lower in nominal terms than its equivalent amount in January 2019.
2. **Weak consumer demand:** We demonstrated that the increase in consumer demand that was seen shortly after the first lockdowns were lifted was short-lived. Consumer demand for durables has fallen across the board and continues to remain weak.
3. **Where you work matters:** Looking at those people employed in companies, we show that the group that actually worked in an office was shielded from the lockdowns whereas the group that worked in non-office settings like factories or warehouses, suffered a decline in employment. Equally, agricultural employment increased to record levels and stays high despite the fact that the Jan-Apr wave of CPHS usually records lower levels of employment for farm-work.



The uneven expansion of electricity in India: Summary

by Kaushik Krishnan

We conducted the 10th Consumer Pyramids Household Survey Research Seminar on **June 24 2021** at 4.30 PM IST. You can view a recording of the webinar [here](#).



Alfonso Martinez Arranz from the [University of Melbourne](#) and Robert Thomson from [Monash University](#) presented:

The uneven expansion of electricity supply in India

Their paper is coauthored with Steven Zech (Monash University), Ganesh Hegde (IIT Bombay), Dharmalingam Arunachalam (Monash University) and Anand B. Rao (IIT Bombay). It has recently been published in [Energy Research & Social Science](#).

Their work was discussed by Santosh Harish from the [Centre for Policy Research](#).

about the data and 3 stories from the data of Wave 22.

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2. Stories from the data of Wave 22

1. **Depressed incomes:** We showed evidence that while incomes

Summary

This paper is the first in a series of investigations into access to public goods in India. It concerns access to electricity. The authors use data from CPHS in conjunction with electoral data to try and explain patterns of access to electricity.

The primary variable of interest from CPHS is [POWER_AVAILABILITY_IN_HOURS_PER_DAY](#), which measures the number of hours in a day for which electricity is available in the household.

The authors postulate three hypotheses that could explain changes to electricity access over time:

1. Clientelism: Locations with small electoral margins of support for parties that control state-level governments experience the largest increases in electricity supply.
2. Incrementalism: Locations surrounded by areas with relatively high-quality energy infrastructure experience the largest increases in electricity supply.
3. Maximin: Locations with the poorest previous electricity supply experience the largest increases in electricity supply

The authors find very strong evidence for the Maximin hypothesis as well as reasonably strong evidence to support the Incrementalism hypothesis. They find very little evidence in support of the Clientelism hypothesis.

Future work

The authors are keen to expand on their work in two directions:

1. Study data further back in time: The authors are considering exploring data sources before CPHS such as NSS data and the IHDS to investigate changes that took place before they could be captured in CPHS.
2. Study access to other public goods in India such as access to drinking water, sanitation and education: The authors plan to explore other

Stories From Wave 22: Research Ideas

by Kaushik Krishnan

CMIE presented [Stories from Wave 22](#) on June 10, 2021. The presentation was followed by a live question and answer session. Over 150 questions were asked by the audience, with the bulk of them being answered during the session.

Many of the questions asked were whether particular research ideas were feasible. Almost all of the questions from the audience are possible to explore with the unit-level data that is available in CPdx! We summarise those ideas below for you to investigate:



Labour Force Participation

1. Did Covid19 and the lockdowns cause a significant change in occupational structures?
2. Can the pattern of jobs destruction among those people employed by companies, but did not have office jobs be attributed to differences between blue-collar and white-collar workers?
3. Are non-office based company workers largely contract workers?
4. Did people with jobs in the IT sector or those that work on digital

- 3. Are non-office based company workers largely contract workers?
- 4. Did people with jobs in the IT sector, or those that work on digital services, see the same job loss as people working in other sectors?
- 5. Did those people working in companies, who managed to retain their jobs during the pandemic experience salary cuts?
- 6. What explains the rise in agricultural employment since 2020?

Incomes

- 1. What is the evolution of average household income in real terms?
- 2. How have incomes changed for agricultural households?

The People of India Database provides a moving kaleidoscope of the attributes and peculiarities of the Indian people.

Explore household assets and amenities, household sentiments, their perceptions and decisions regarding purchase of assets or to make investments.

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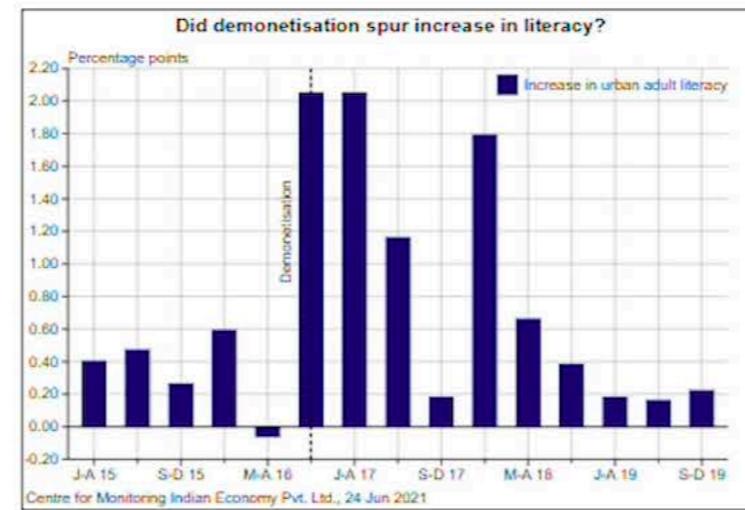
Stories From Wave 22: Research Ideas

Kaushik Krishnan 16 Jun 2021

Stories From Wave 22: Survey Execution Q&A

Mahesh Vyas 24 Jun 2021

Limitations? Sure. But Bias? Nope.



Kaushik Krishnan 11 Jun 2021

Kaushik Krishnan 17 Jun 2021

Stories from Wave 22: Data Availability

Kaushik Krishnan 16 Jun 2021

Understanding CMIE's CPHS Employment Data

Kaushik Krishnan 16 Jun 2021

Stories From Wave 22: Survey Design Q&A

1. What is the evolution of average household income in real terms?
2. How have incomes changed for agricultural households?
3. Did the increase in agricultural employment in 2020 and 2021 cause agricultural wage rates to fall?
4. How is the marginal rupee of income allocated by the household between savings and consumption expenditure?

Consumption Expenditure

1. Do government incentives to spend money result in increased consumption expenditure?
2. Does consumption expenditure on non-durables have any relationship to consumption expenditure on durables?
3. How has food consumption changed due to Covid-19 and the lockdowns?

Ownership and Intentions to Purchase Assets

1. Can the time series in intention to purchase be studied to find out exactly when consumer demand dropped?
2. Some households already own certain assets. Can one analyse just those households that don't currently own that asset, and then study



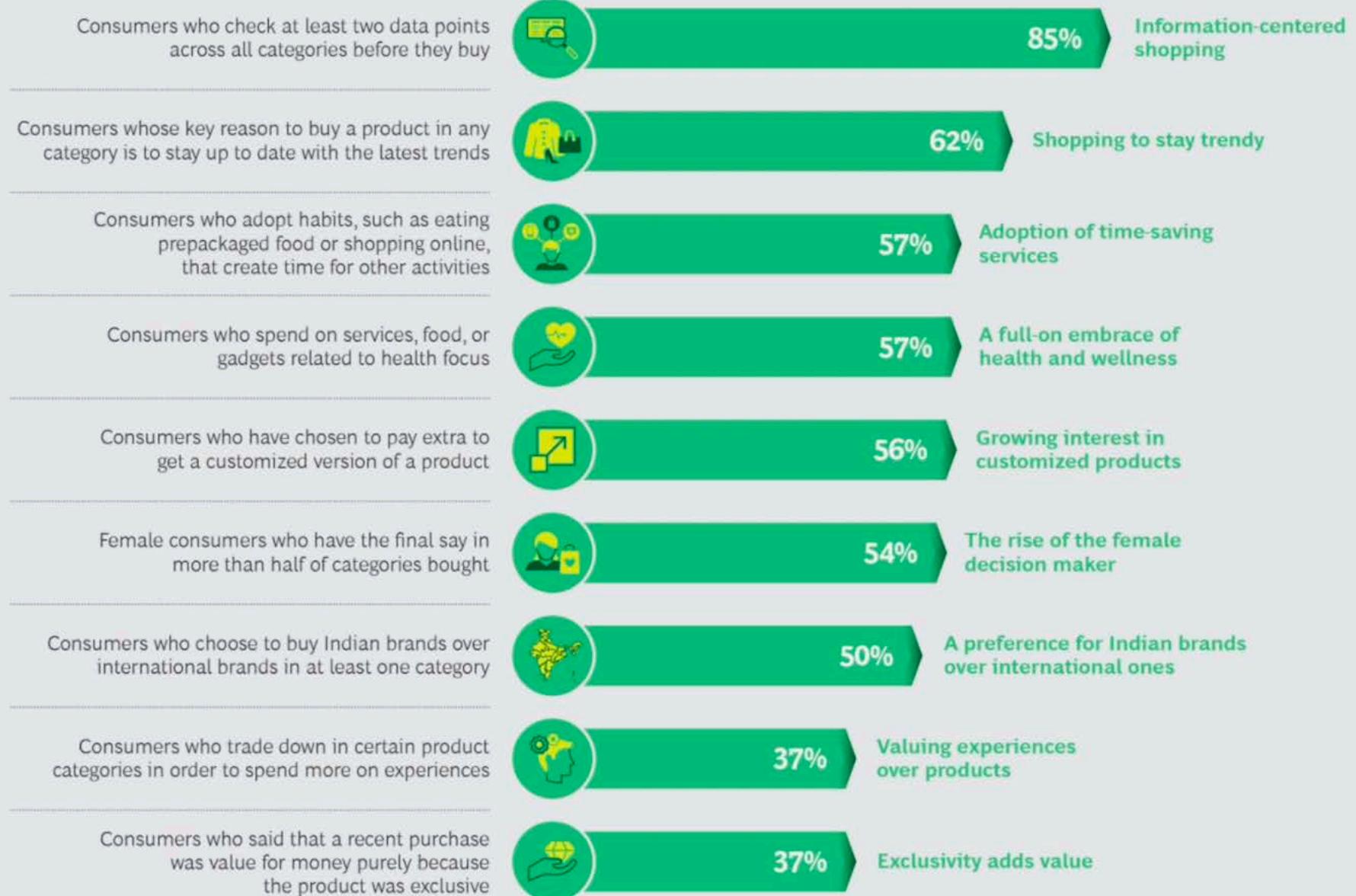
Trisha and Samir, a married couple in their early 30s, grew up in typical middle-class Indian households.¹ Their circumstances as children were modest, and their families were extremely cautious with spending: the adults' biggest dream was to move out of the rentals they were living in and buy their own homes. Trisha remembers her mother going to *mandi* (a fresh-vegetable market) every other day to get the best produce at the cheapest price. Both families' major indulgence was the occasional getaway to hill stations—higher-elevation towns with cooler temperatures that are popular vacation spots in India.

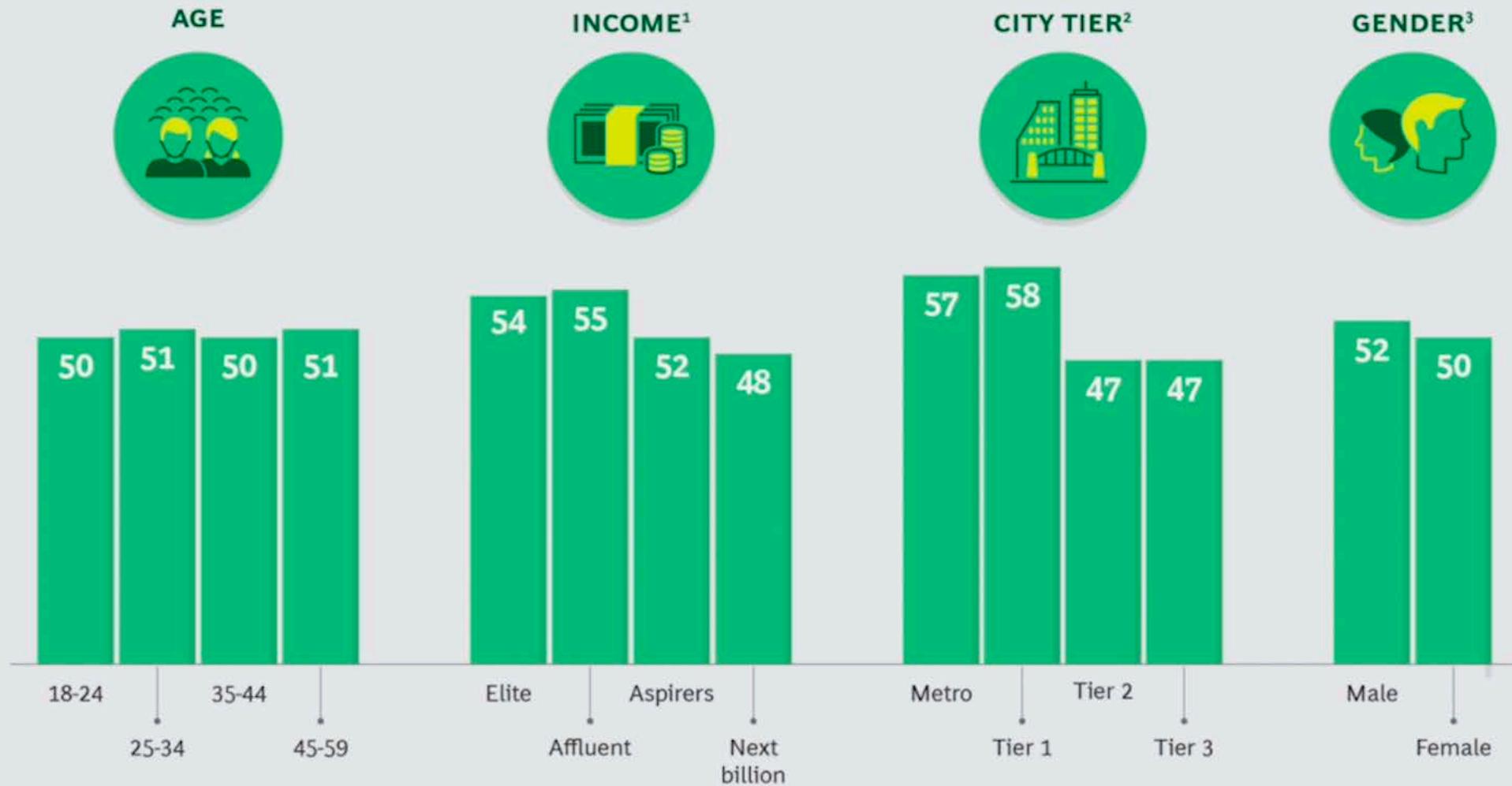
But attitudes in India are changing as a **consequence of rising incomes** and of exposure to new ideas and technologies. For Trisha and Samir—and the tens of millions of Indians like them—the interest in spending on traditional things, such as the purchase of a home, has fallen. Increasingly, people are spending more on experiences, customized products, and time-saving

Ten Trends That Are Altering Consumer Behavior in India



EXHIBIT 4 | TEN EMERGING BEHAVIORS OF INDIAN CONSUMERS





Source: BCG analysis.

Note: Percentages reflect the average adoption of all ten trends.

¹Annual household income: elite = greater than \$30,800; affluent = \$15,400 to \$30,800; aspirers = \$7,700 to \$15,400; next billion = \$2,300 to \$7,700. The income bands reflect a conversion rate of \$1 = ₹65.

²City population: metro = greater than 4 million; tier 1 = 1 million to 4 million; tier 2 = 500,000 to 1 million; tier 3 = 100,000 to 500,000.

³The “rise in the female decision maker” trend was omitted for gender analysis.

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³The “rise in the female decision maker” trend was omitted for gender analysis.

Information-Centered Shopping. People in Indian cities now treat information gathering as an integral part of the shopping experience. Eighty-five percent of consumers check at least two data points (beyond prices and discounts) when they’re buying something, and roughly 50% do some sort of online research. Among the sorts of information that people look for are product reviews, manufacturing and expiration dates, and how a product compares with alternatives in terms of features. “I need to read the pack before buying,” said a 38-year-old housewife from Gurugram. This is true even for a simple product, such as yogurt, which she noted can come in many varieties. “You need to know what you’re buying.”

available in Jamnagar, the tier 1 city where she lives. There are numerous social occasions in “cities like ours,” she said, and “people really talk about what the other person was wearing. No one likes to repeat their clothes.”

THE TRENDS THROUGH A DIFFERENT LENS

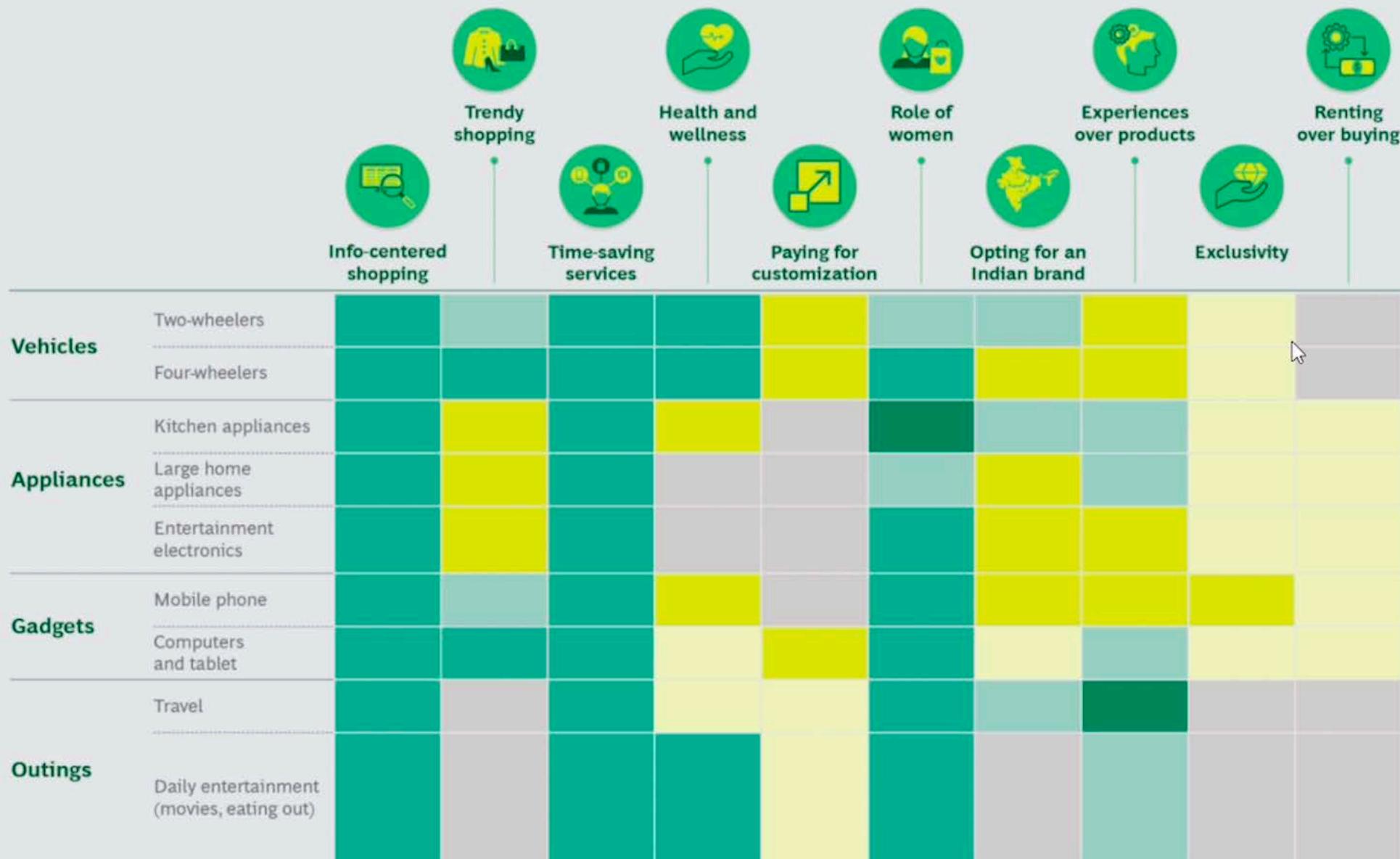
Because the survey questions covered 30 categories, it was possible to do a detailed analysis of the trends across product segments. (See Exhibit 3.)

While each of these trends is gaining steam, their current penetration across categories varies. For instance, nascent trends, such as the more favorable views of renting and

“

There’s a belief that what one buys should reflect one’s individual preferences and needs—even if one has to pay

EXHIBIT 3 | How the Trends Are Affecting Product Categories





IIT Madras

ONLINE DEGREE

The Theory of Consumer Behavior

The Theory of Consumer Behavior

The principle assumption upon which the theory of consumer behavior and demand is built is:

a consumer attempts to allocate his/her limited money income among available goods and services so as to maximize his/her utility (satisfaction).

Useful for understanding the demand side of the market.

***Utility* - amount of satisfaction derived from the consumption of a commoditymeasurement units \Rightarrow utils**

Theories of Consumer Choice

Utility Concepts:

- The Cardinal Utility Theory (TUC)
 - Utility is measurable in a cardinal sense
 - *cardinal utility* - assumes that we can assign values for utility.
E.g., derive 100 utils from eating a slice of bread
- The Ordinal Utility Theory (TUO)
 - Utility is measurable in an ordinal sense
 - *ordinal utility approach* - does not assign values, instead works with a ranking of preferences.

The Cardinal Approach

Nineteenth century economists, such as Jevons, Menger and Walras, assumed that utility was measurable in a cardinal sense, which means that the difference between two measurement is itself numerically significant.

$$U_X = f(X), \quad U_Y = f(Y), \dots$$

Utility is maximized when:

$$MU_X / MU_Y = P_X / P_Y$$

The Cardinal Approach

- **Total utility (TU)** - the overall level of satisfaction derived from consuming a good or service
- **Marginal utility (MU)** additional satisfaction that an individual derives from consuming an *additional unit* of a good or service.

Formula :

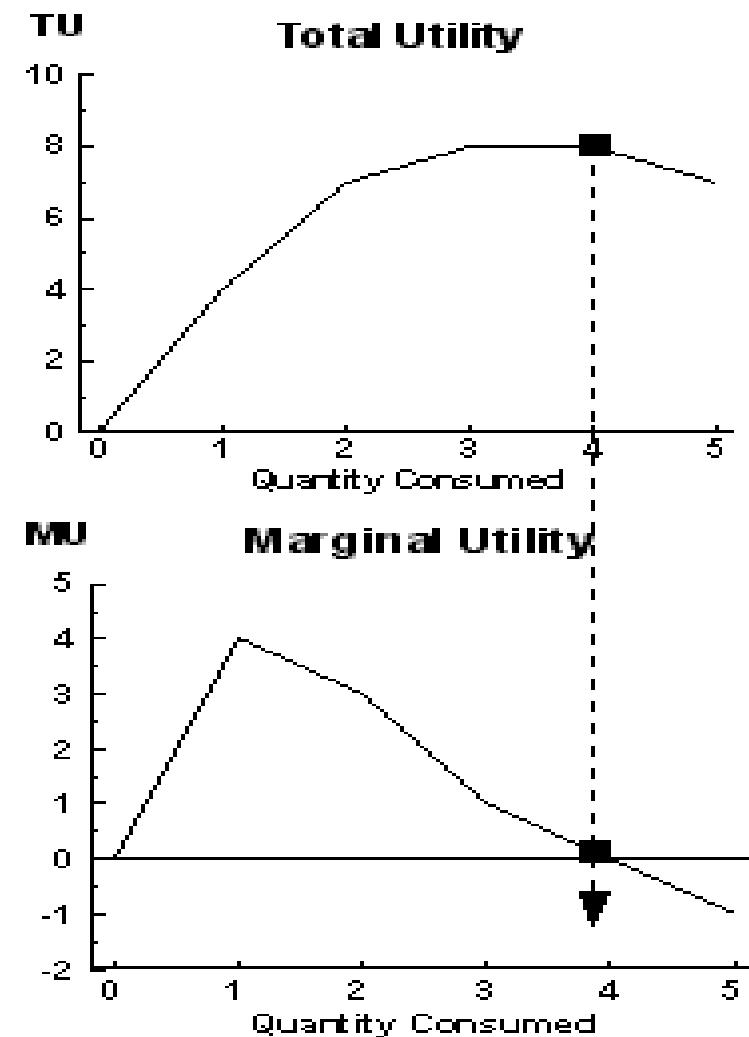
$$\begin{aligned} MU &= \frac{\text{Change in total utility}}{\text{Change in quantity}} \\ &= \frac{\Delta TU}{\Delta Q} \end{aligned}$$

The Cardinal Approach

- Law of Diminishing Marginal Utility (Return) = **As more and more of a good are consumed, the process of consumption will (at some point) yield smaller and smaller additions to utility**
- When the total utility maximum, marginal utility = 0
- When the total utility begins to decrease, the marginal utility = negative (-ve)

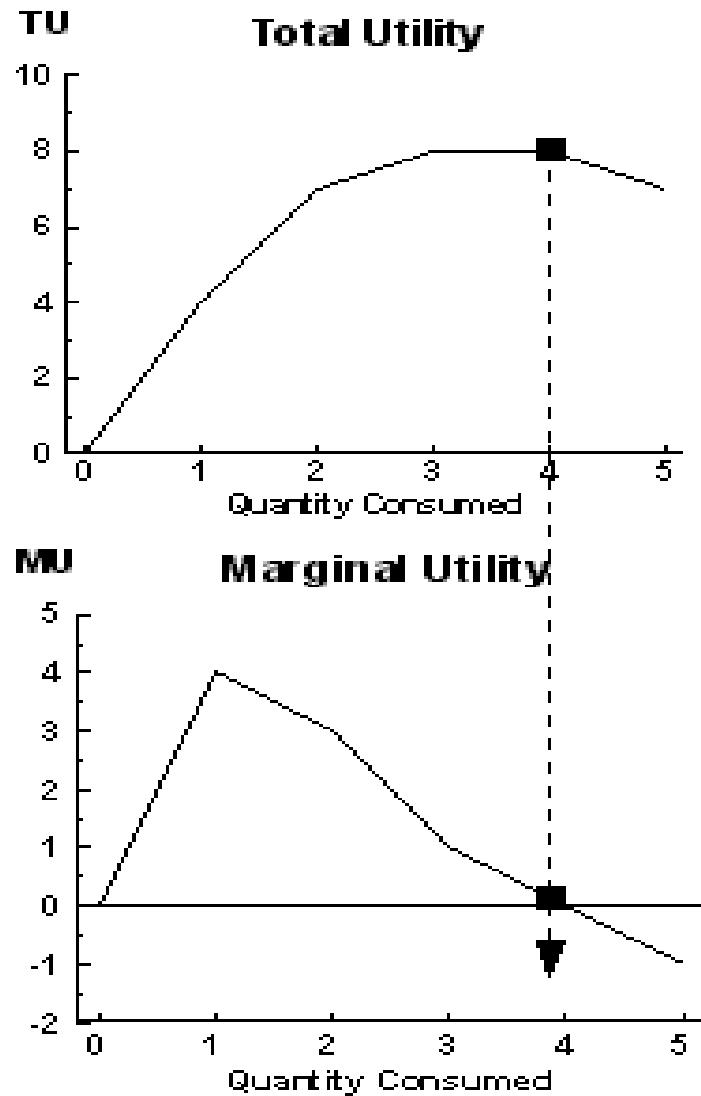
EXAMPLE

Number Purchased	Total Utility	Marginal Utility
0	0	0
1	4	4
2	7	3
3	8	1
4	8	0
5	7	-1



The Cardinal Approach

- TU, in general, increases with Q
- At some point, TU can start falling with Q (see Q = 5)
- If TU is increasing, MU > 0
- From Q = 1 onwards, MU is declining
⇒ principle of diminishing marginal utility ⇒ As more and more of a good are consumed, the process of consumption will (at some point) yield smaller and smaller additions to utility



Consumer Equilibrium

- So far, we have assumed that any amount of goods and services are always available for consumption
- In reality, consumers face constraints (income and prices):
 - Limited consumer's income or budget
 - Goods can be obtained at a price
- Consumer's objective: to maximize his/her utility subject to income constraint
 - 2 goods (X, Y)
 - Prices P_x, P_y are fixed
 - Consumer's income (I) is given

Consumer Equilibrium

- Optimizing condition:

$$\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y}$$

- If

$$\frac{MU_X}{P_X} > \frac{MU_Y}{P_Y}$$

⇒ spend more on good X and less of Y

The Ordinal Approach

Economists following the lead of Hicks, Slutsky and Pareto believe that utility is measurable in an ordinal sense—

the utility derived from consuming a good, such as X, is a function of the quantities of X and Y consumed by a consumer.

$$U = f(X, Y)$$

Ordinal Utility Theory (TUO)

—Can be measured in qualitative, not quantitative, but only lists the main options (indifference curves & budget line).

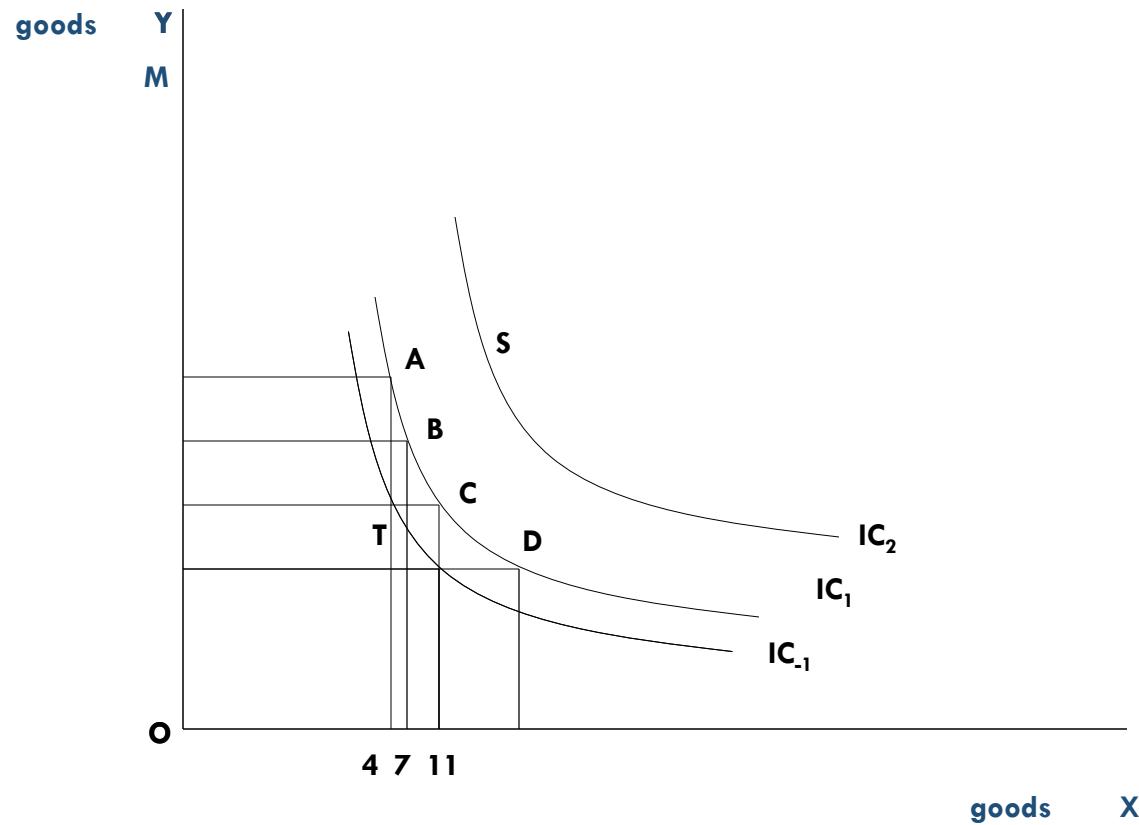
Rational human beings will choose to maximize the utility by selecting the highest utility

Different consumers, different utilities.

INDIFFERENCE CURVE (IC)

- Curve where the points represent a combination of items when the consumer at indifference situation (satisfaction).
- Axes: both axes refer to the quantity of goods
- For the combination that produces a higher level of satisfaction, the curves shift to the right (IC_2) from the first curve (IC_1)
- In contrast, the curves shift to the left (IC_{-1})

INDIFFERENCE CURVE



PROPERTIES OF INDIFFERENCE CURVE

- **Downward sloping** from left to right: This shows an increase in quantity of certain good.
- **Convex to the origin:** the marginal rate of substitution (MRS) decreased
 - $MRS = \text{quantity of goods Y willing to substitute to obtain one unit of goods X} & \text{this substitution is to maintain its position at the same level of satisfaction}$
- **Do not cross (intersect): consumer preferences transitive**
 - Eg : Quantities X and Y for the combination of A > a combination of B;
 $\Rightarrow \text{utility } A > B$ *
 - When cross = C, so the utility A = C & B = C; $\Rightarrow \text{utility } A = B = C$. This is not transitive as above *
- **Different ICs show different level of satisfaction.** Far from the origin, the higher the satisfaction.

Markets and Competition

Market

- A group of buyers and sellers of a particular good or service

Buyers

- Determine the demand for the product

Sellers

- Determine the supply of the product



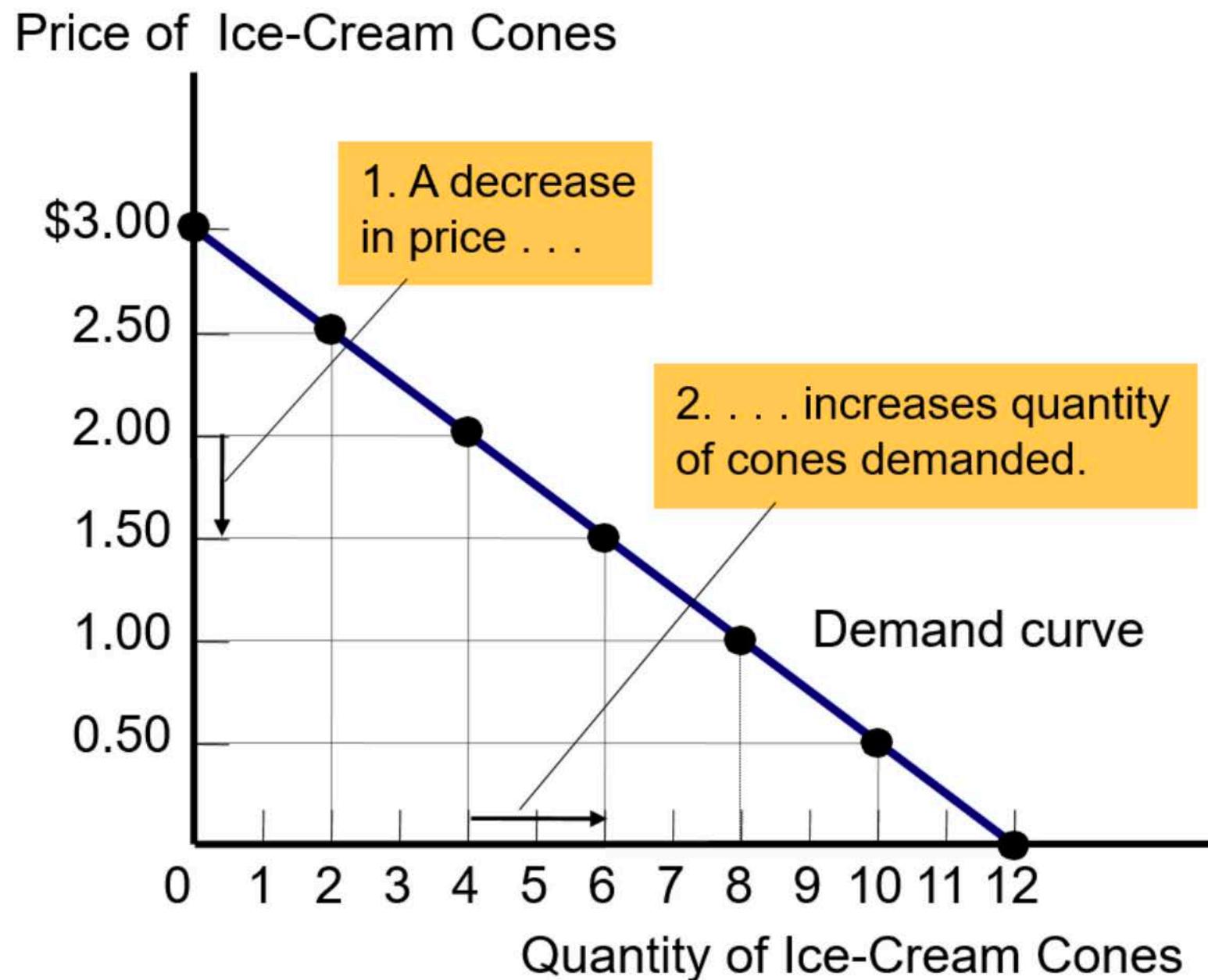
Demand

- **Quantity demanded**
 - Amount of a good that buyers are willing and able to purchase
- **Law of demand**
 - Other things equal, when the price of the good rises, Quantity demanded of a good falls
- **Demand schedule - a table**
 - Relationship between the price of a good and quantity demanded
- **Demand curve - a graph**
 - Relationship between the price of a good and quantity demanded
- **Individual demand**
 - Demand of one individual



Demand Schedule and Demand Curve

Price of Ice-Cream Cone	Quantity of Cones Demanded
\$0.00	12 cones
0.50	10
1.00	8
1.50	6
2.00	4
2.50	2
3.00	0



The demand schedule is a table that shows the quantity demanded at each price. The demand curve, which graphs the demand schedule, illustrates how the quantity demanded of the good changes as its price varies. Because a lower price increases the quantity demanded, the demand curve slopes downward.

Demand

- Market demand curve
 - Sum the individual demand curves horizontally
 - Total quantity demanded of a good varies
 - As the price of the good varies
 - Other things constant

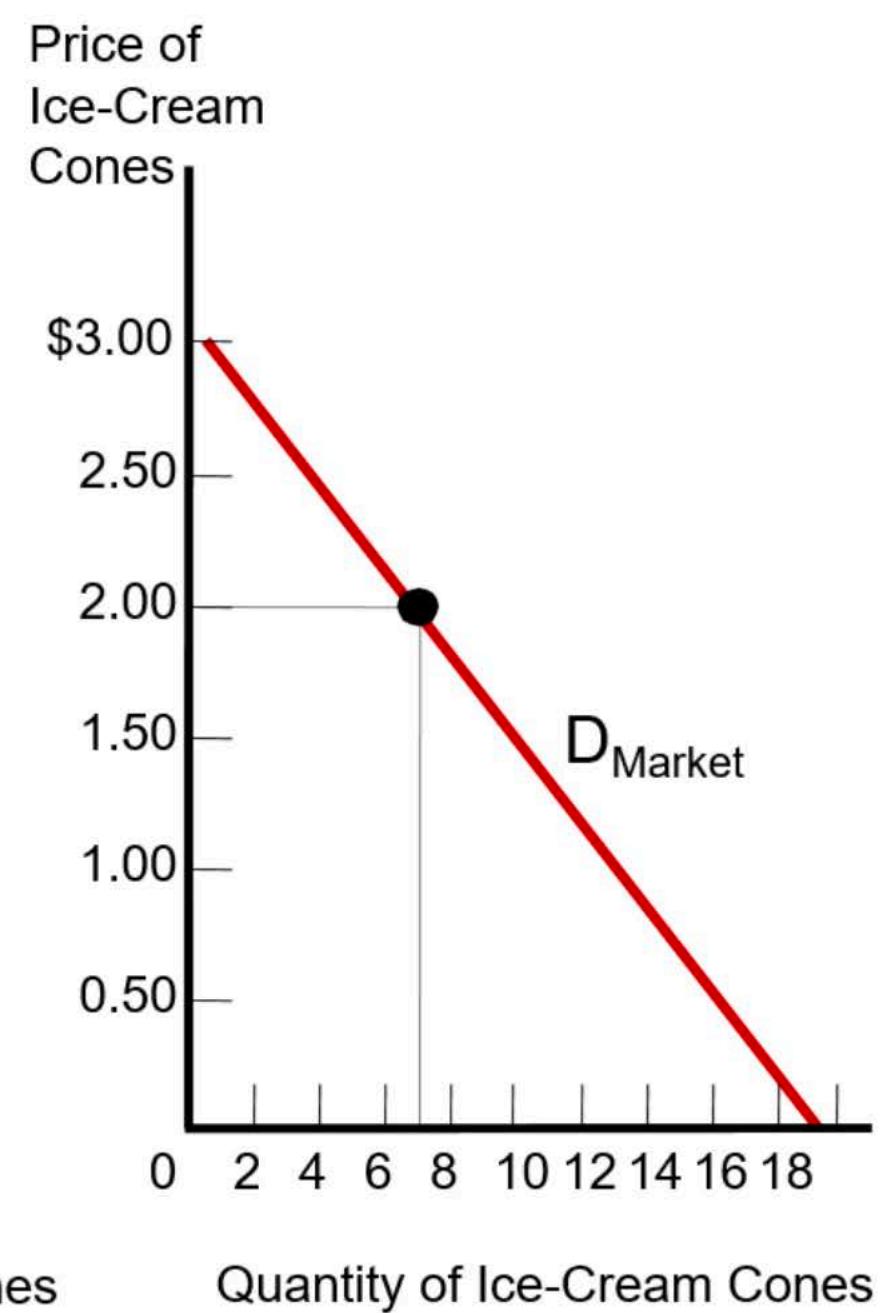
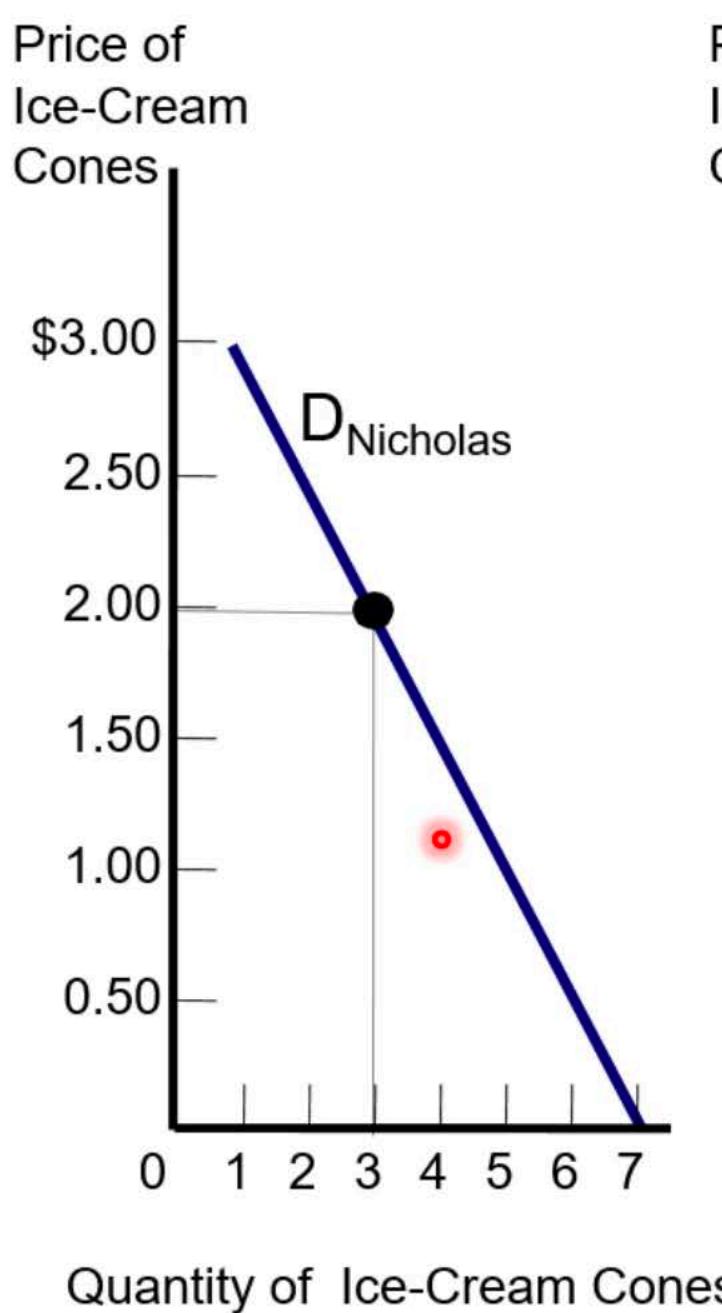
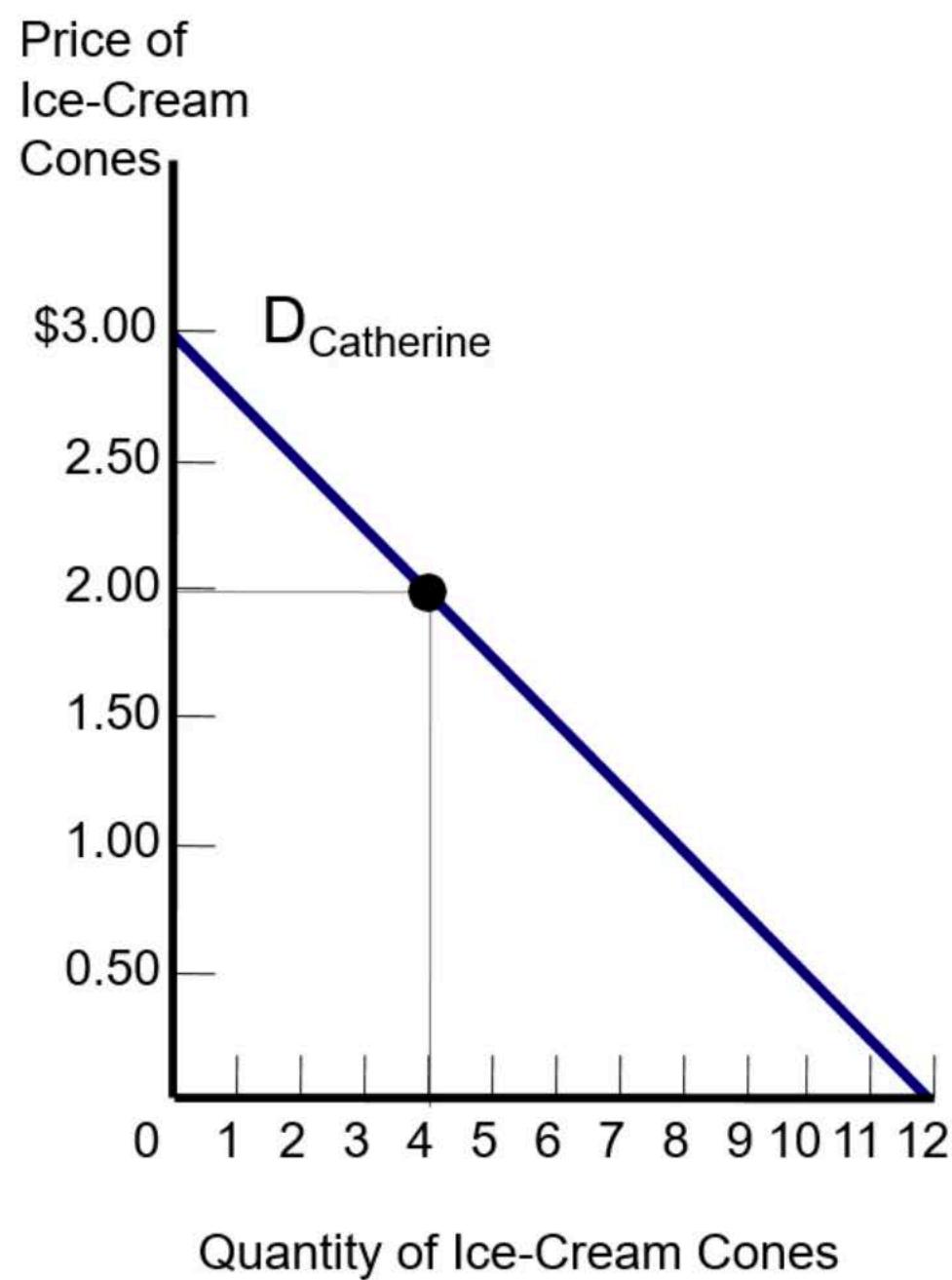


Market Demand as the Sum of Individual Demands

Catherine's demand

+ Nicholas's demand

= Market demand



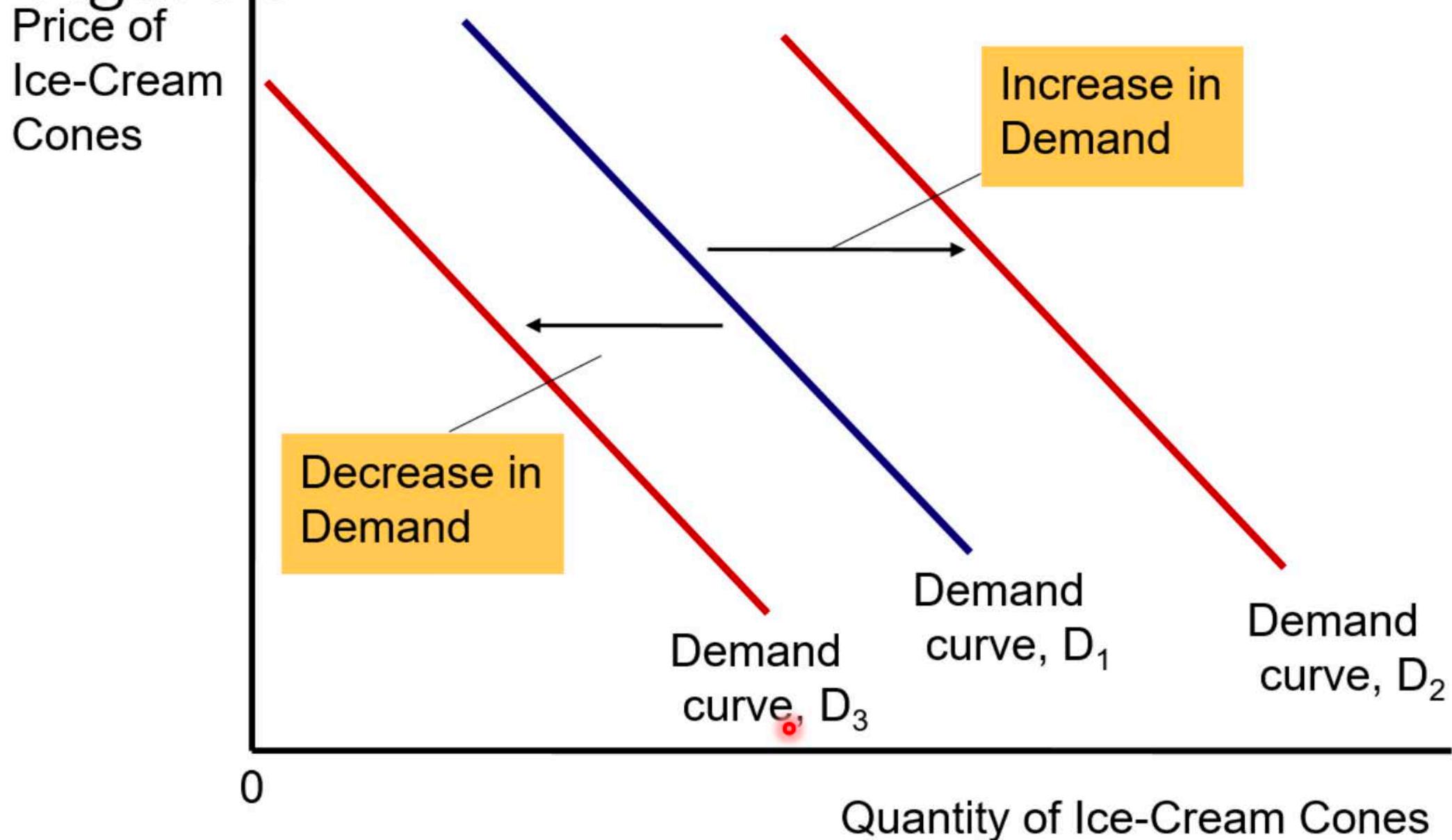
Demand

Shifts in the demand curve

- Increase in demand
 - Any change that increases the quantity demanded at every price
 - Demand curve shifts right
- Decrease in demand
 - Any change that decreases the quantity demanded at every price
 - Demand curve shifts left

Shifts in the Demand Curve

Figure 3



Any change that raises the quantity that buyers wish to purchase at any given price shifts the demand curve to the right. Any change that lowers the quantity that buyers wish to purchase at any given price shifts the demand curve to the left.

Demand

- Variables that can shift the demand curve

- Income
- Prices of related goods
- Tastes
- Expectations
- Number of buyers



Demand

- Income
 - Normal good
 - Other things constant
 - An increase in income leads to an increase in demand
 - Inferior good
 - Other things constant
 - An increase in income leads to a decrease in demand
- Prices of related goods
 - Substitutes - two goods
 - An increase in the price of one
 - Leads to an increase in the demand for the other
 - Complements – two goods
 - An increase in the price of one
 - Leads to a decrease in the demand for the other

Demand

Tastes

- Change in tastes – changes the demand

Expectations about the future

- Expect an increase in income
 - Increase in current demand
- Expect higher prices
 - Increase in current demand



Number of buyers – increase

- Market demand - increases

Variables That Influence Buyers

Table 1

Variable	A Change in This Variable . . .
Price of the good itself	Represents a movement along the demand curve
Income	Shifts the demand curve
Prices of related goods	Shifts the demand curve
Tastes	Shifts the demand curve
Expectations	Shifts the demand curve
Number of buyers	Shifts the demand curve

This table lists the variables that affect how much consumers choose to buy of any good. Notice the special role that the price of the good plays: A change in the good's price represents a movement along the demand curve, whereas a change in one of the other variables shifts the demand curve.

Supply and Demand Together

Equilibrium - a situation

- Supply and demand forces are in balance
- A situation in which market price has reached the level where
 - Quantity supplied = quantity demanded
 - Supply and demand curves intersect

o

Supply and Demand Together

Equilibrium price

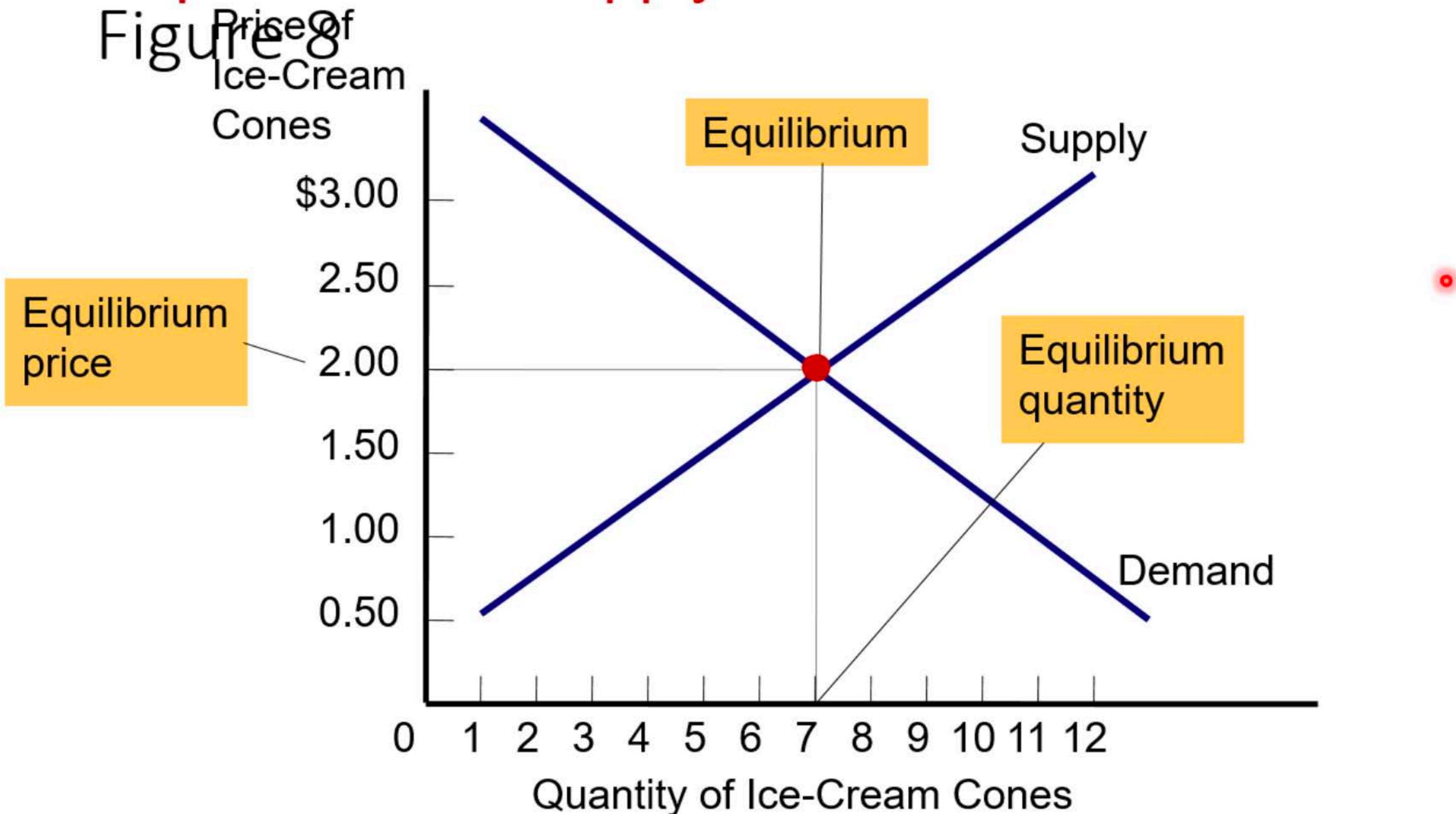
- Balances quantity supplied and quantity demanded
- Market-clearing price

Equilibrium quantity

- Quantity supplied and quantity demanded at the equilibrium price

The Equilibrium of Supply and Demand

Figure 8



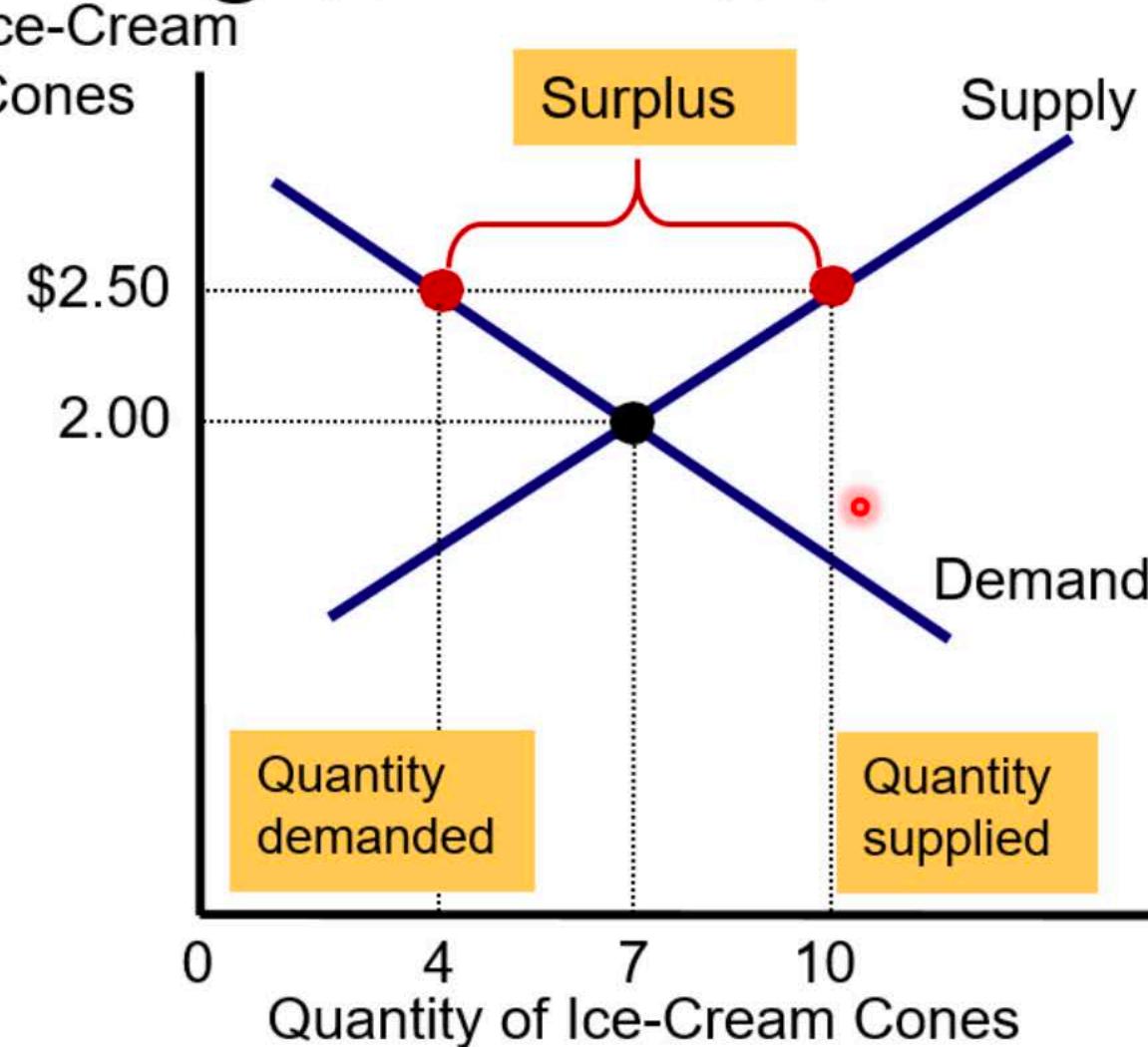
The equilibrium is found where the supply and demand curves intersect. At the equilibrium price, the quantity supplied equals the quantity demanded. Here the equilibrium price is \$2.00: At this price, 7 ice-cream cones are supplied, and 7 ice-cream cones are demanded.

Supply and Demand Together

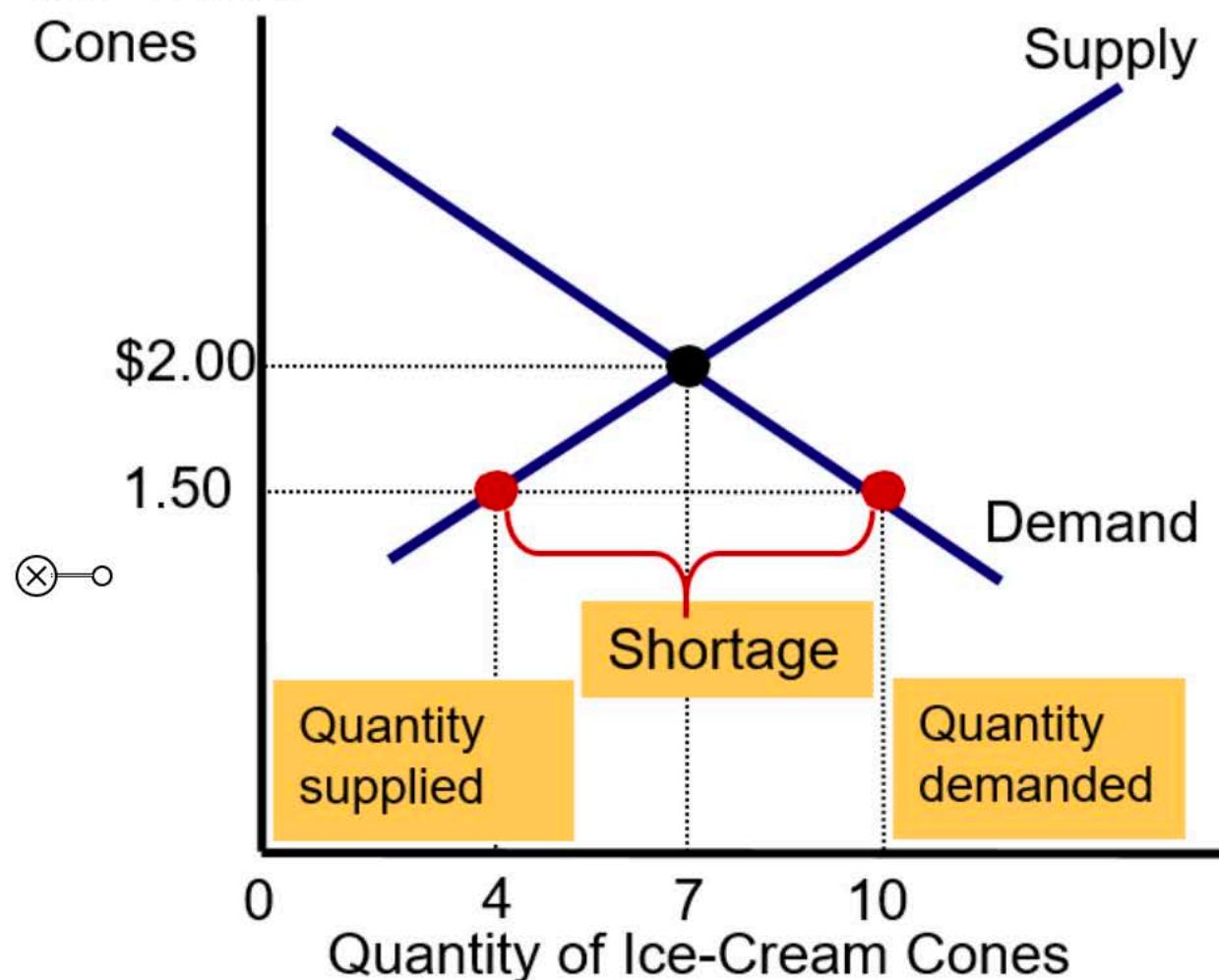
- Surplus
 - Quantity supplied > quantity demanded
 - Excess supply (surplus)
 - Downward pressure on price
 - Movements along the demand and supply curves
 - Increase in quantity demanded
 - Decrease in quantity supplied
- Shortage
 - Quantity demanded > quantity supplied
 - Excess demand (shortage)
 - Upward pressure on price
 - Movements along the demand and supply curves
 - Decrease in quantity demanded
 - Increase in quantity supplied

Markets Not in Equilibrium

Figure 9-9 Excess Supply



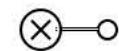
(b) Excess demand



In panel (a), there is a surplus. Because the market price of \$2.50 is above the equilibrium price, the quantity supplied (10 cones) exceeds the quantity demanded (4 cones). Suppliers try to increase sales by cutting the price of a cone, and this moves the price toward its equilibrium level. In panel (b), there is a shortage. Because the market price of \$1.50 is below the equilibrium price, the quantity demanded (10 cones) exceeds the quantity supplied (4 cones). With too many buyers chasing too few goods, suppliers can take advantage of the shortage by raising the price. Hence, in both cases, the price adjustment moves the market toward the equilibrium of supply and demand.

Supply and Demand Together

- Law of supply and demand
 - The price of any good adjusts
 - To bring the quantity supplied and the quantity demanded for that good into balance
 - In most markets
 - Surpluses and shortages are temporary



- Prices
 - Signals that guide the allocation of resources
 - Mechanism for rationing scarce resources
 - Determine who produces each good and how much is produced



Changes in Demand and Elasticities

- Price elasticity of demand
 - Percentage change in quantity demanded divided by the percentage change in price
- Elastic demand
 - Quantity demanded responds substantially to changes in price
- Inelastic demand
 - Quantity demanded responds only slightly to changes in price

The Elasticity of Demand

- Elasticity
 - Measure of the responsiveness of quantity demanded or quantity supplied
 - To a change in one of its determinants
- Price elasticity of demand
 - How much the quantity demanded of a good
 - Responds to a change in the price of that good

- Determinants of price elasticity of demand
 - Availability of close substitutes
 - Goods with close substitutes – more elastic demand
 - Necessities vs. luxuries
 - Necessities – inelastic demand
 - Luxuries – elastic demand

Computing the price elasticity of demand

- Percentage change in quantity demanded divided by percentage change in price
- Use absolute value (drop the minus sign)

Variety of demand curves

- Demand is elastic
 - Price elasticity of demand > 1
- Demand is inelastic
 - Price elasticity of demand < 1
- Demand has unit elasticity
 - Price elasticity of demand = 1

Variety of demand curves

- Demand is perfectly inelastic
 - Price elasticity of demand = 0
 - Demand curve is vertical
- Demand is perfectly elastic
 - Price elasticity of demand = infinity
 - Demand curve is horizontal

The flatter the demand curve

- The greater the price elasticity of demand
- But elasticity is NOT just the slope, but also the position on the curve

Computing the price elasticity of demand

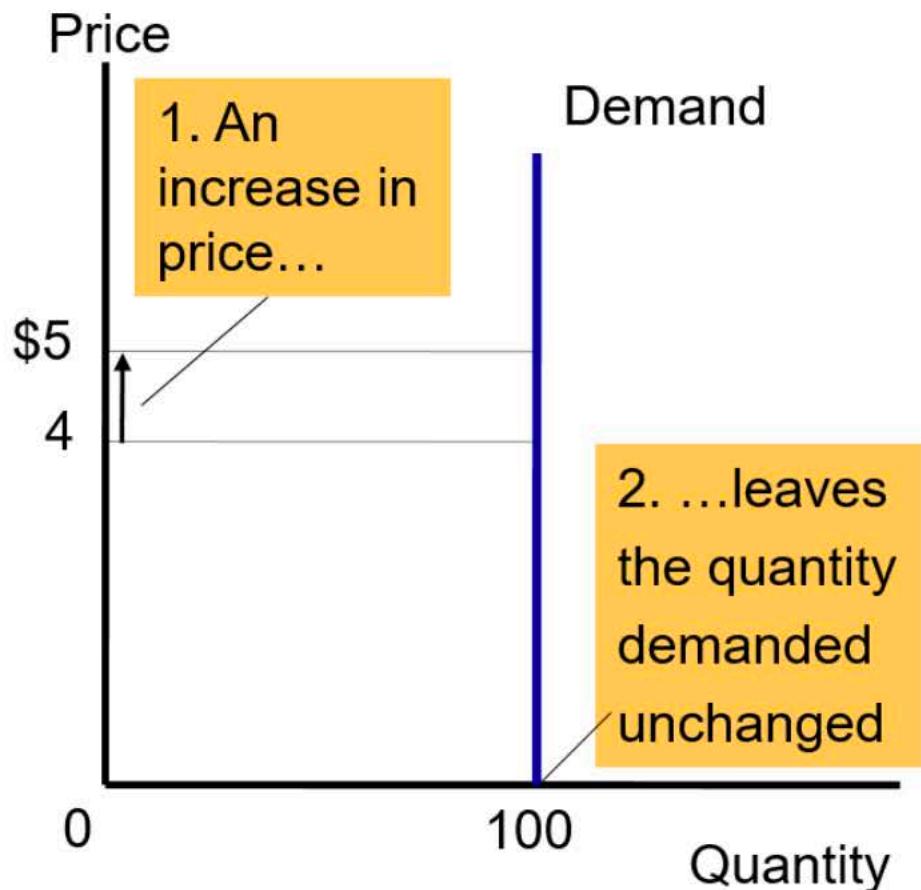
- Percentage change in quantity demanded divided by percentage change in price
- Use absolute value (drop the minus sign)

Variety of demand curves

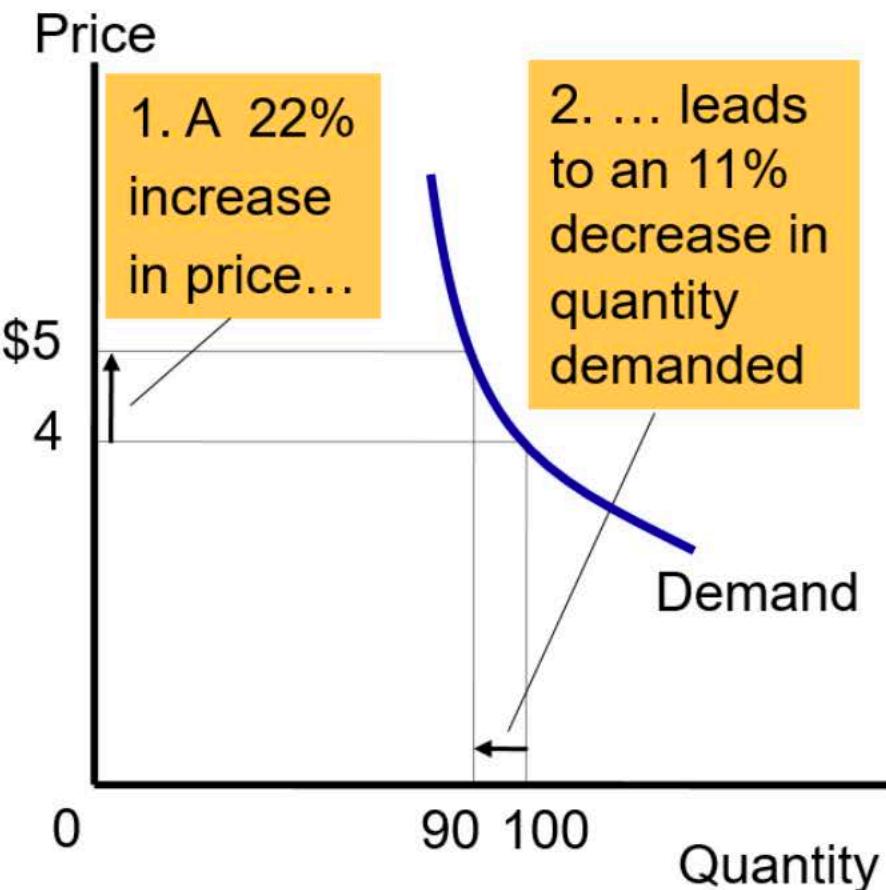
- Demand is elastic
 - Price elasticity of demand > 1
- Demand is inelastic
 - Price elasticity of demand < 1
- Demand has unit elasticity
 - Price elasticity of demand = 1

The Price Elasticity of Demand (a, b)

(a) Perfectly Inelastic Demand:
Elasticity Equals 0



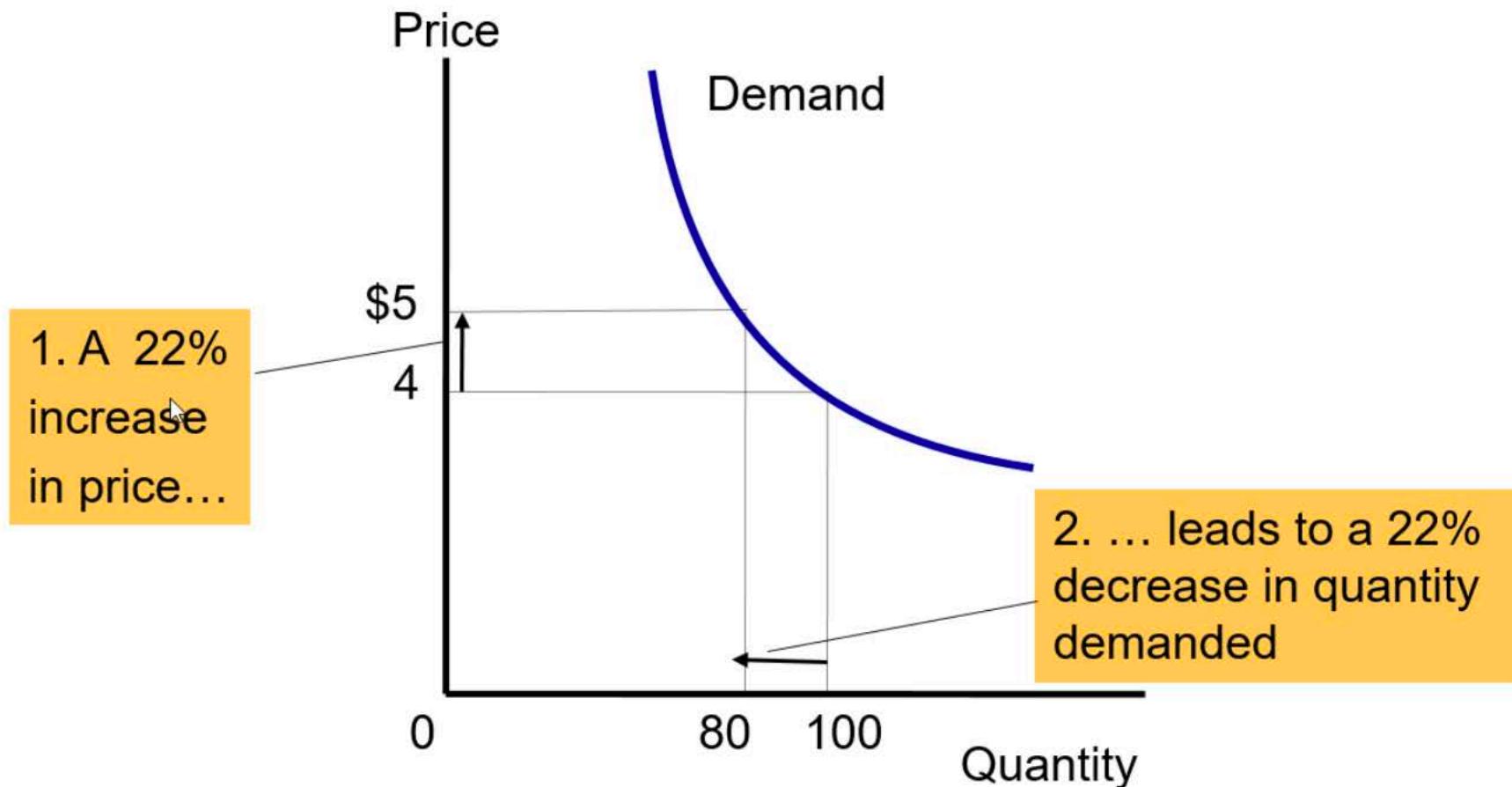
(b) Inelastic Demand: Elasticity Is Less Than 1



The price elasticity of demand determines whether the demand curve is steep or flat.
Note that all percentage changes are calculated using the midpoint method.

The Price Elasticity of Demand (c)

(c) Unit Elastic Demand: Elasticity Equals 1

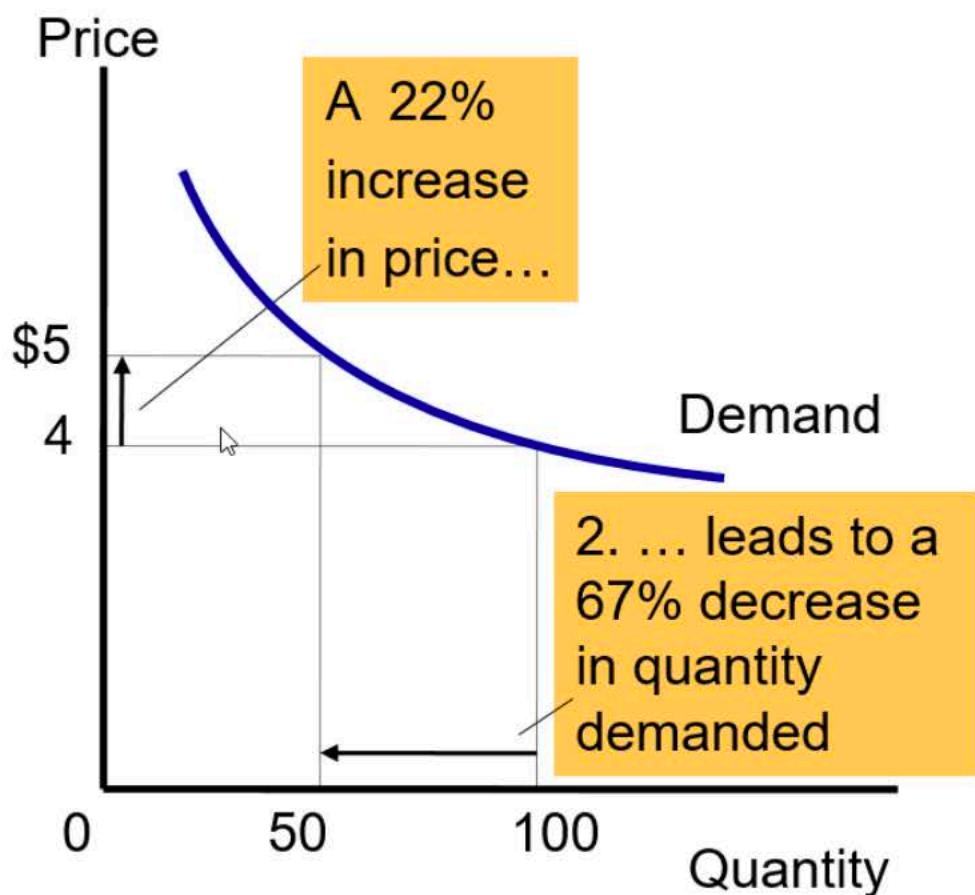


The price elasticity of demand determines whether the demand curve is steep or flat. Note that all percentage changes are calculated using the midpoint method.

The Price Elasticity of Demand (d, e)

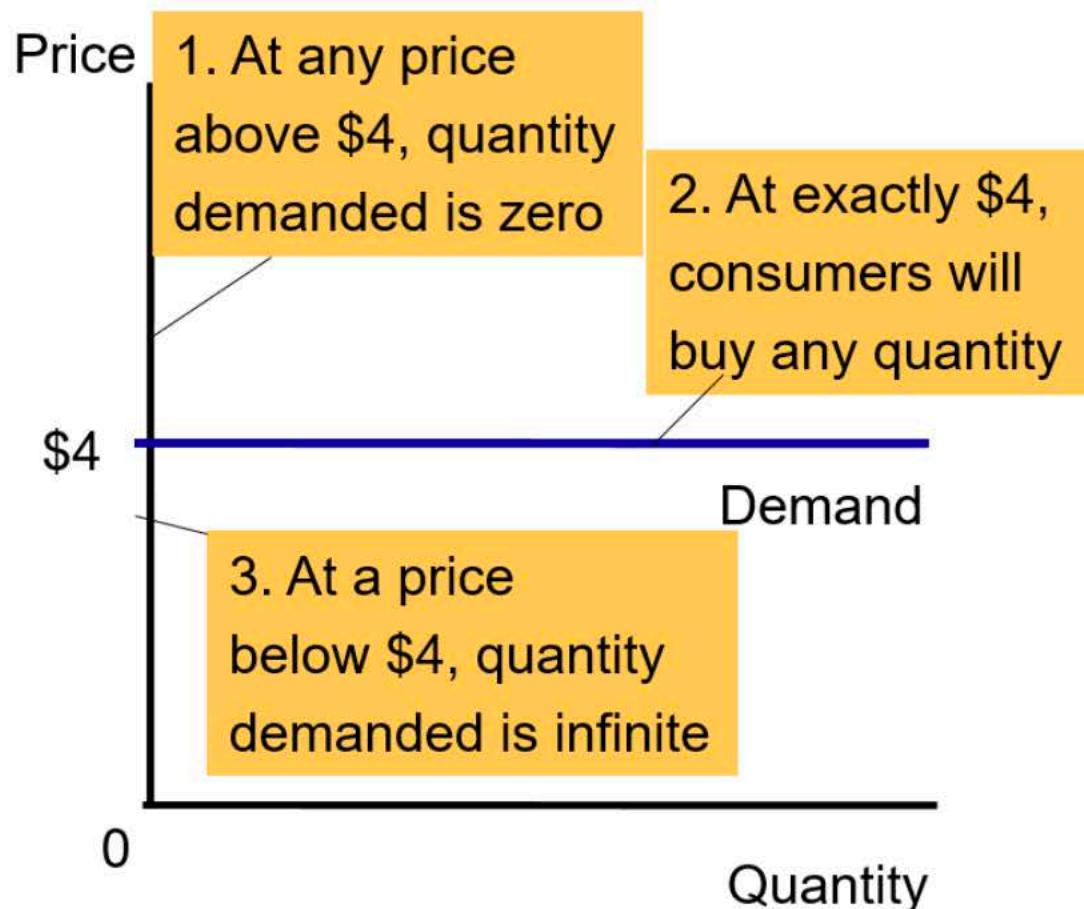
(d) Elastic demand:

Elasticity > 1



(e) Perfectly elastic demand:

Elasticity equals infinity



The price elasticity of demand determines whether the demand curve is steep or flat. Note that all percentage changes are calculated using the midpoint method.

Income Elasticity of Demand

Income elasticity of demand

- How much the quantity demanded of a good responds to a change in consumers' income
- Percentage change in quantity demanded
 - Divided by the percentage change in income

Income Elasticity of Demand

Normal goods

- Positive income elasticity
- Necessities
 - Smaller income elasticities
- Luxuries
 - Large income elasticities

Inferior goods

- Negative income elasticities

Cross-Price Elasticity of Demand

Cross-price elasticity of demand

- How much the quantity demanded of one good responds to a change in the price of another good
- Percentage change in quantity demanded of the first good
 - Divided by the percentage change in price of the second good

The Elasticity of Demand

Substitutes

- Goods typically used in place of one another
- Positive cross-price elasticity

Complements

- Goods that are typically used together
- Negative cross-price elasticity

The Elasticity of Supply

Price elasticity of supply

- How much the quantity supplied of a good responds to a change in the price of that good
- Percentage change in quantity supplied
 - Divided by the percentage change in price
- Depends on the flexibility of sellers to change the amount of the good they produce

The Elasticity of Supply

Elastic supply

- Quantity supplied responds substantially to changes in the price

Inelastic supply

- Quantity supplied responds only slightly to changes in the price

Determinant of price elasticity of supply

- Time period
 - Supply is more elastic in long run

The Elasticity of Supply

Computing price elasticity of supply

- Percentage change in quantity supplied divided by percentage change in price
- Always positive

Variety of supply curves

- Supply is unit elastic
 - Price elasticity of supply = 1
- Supply is elastic
 - Price elasticity of supply > 1
- Supply is inelastic
 - Price elasticity of supply < 1

Income and Substitution Effects of a Price Change

- Income effect – a change in a consumer's real purchasing power brought about by a change in the price of a good
- Substitution effect – an incentive to increase consumption of a good whose price falls, at the expense of other, now relatively more expensive, goods

Price and Income Elasticities of Demand

Income elasticity measures **shifts** in the demand curve

Price elasticity measures **movements** along the curve

Normal and Inferior Goods

Normal goods have a **positive** income elasticity

Inferior goods have a **negative** income elasticity

Necessities and Luxuries

Necessities typically have an income elasticity
between 0 and 1

Luxuries typically have an income elasticity
greater than 1

Elasticities of Demand

Price elasticity measures movements along the curve

Income elasticity measures shifts in the demand curve

Cross-price elasticity measures shifts in the demand curve

Substitutes and Complements

Goods are said to be substitutes if $\varepsilon_{ij} > 0$

Demand goes up as other price goes up

Goods are said to be complements if $\varepsilon_{ij} < 0$

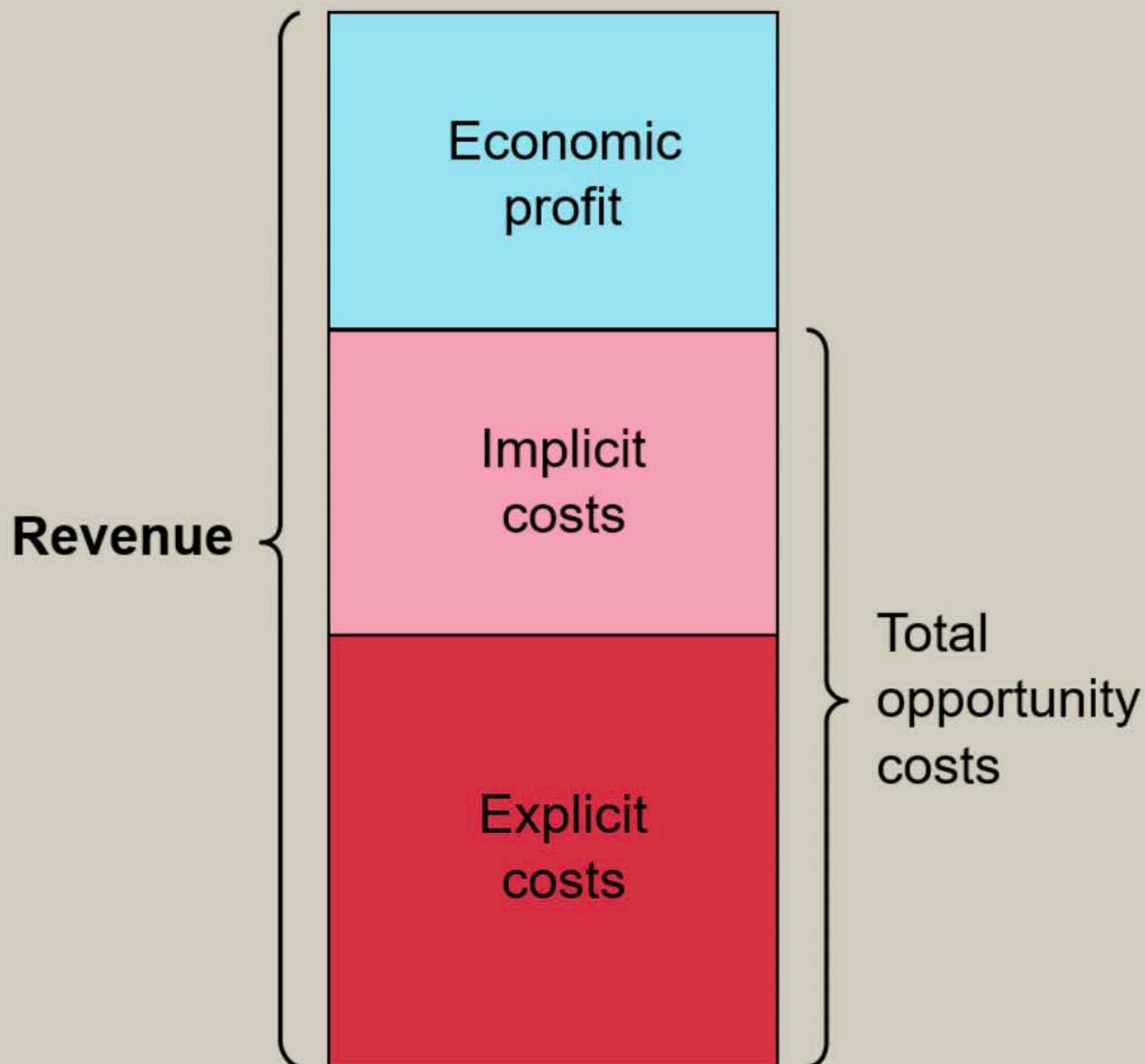
Demand goes down as other price goes up

Goods are said to be close substitutes if $\varepsilon_{ij} \gg 0$

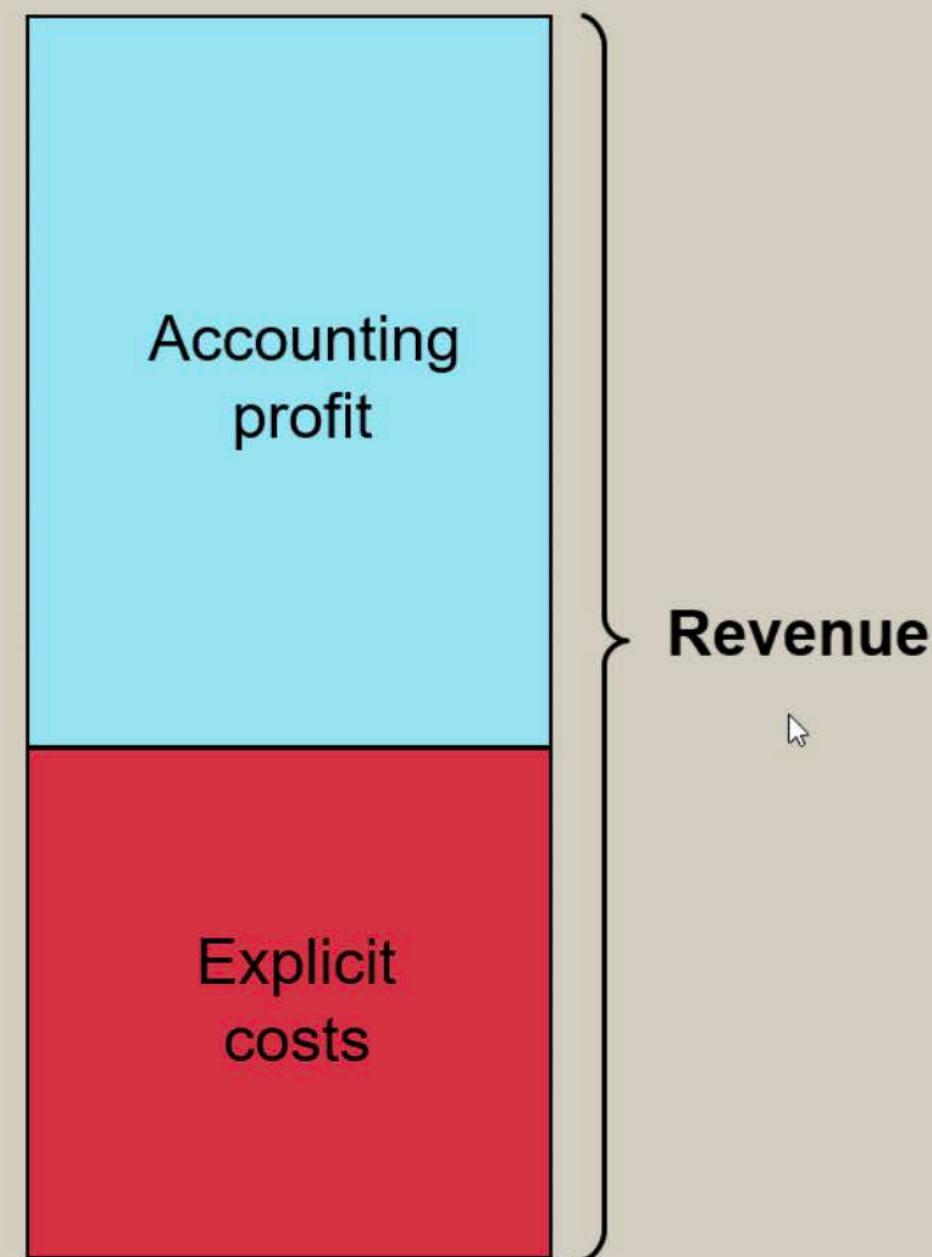
The Costs of Production

Economic versus Accounting concepts

How an Economist Views a Firm



How an Accountant Views a Firm



Types of costs

- Opportunity cost and actual cost
- Direct and indirect cost
- Explicit and implicit cost
- Historical and replacement cost
- Fixed cost and variable cost
- Real and prime cost
- Total,average, and marginal cost

Opportunity cost and actual cost

Opportunity cost : Cost incurred for loosing next best alternative



Actual cost : An actual amount paid or incurred, as opposed to estimated cost or standard cost.

Explicit and implicit cost

Explicit cost refers to the money expended to buy or hire resources from outside the organization for the process of production

Implicit cost refers to the cost of use of the self owned resources of organization that are used in production

Direct and Indirect cost

Direct cost is a cost.

Direct Cost: Direct costs are those cost that have directly accountable to specific cost object such as a process or product

Ex:wages paid ,salary paid labor, material...etc

Indirect cost:

Indirect cost are those costs which are not directly accountable to specific cost object or not directly related to production

Ex: insurance, mentainence ,telecom,etc

Historical and replacement cost

Historical cost refers to the original (actual) cost incurred at the time the asset was acquired

The **replacement cost** is the price that an entity would pay to replace an existing assets at current market price that may not be market value of that asset.



Fixed and variable cost

Fixed cost is the cost that remains unchanged irrespective of the output level or sales revenue such as intrest,rent,salaries etc

Variable cost are those costs that vary depending on a company's production volume; they raise as production increases and fall as production decreases

Real cost and Prime cost

Real cost of a production refers to the physical quantities of various factors used in producing commodity

Ex: Real cost of a table composes of a carpenter's labor to cubic feet of a wood ,a dozen of nails, half a bottle of varnish.....etc

“ *Real cost thus signifies the aggregate of real productive resources absorbed in the production*”

Prime cost

The direct cost of commodity in terms of the materials and labor involved in its production excluding fixed cost

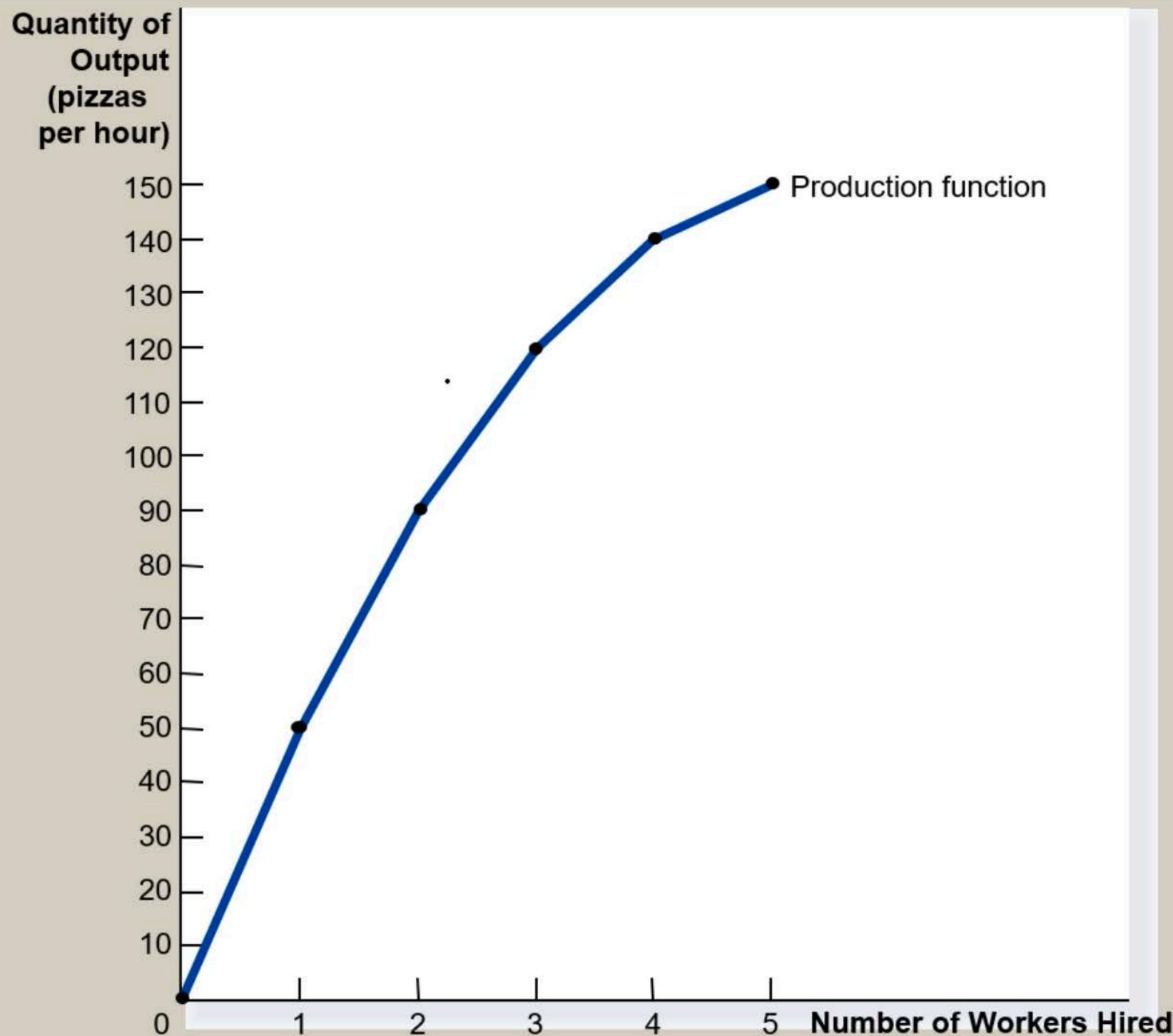
By calculating prime cost the firm can decide how much should be their selling price to earn profit



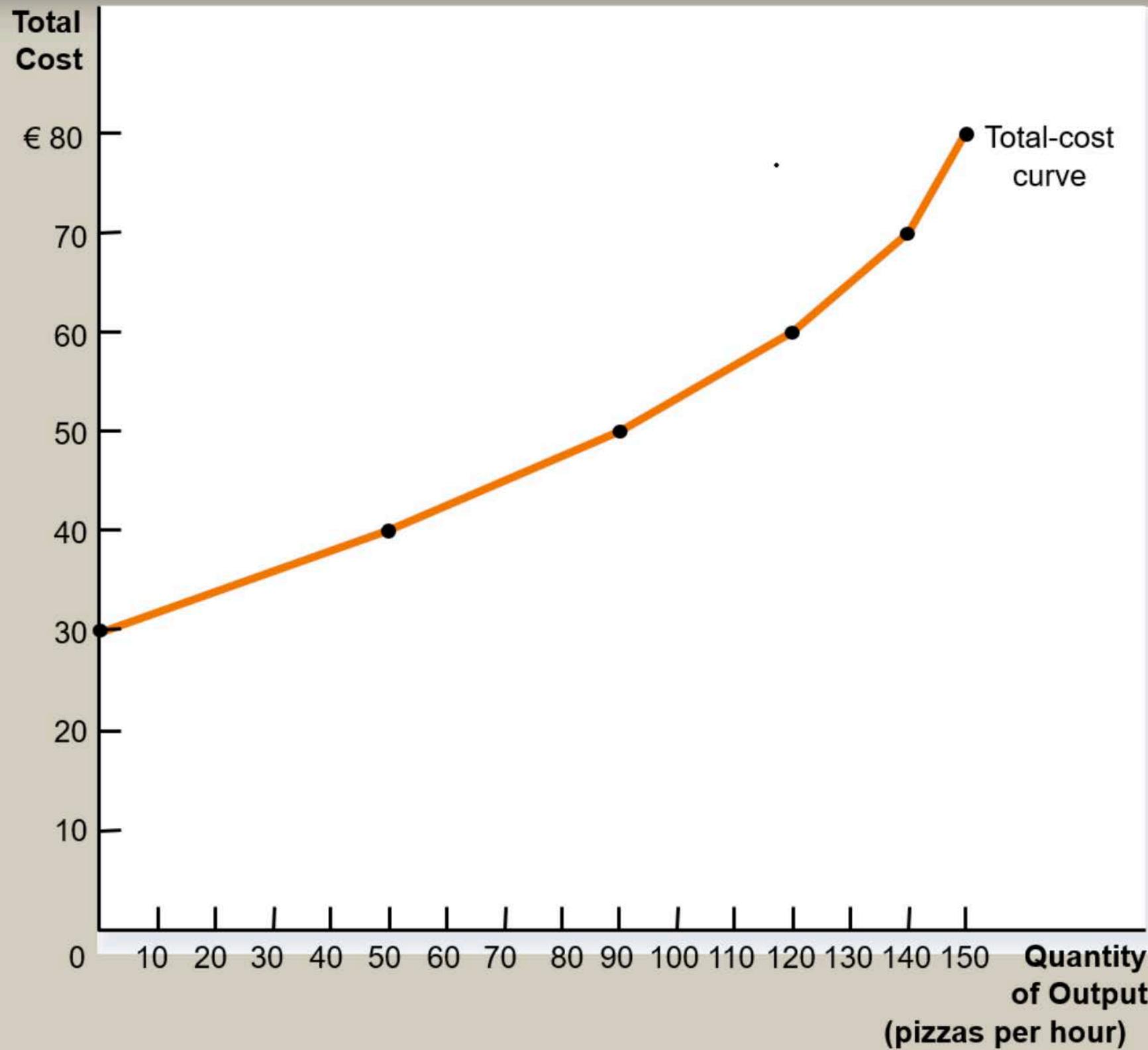
A Production Function and Total Cost: A Pizza Factory

Number of workers	Output (quantity of pizzas produced per hour)	Marginal product of labour	Cost of factory	Cost of workers	Total cost of inputs (cost of factory + cost of workers)
0	0	50	€30	€0	€30
1	50	40	30	10	40
2	90	30	30	20	50
3	120	20	30	30	60
4	140	10	30	40	70
5	150		30	50	80

Production Function



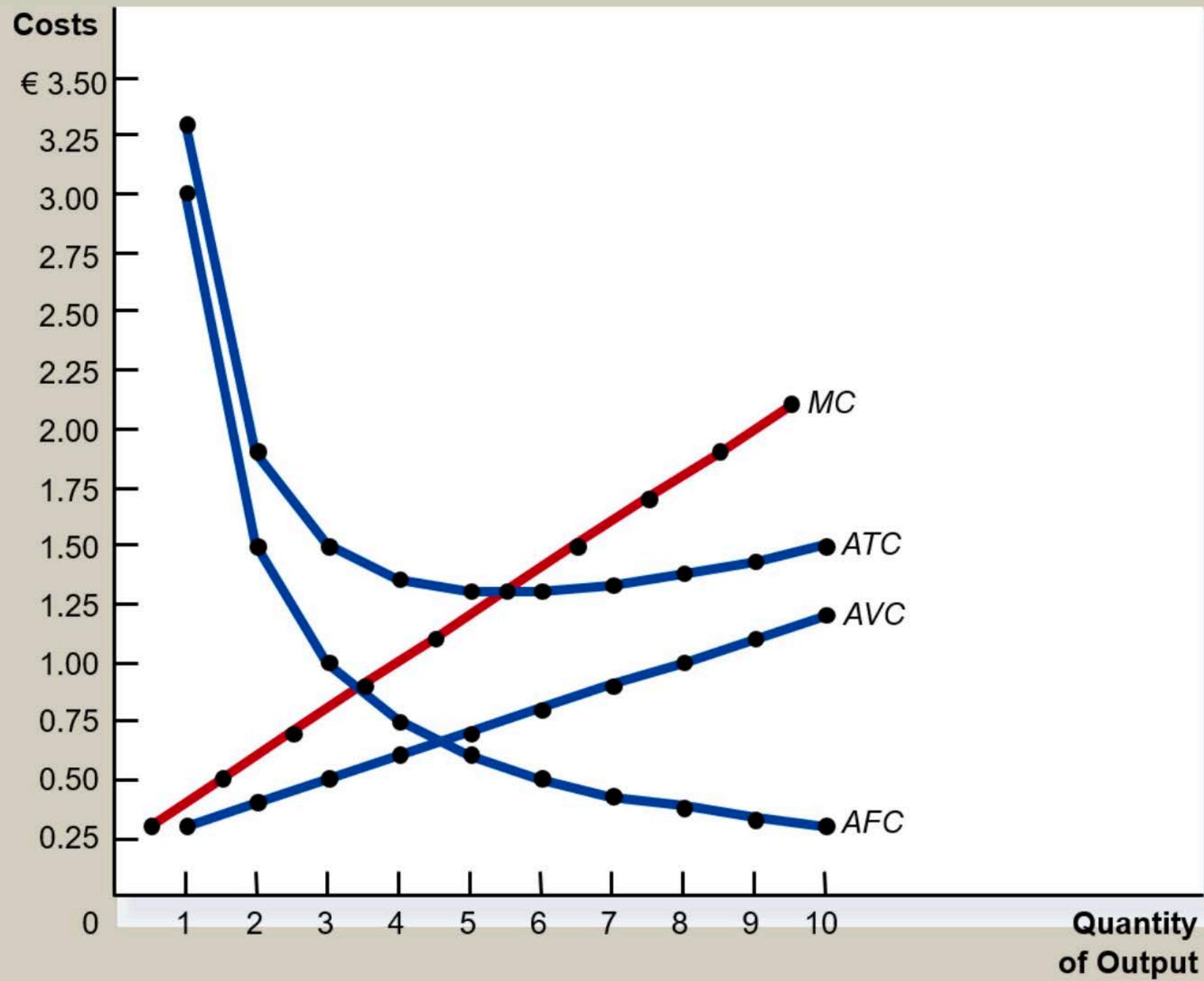
Total Cost Curve



The Various Measures of Cost: Lemonade Shop

Quantity of lemonade glasses (per hour)	Total cost	Fixed cost	Variable cost	Average fixed cost	Average variable cost	Average total cost	Marginal cost
0	€3.00	€3.00	€0.00	—	—	—	€0.30
1	3.30	3.00	0.30	€3.00	€0.30	€3.30	0.50
2	3.80	3.00	0.80	1.50	0.40	1.90	0.70
3	4.50	3.00	1.50	1.00	0.50	1.50	0.90
4	5.40	3.00	2.40	0.75	0.60	1.35	1.10
5	6.50	3.00	3.50	0.60	0.70	1.30	1.30
6	7.80	3.00	4.80	0.50	0.80	1.30	1.50
7	9.30	3.00	6.30	0.43	0.90	1.33	1.70
8	11.00	3.00	8.00	0.38	1.00	1.38	1.90
9	12.90	3.00	9.90	0.33	1.10	1.43	2.10
10	15.00	3.00	12.00	0.30	1.20	1.50	

Average Cost and Marginal Cost Curves



Average Cost and Marginal Cost Curves

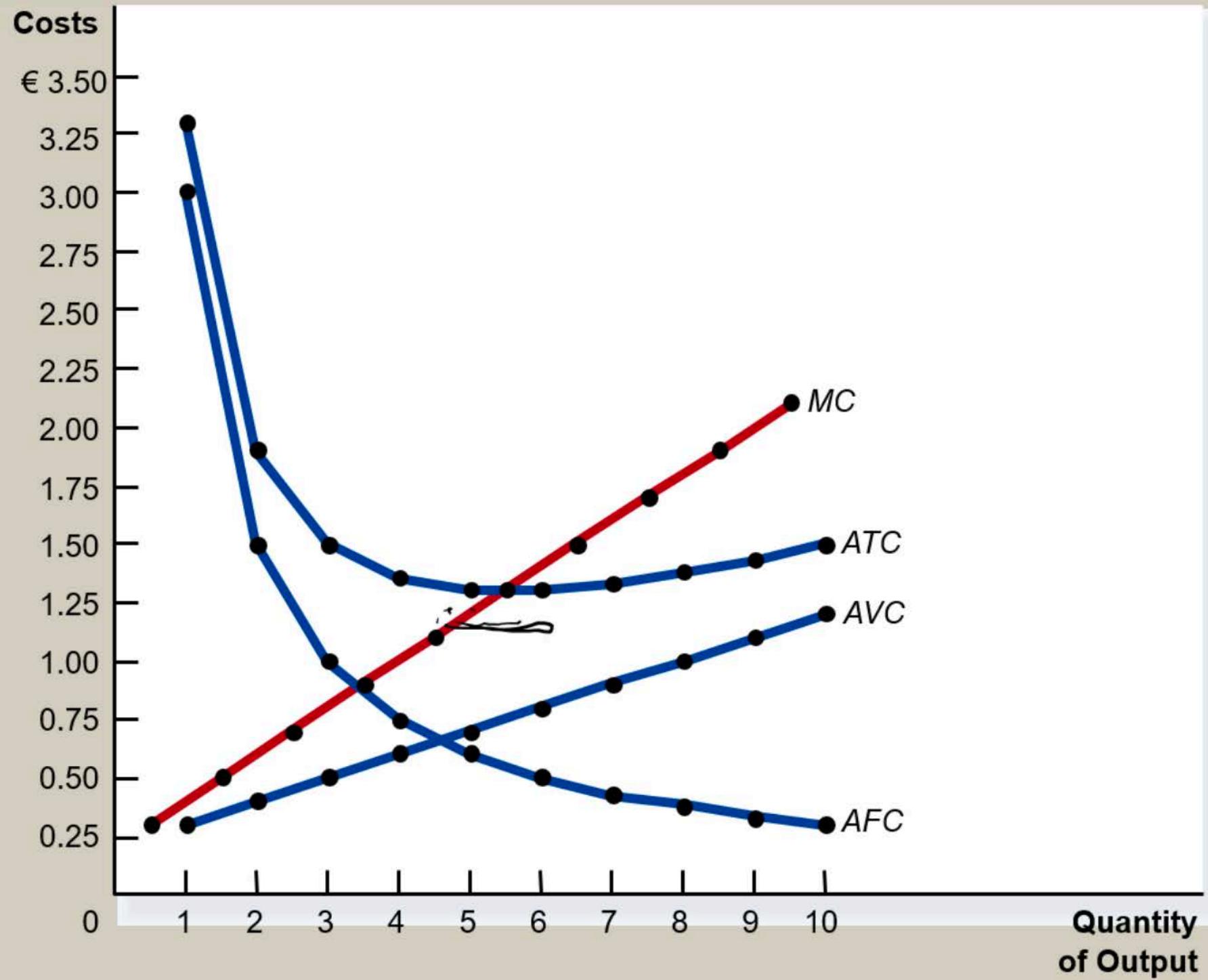
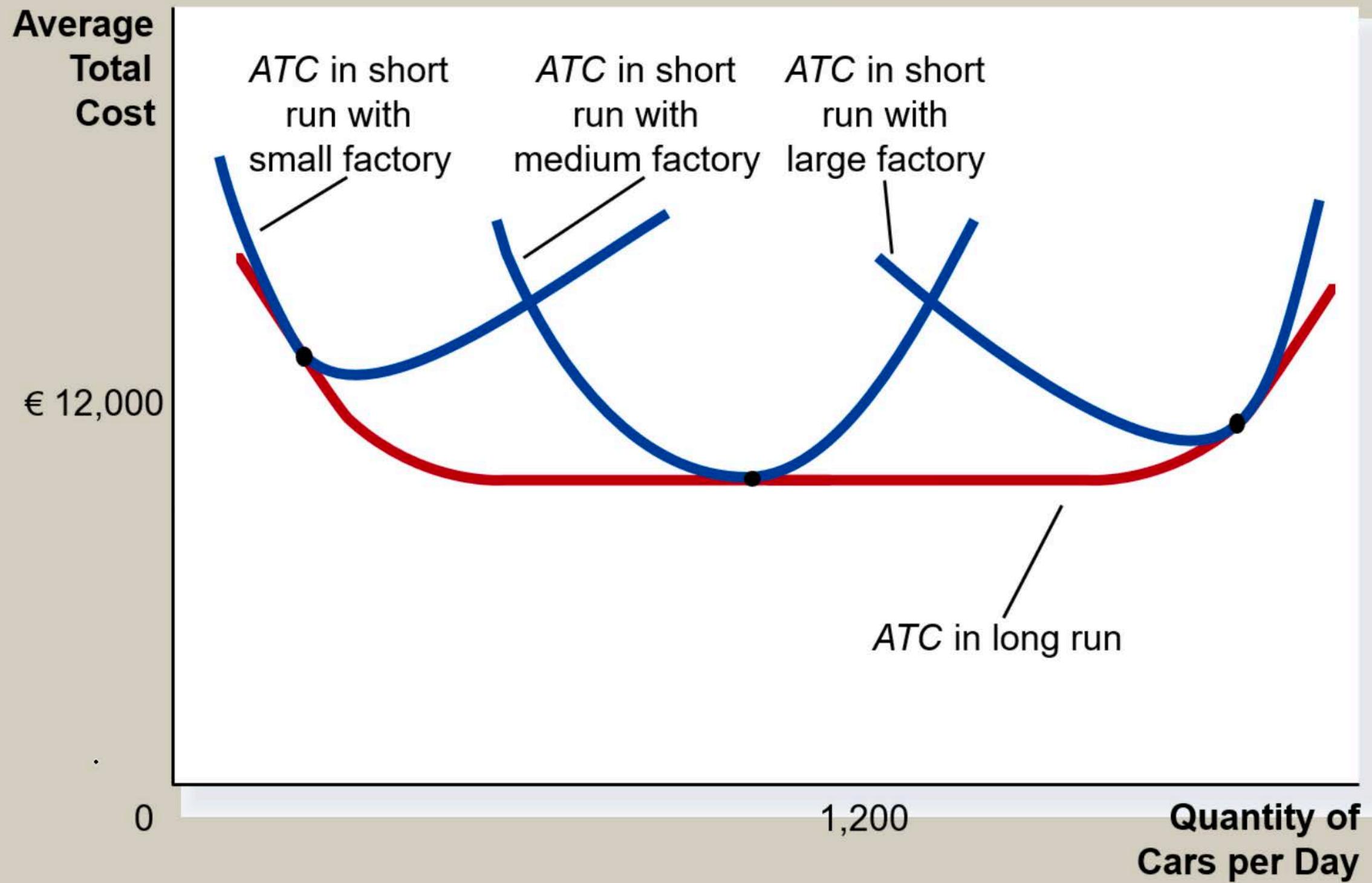


Figure 7 Average Total Cost in the Short and Long Run



Key questions

- Make or Buy decisions – If making, how much to make?
- Pricing decisions
- Given cost and technology, producer can decide quantity and/or price depending the extent of market competition
- In competitive markets, only quantity can be controlled.
- Price competition becomes different in the presence of multiple competitors, so other instruments of competition are used.

Financials of 14 cement companies (Unit % change)

	Q2-FY21		y-o-y	
	q-o-q	y-o-y	H1-FY20	H1-FY21
Net Sales	27.2%	3.9%	7.0%	-12.1%
Total Expenditure	27.6%	-3.7%	1.5%	-15.8%
Cost of Services & Raw Materials	43.6%	-3.1%	-1.5%	-25.3%
Electricity Power & Fuel Cost	35.9%	-10.2%	-3.2%	-22.9%
Selling & Distribution Expenses	36.8%	3.6%	-2.1%	-11.1%
Operating Profit	16.7%	32.1%	36.9%	2.5%
Profit after tax	46.3%	73.3%	103.0%	-1.4%

	Q2-FY20	Q1-FY21	Q2-FY21	H1-FY20	H1-FY21
OPM (%)	19.4	26.8	24.6	22.0	25.6
NPM (%)	5.3	7.7	8.8	7.4	8.3
ICR (times)	3.7	4.8	6.1	4.6	5.4

Reference: ACE Equity, CARE Ratings

UltraTech Cement – Key operating parameters

Key Operating Parameters

Per ton analysis (INR/ton)	FY20				FY21				FY21	Var.	
	1Q	2Q	3Q	4Q	1Q	2Q	3QE	4QE			
Volume (m ton)	21.42	18.69	20.90	21.44	14.65	20.06	23.88	25.80	82.33	84.28	22.86
YoY Change (%)	8.3	-1.0	-4.0	-15.7	-31.6	7.3	14.3	20.3	-3.9	2.4	9.4
Realization (incl RMC)	5,331	5,147	4,954	5,012	5,236	5,178	5,132	5,182	5,117	5,183	5,101
YoY Change (%)	10.5	5.1	3.2	3.0	-1.8	0.6	3.6	3.4	5.3	1.3	3.0
RM Cost	733	804	856	678	822	835	751	788	767	795	780
Power & Fuel	1,094	1,052	976	988	942	1,020	1,006	1,077	1,029	996	991
Staff Cost	278	342	297	305	384	282	256	245	305	281	262
Freight & Forwarding	1,211	1,143	1,121	1,249	1,097	1,146	1,193	1,202	1,181	1,168	1,156
Other Expenditure	639	781	697	653	572	649	630	601	692	616	640
Total Expenditure	3,954	4,121	3,946	3,874	3,818	3,833	3,836	3,914	3,973	3,856	3,829
EBITDA	1,377	1,026	1,008	1,138	1,418	1,345	1,296	1,269	1,143	1,327	1,272

Reference: Motilal Oswal, January 2021

UltraTech – Profit & Loss

Y/E March	FY16	FY17	FY18	FY19	FY20	FY21E	FY22E	FY23E
Total Income from Operations	251,532	253,749	309,786	416,088	421,248	436,812	497,871	547,805
Change (%)	3.3	0.9	22.1	34.3	1.2	3.7	14.0	10.0
Raw Materials	44,175	44,926	52,888	69,831	63,131	66,971	71,959	79,387
Employees Cost	14,450	15,223	18,102	22,911	25,094	23,717	25,919	27,686
Other Expenses	143,898	141,476	177,344	249,877	239,167	234,307	277,067	299,889
Total Expenditure	202,523	201,625	248,335	342,619	327,106	324,994	374,945	406,962
% of Sales	80.5	79.5	80.2	82.3	77.7	74.4	75.3	74.3
EBITDA	49,010	52,124	61,452	73,469	94,142	111,818	122,926	140,843
Margin (%)	19.5	20.5	19.8	17.7	22.3	25.6	24.7	25.7
Depreciation	13,772	13,484	18,479	24,507	27,022	26,828	27,460	28,738
EBIT	35,238	38,640	42,972	48,962	67,121	84,989	95,466	112,105
Int. and Finance Charges	5,663	6,401	12,376	17,779	19,857	14,495	9,723	7,359
Other Income	4,638	6,481	5,886	4,634	6,478	8,542	8,551	11,365
PBT bef. EO Exp.	34,213	38,721	36,482	35,818	53,742	79,036	94,294	116,111
EO Items	0	0	-3,466	-1,139	19,788	-1,574	0	0
PBT after EO Exp.	34,213	38,721	33,016	34,679	73,530	77,462	94,294	116,111
Total Tax	9,417	11,586	10,770	10,681	15,413	23,991	29,178	35,920
Tax Rate (%)	27.5	29.9	32.6	30.8	21.0	31.0	30.9	30.9
Minority Interest	16	-14	24	-37	-32	5	5	5
Reported PAT	24,780	27,149	22,222	24,035	58,148	53,466	65,111	80,186
Adjusted PAT	24,780	27,149	24,557	24,823	38,360	54,552	65,111	80,186
Change (%)	18.1	9.6	-9.5	1.1	54.5	42.2	19.4	23.2
Margin (%)	9.9	10.7	7.9	6.0	9.1	12.5	13.1	14.6

Reference: Motilal Oswal, January 2021

UltraTech Cement – Trend in key operating parameters

INR/ton	3QFY21	3QFY20	YoY (%)	2QFY21	QoQ (%)
Realization	5,132	4,954	4%	5,178	-1%
RM Cost	751	856	-12%	835	-10%
Power & Fuel	1,006	976	3%	920	9%
Staff Cost	256	297	-14%	282	-9%
Freight & Forwarding	1,193	1,121	6%	1,146	4%
Other Expenditure	630	697	-10%	649	-3%
Total Expenditure	3,836	3,946	-3%	3,833	0%
EBITDA	1,296	1,008	29%	1,345	-4%

Reference: Motilal Oswal, January 2021

Production Decisions

Production Function

- **Production function:** defines the relationship between inputs and the maximum amount that can be produced within a given period of time with a given level of technology

$$Q = f(X_1, X_2, \dots, X_k)$$

Q = level of output

X_1, X_2, \dots, X_k = inputs used in production

Production Function

- For simplicity we will often consider a production function of two inputs:

$$Q=f(X, Y)$$

Q = output

X = labor

Y = capital



Production Function

- **Short-run production function:** the maximum quantity of output that can be produced by a set of inputs
 - Assumption: the amount of at least one of the inputs used remains unchanged
- **Long-run production function:** the maximum quantity of output that can be produced by a set of inputs
 - Assumption: the firm is free to vary the amount of all the inputs being used

Short-run Analysis of Total, Average, and Marginal Product

- **Marginal product (MP)** = change in output (Total Product) resulting from a unit change in a variable input

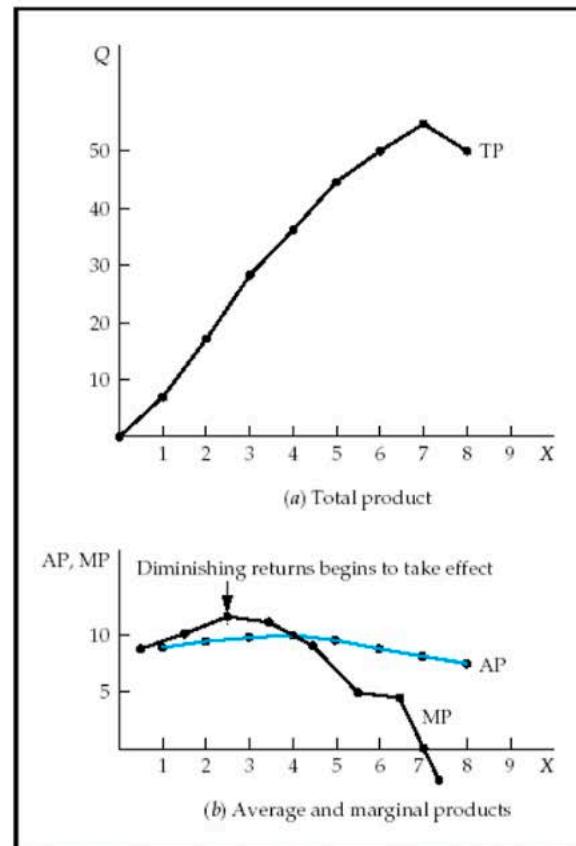
$$MP_X = \frac{\Delta Q}{\Delta X}$$

- **Average product (AP)** = Total Product per unit of input used

$$AP_X = \frac{Q}{X}$$

Short-run Analysis of Total, Average, and Marginal Product

- if $MP > AP$ then AP is rising
- if $MP < AP$ then AP is falling
- $MP = AP$ when AP is maximized

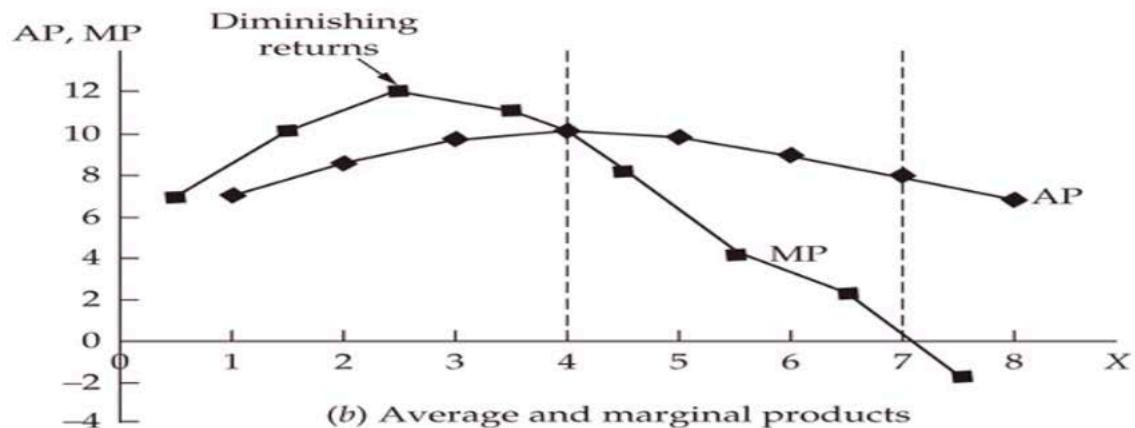
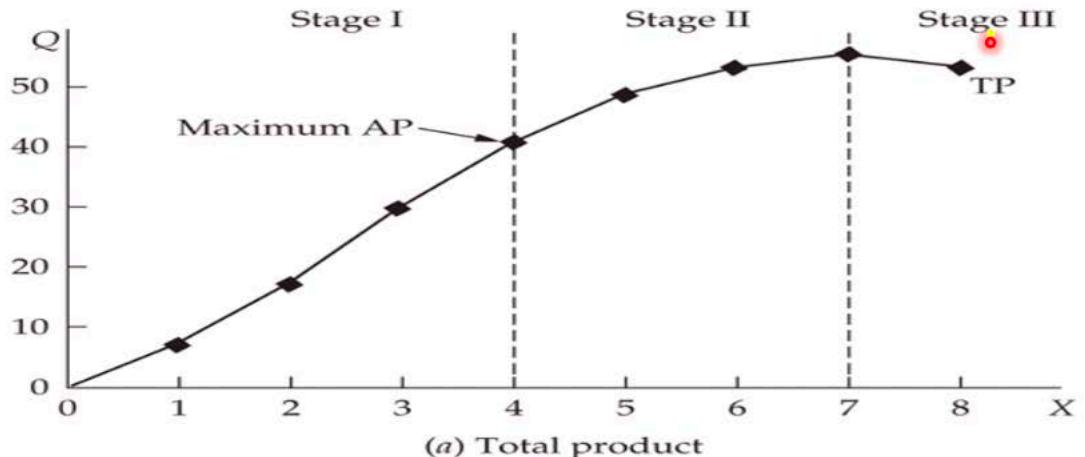


Short-run Analysis of Total, Average, and Marginal Product

- **Law of diminishing returns:** as additional units of a variable input are combined with a fixed input, after some point the additional output (i.e., marginal product) starts to diminish
 - nothing says *when* diminishing returns will start to take effect
 - all inputs added to the production process have the same productivity

Short-run Analysis of Total, Average, and Marginal Product

- The **Three Stages of Production** in the short run:
 - Stage I: from zero units of the variable input to where AP is maximized (where $MP=AP$)
 - Stage II: from the maximum AP to where $MP=0$
 - Stage III: from where $MP=0$ on



Long-run Production Function

- In the long run, a firm has enough time to change the amount of *all* its inputs
- The long run production process is described by the concept of **returns to scale**
- Returns to scale = the resulting increase in total output as all inputs increase

Long-run Production Function

- If all inputs into the production process are doubled, three things can happen:
 - output can more than double
 - ‘increasing returns to scale’ (IRTS)
 - output can exactly double
 - ‘constant returns to scale’ (CRTS)
 - output can less than double
 - ‘decreasing returns to scale’ (DRTS)

Estimation of Production Functions

- Production function examples
 - Cobb-Douglas function: exponential for two inputs

$$Q = aL^bK^c$$



if $b + c > 1$, IRTS

if $b + c = 1$, CRTS

if $b + c < 1$, DRTS

Estimation of Production Functions

Statistical estimation of production functions

- inputs should be measured as ‘flow’ rather than ‘stock’ variables, which is not always possible
- usually, the most important input is labor
- most difficult input[↙] variable is capital
- must choose between time series and cross-sectional analysis

Estimation of Production Functions

Aggregate production functions: whole industries or an economy

Gathering data for aggregate functions can be difficult:

- for an economy: GDP could be used
- for an industry: data from Annual Survey of Industries , CMIE etc
- for labor: data from Labor Bureau, CMIE etc

Importance of Production Functions in Managerial Decision Making

- **Capacity planning:** planning the amount of fixed inputs that will be used along with the variable inputs

Good capacity planning requires:

- accurate forecasts of demand
- effective communication between the production and marketing functions

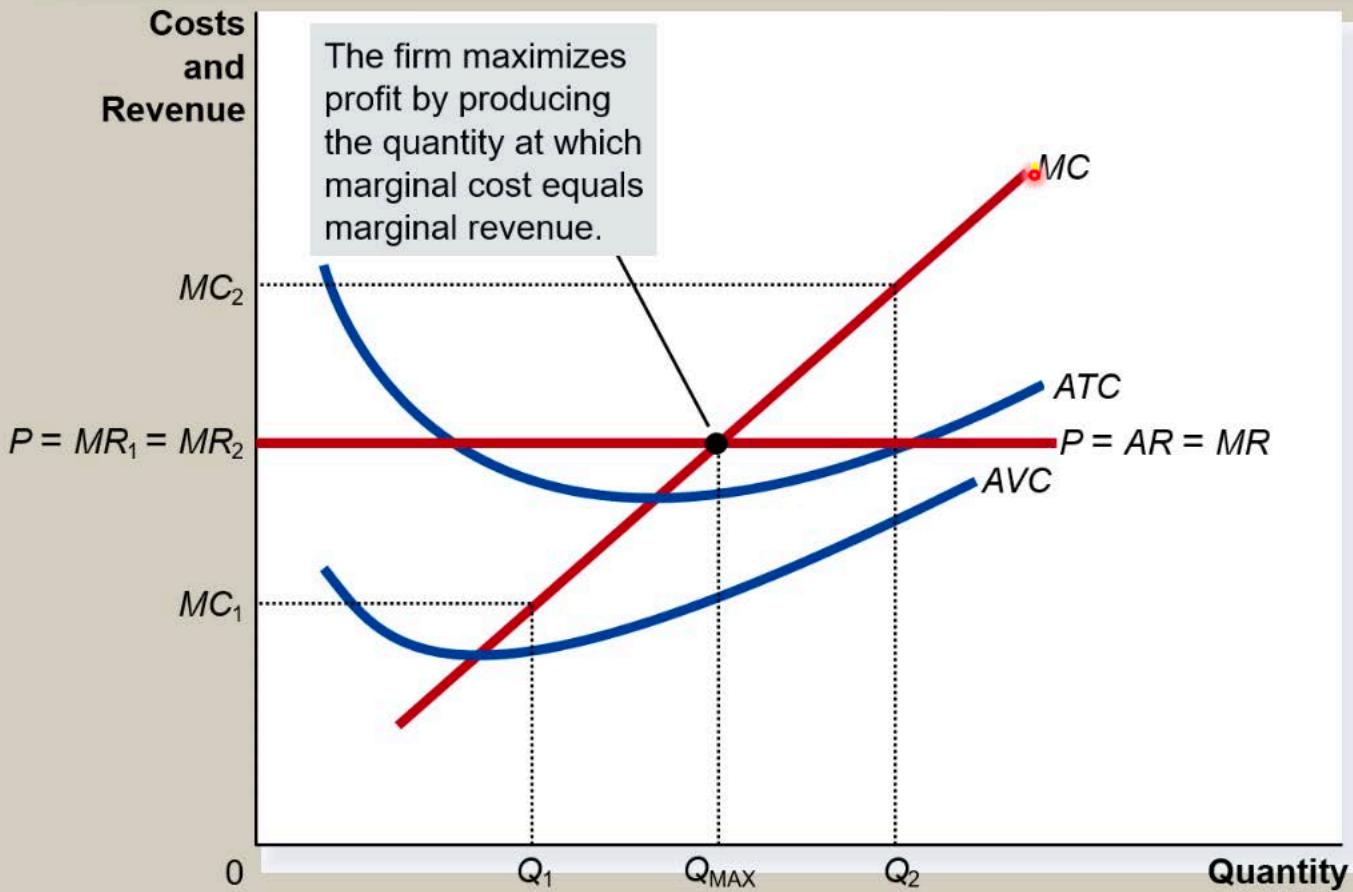
Total, Average, and Marginal Revenue for a Competitive Firm

Quantity (Q)	Price (P)	Total revenue ($TR = P \times Q$)	Average revenue ($AR = TR/Q$)	Marginal revenue ($MR = \Delta TR/\Delta Q$)
1 litre	€6	€6	€6	€6
2	6	12	6	6
3	6	18	6	6
4	6	24	6	6
5	6	30	6	6
6	6	36	6	6
7	6	42	6	6
8	6	48	6	6

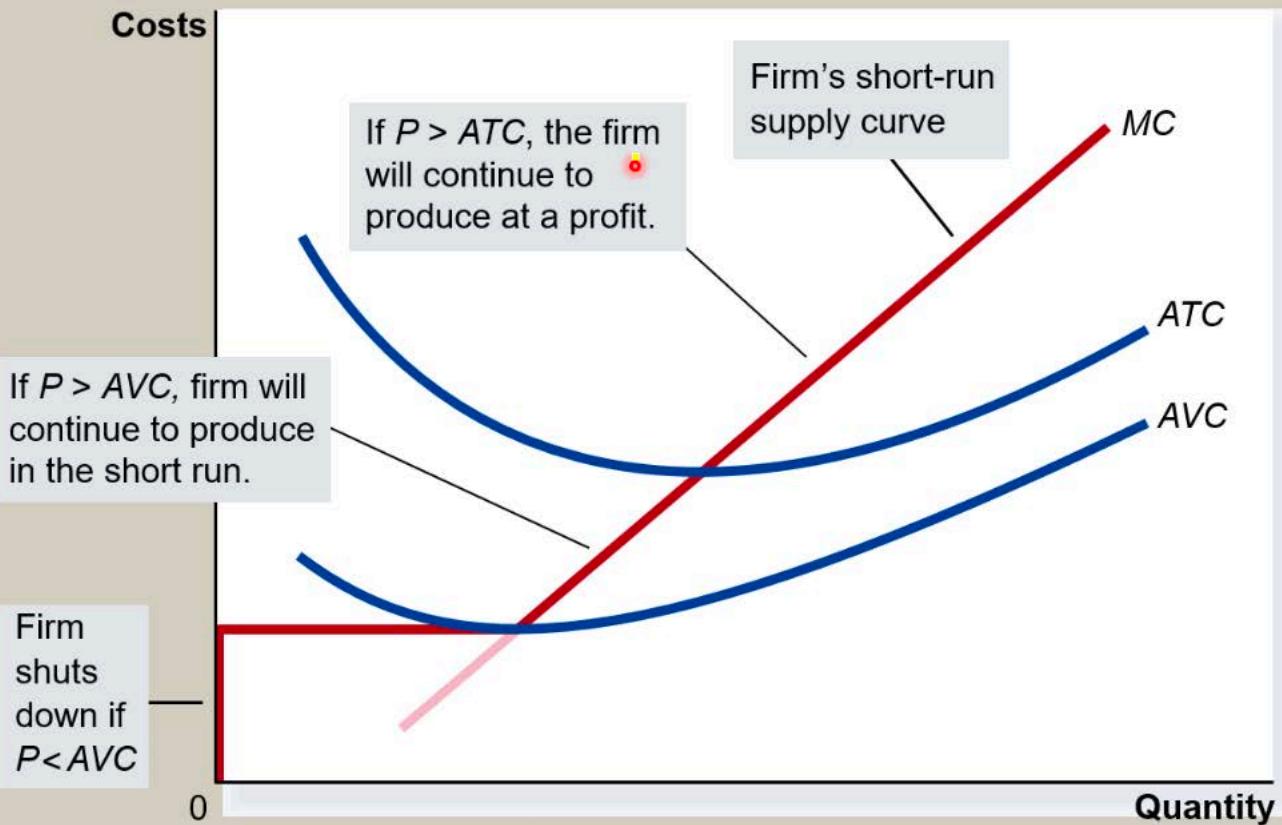
Profit Maximization: A Numerical Example

Quantity (Q)	Total revenue (TR)	Total cost (TC)	Profit (TR - TC)	Marginal revenue ($MR = \Delta TR / \Delta Q$)	Marginal cost ($MC = \Delta TC / \Delta Q$)	Change in profit ($MR - MC$)
0 litres	€0	€3	-€3			
1	6	5	1	€6	€2	€4
2	12	8	4	6	3	3
3	18	12	6	6	4	2
4	24	17	7	6	5	1
5	30	23	7	6	6	0
6	36	30	6	6	7	-1
7	42	38	4	6	8	-2
8	48	47	1	6	9	-3

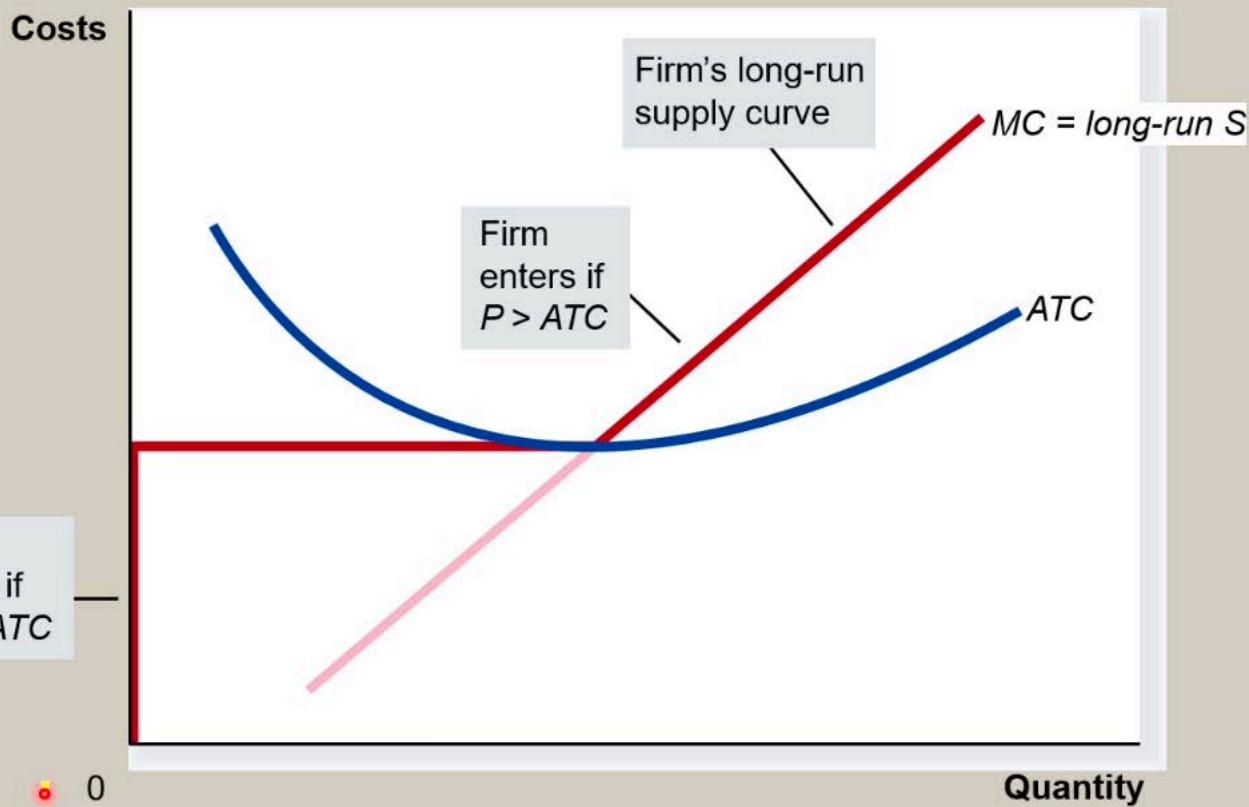
Profit Maximization for a Competitive Firm

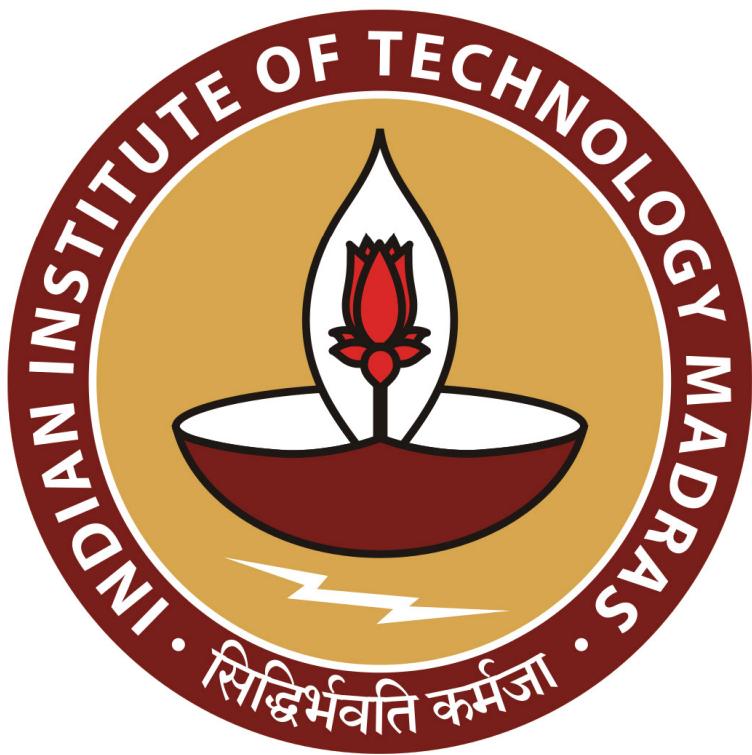


The Competitive Firm's Short Run Supply Curve



The Competitive Firm's Long-Run Supply Curve





IIT Madras

ONLINE DEGREE

Pricing Strategies

Pricing Strategy: Objectives

- Long Run Profits
- Short Run Profits
- Increase Sales Volume
- Company Growth
- Match Competitors Price
- Create Interest & Excitement about the Product
- Discourage Competitors From cutting Price
- Social, Ethical & Ideological Objectives
- Discourage New Entrants
- Survival

Decisions in Pricing Strategy

- Fixed & Variable Cost
- Competition
- Company Objectives
- Proposed Positioning Strategies
- Target Group & Willingness to Pay
- External Market Demand
- Internal Factors; Product Cost & Objectives of Company

- Pricing is a market and cost consideration.
- Understand customers' primary goals. Be clear on what the customer wants first, then set pricing and bundling decisions.
- Consider bundling products or services together. Bundle a low- and high-valued product together.
- Understand your value proposition. Have a clear understanding of if and how your product or service is differentiated from the competition.
- Build the customers' perception of value. Constantly build on customer perception. The more subtle the differentiation of the product or service, the more often customers need to be reminded of the value of your product or service.

Factors Affecting Pricing



Pricing Strategies

- **Marketing Skimming**
- **Value Pricing**
- **Loss Leader**
- **Psychological Pricing**
- **Going Rate (Price Leadership)**
- **Tender Pricing**
- **Price Discrimination**
- **Penetration Pricing**
- **Cost Plus Pricing**
- **Contribution Pricing**
- **Target Pricing**
- **Destroyer Pricing**
- **Marginal Cost Pricing**
- **Absorption Cost Pricing**

Market Skimming Pricing

- High Price low volume
- Skim the Profit from the Market
- Suitable for the products that have short life cycle or Which will face competition at some point in future.
- Examples; Play Station, Digital Technology & DVD etc.



Value Pricing

- Based on consumer Perception.
- Price charged according to the Customers Perception.
- Price set by the company as per the perceived value.
- Example; Status Products/ Exclusive Products.



Loss Leader Pricing

- Goods/services deliberately sold below cost to encourage sales elsewhere
- Typical in supermarkets, e.g. at Diwali, selling sweets at lower prices in the hope that people will be attracted to the store and buy other things
- Purchases of other items more than covers ‘loss’ on item sold
- e.g. ‘Free’ mobile phone when taking on contract package



Psychological Pricing

- Used to play on consumer perceptions
- Classic example – Rs. 9.99 instead of Rs.10.99!
- Links with value pricing – high value goods priced according to what consumers THINK should be the price

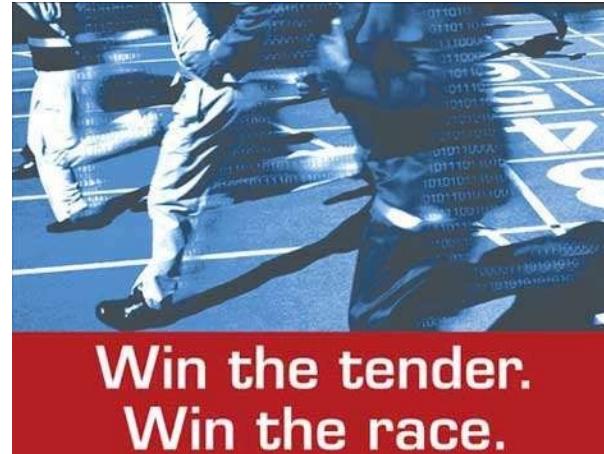


Going Rate Pricing

- In case of price leader, rivals have difficulty in competing on price – too high and they lose market share, too low and the price leader would match price and force smaller rival out of market
- May follow pricing leads of rivals especially where those rivals have a clear dominance of market share
- Where competition is limited, ‘going rate’ pricing may be applicable – banks, petrol, supermarkets, electrical goods – find very similar prices in all outlets

Tender Pricing

- Many contracts awarded on a tender basis
- Firm (or firms) submit their price for carrying out the work
- Purchaser then chooses which represents best value
- Mostly done in secret



Price Discrimination

- Charging a different price for the same good/service in different markets
- Requires each market to be impenetrable
- Requires different price elasticity of demand in each market
- Prices for air travel differ for the same journey at different times of the day



Penetration Pricing

- Price set to ‘penetrate the market’
- ‘Low’ price to secure high volumes
- Typical in mass market products – chocolate bars, food stuffs, household goods, etc.
- Suitable for products with long anticipated life cycles
- May be useful if launching into a new market



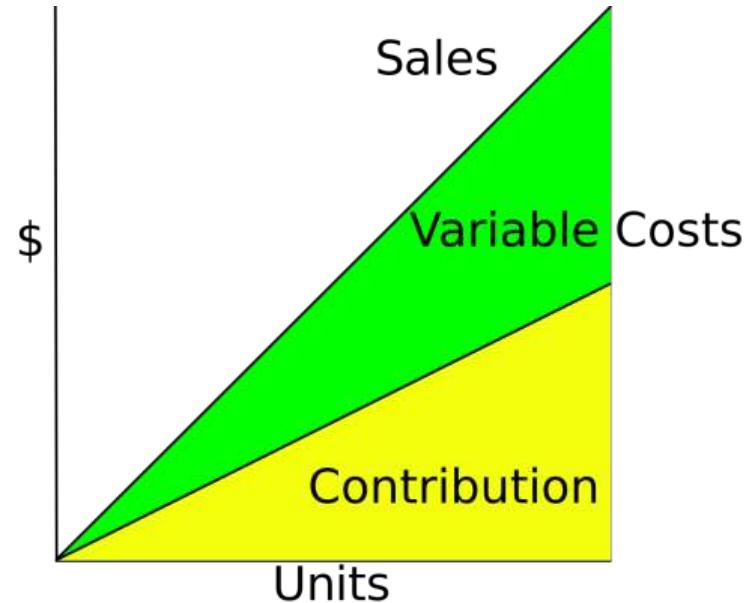
Cost Plus Pricing

- Cost-plus pricing is a pricing strategy that is used to maximize the rates of return of companies.
- Cost-plus pricing is also known as mark-up pricing where cost + mark-up = selling price.
- In practice, most firms use either value- based pricing or cost-plus pricing.



Contribution Pricing

- Contribution = Selling Price – Variable (direct costs)
- Prices set to ensure coverage of variable costs and a ‘contribution’ to the fixed costs
- Similar in principle to marginal cost pricing
- Break-even analysis might be useful in such circumstances



Target Pricing

- Setting price to ‘target’ a specified profit level
- Estimates of the cost and potential revenue at different prices, and thus the break-even have to be made, to determine the mark-up
- $\text{Mark-up} = \frac{\text{Profit}}{\text{Cost}} \times 100$



Marginal Cost Pricing

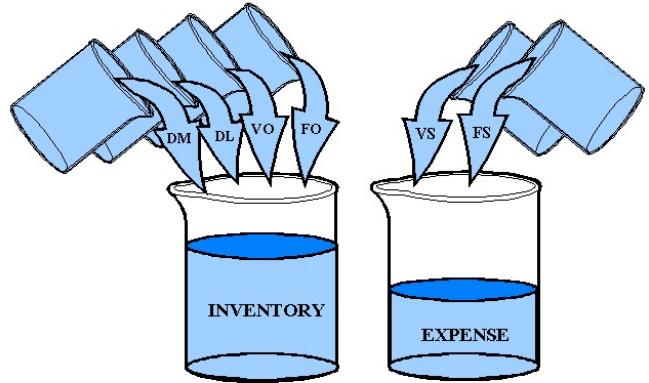
- Marginal cost – the cost of producing ONE extra or ONE fewer item of production
- MC pricing – allows flexibility
- Particularly relevant in transport where fixed costs may be relatively high
- Allows variable pricing structure – e.g. on a flight from London to New York – providing the cost of the extra passenger is covered, the price could be varied a good deal to attract customers and fill the aircraft

$$MC = \frac{\Delta Total\ Cost}{\Delta Output} = \frac{\$80}{2} = \$40$$

Absorption Cost Pricing

- Full Cost Pricing – attempting to set price to cover both fixed and variable costs
- Absorption Cost Pricing – Price set to ‘absorb’ some of the fixed costs of production

ABSORPTION COSTING



Destroyer Pricing

- Deliberate price cutting or offer of ‘free gifts/products’ to force rivals (normally smaller and weaker) out of business or prevent new entrants
- Anti-competitive and illegal if it can be proved



Analyzing Firm Performance

Financial Analysis

- Assessment of the firm's past, present and future financial conditions
- Done to find firm's financial strengths and weaknesses
- Primary Tools:
 - Financial Statements
 - Comparison of financial ratios to past, industry, sector and all firms

Financial Statements

- Balance Sheet
- Income Statement
- Cashflow Statement
- Statement of Retained Earnings

Objectives of Ratio Analysis

- Standardize financial information for comparisons
- Evaluate current operations
- Compare performance with past performance
- Compare performance against other firms or industry standards
- Study the efficiency of operations
- Study the risk of operations

Ratio Analysis

1. **Liquidity** – the ability of the firm to pay its way
2. **Investment/shareholders** – information to enable decisions to be made on the extent of the risk and the earning potential of a business investment
3. **Gearing** – information on the relationship between the exposure of the business to loans as opposed to share capital
4. **Profitability** – how effective the firm is at generating profits given sales and or its capital assets
5. **Financial** – the rate at which the company sells its stock and the efficiency with which it uses its assets

Acid Test

- Also referred to as the ‘Quick ratio’
- **(Current assets – stock) : liabilities**
- 1:1 seen as ideal
- The omission of stock gives an indication of the cash the firm has in relation to its liabilities (what it owes)
- A ratio of 3:1 therefore would suggest the firm has 3 times as much cash as it owes – very healthy!
- A ratio of 0.5:1 would suggest the firm has twice as many liabilities as it has cash to pay for those liabilities. This *might* put the firm under pressure.

Current Ratio

- Looks at the ratio between Current Assets and Current Liabilities
- **Current Ratio = Current Assets : Current Liabilities**
- Ideal level? – 1.5 : 1
- A ratio of 5 : 1 would imply the firm has Rs.5 of assets to cover every Rs.1 in liabilities
- A ratio of 0.75 : 1 would suggest the firm has only 75p in assets available to cover every Rs.1 it owes
- Too high – Might suggest that too much of its assets are tied up in unproductive activities – too much stock, for example?
- Too low - risk of not being able to pay your way

Investment/Shareholders

- **Earnings per share** – profit after tax / number of shares
- **Price earnings ratio** – market price / earnings per share – the higher the better generally for company. Comparison with other firms helps to identify value placed on the market of the business.
- **EV / EBITDA Ratio** - Enterprise Value / EBITDA ratio - the higher the better generally for company . It measures the operational performance of the firm.
- **Dividend yield** – ordinary share dividend / market price x 100 – higher the better. Relates the return on the investment to the share price.

Gearing

- **Gearing Ratio = Long term loans / Capital employed x 100**
- The higher the ratio the more the business is exposed to interest rate fluctuations and to having to pay back interest and loans before being able to re-invest earnings

Profitability

- Profitability measures look at how much profit the firm generates from sales or from its capital assets
- Different measures of profit – gross and net
 - **Gross profit** – effectively total revenue (turnover) – variable costs (cost of sales)
 - **Net Profit** – effectively total revenue (turnover) – variable costs and fixed costs (overheads)

Profitability

- **Gross Profit Margin = Gross profit / turnover x 100**
- The higher the better
- Enables the firm to assess the impact of its sales and how much it cost to generate (produce) those sales
- A gross profit margin of 45% means that for every £1 of sales, the firm makes 45p in gross profit

Profitability

- **Net Profit Margin = Net Profit / Turnover x 100**
- Net profit takes into account the fixed costs involved in production – the overheads
- Keeping control over fixed costs is important – could be easy to overlook for example the amount of waste - paper, stationery, lighting, heating, water, etc.
 - e.g. – leaving a photocopier on overnight uses enough electricity to make 5,300 A4 copies. (1,934,500 per year)
 - 1 ream = 500 copies. 1 ream = Rs.5.00 (on average)
 - Total cost therefore = Rs.19,345 per year – or 1 person's salary

Profitability

- **Return on Capital Employed (ROCE) = Profit / capital employed x 100**
- The higher the better
- Shows how effective the firm is in using its capital to generate profit
- A ROCE of 25% means that it uses every £1 of capital to generate 25p in profit
- Partly a measure of efficiency in organisation and use of capital

Asset Turnover

- **Asset Turnover = Sales turnover / assets employed**
- Using assets to generate profit
- Asset turnover x net profit margin = ROCE

Stock Turnover

- Stock turnover = Cost of goods sold / stock expressed as times per year
- The rate at which a company's stock is turned over
- A high stock turnover might mean increased efficiency?
 - But: dependent on the type of business – supermarkets might have high stock turnover ratios whereas a shop selling high value musical instruments might have low stock turnover ratio
 - Low stock turnover could mean poor customer satisfaction if people are not buying the goods

Debtor Days

- **Debtor Days = Debtors / sales turnover x 365**
- Shorter the better
- Gives a measure of how long it takes the business to recover debts
- Can be skewed by the degree of credit facility a firm offers

Summary of Financial Ratios

- Ratios help to:
 - Evaluate performance
 - Structure analysis
 - Show the connection between activities and performance
- Benchmark with
 - Past for the company
 - Industry
- Ratios adjust for size differences

Limitations of Ratio Analysis

- A firm's industry category is often difficult to identify
- Published industry averages are only guidelines
- Accounting practices differ across firms
- Sometimes difficult to interpret deviations in ratios
- Industry ratios may not be desirable targets
- Seasonality affects ratios

Ultradent

UltraTech Cement – Quarterly performance

	Quarterly performance (Consol.)								(INR m)			
	FY20				FY21				FY20	FY21E	FY21	Var.
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4QE		3QE	(%)	
Net Sales	114,197	96,204	103,538	107,456	76,711	103,871	122,541	133,689	421,248	436,812	116,615	5
YoY Change (%)	19.6	4.0	-0.9	-13.1	-32.8	8.0	18.4	24.4	1.2	3.7	12.6	
Total Expenditure	84,704	77,024	82,476	83,056	55,934	76,895	91,599	100,963	327,106	324,994	87,544	5
EBITDA	29,493	19,180	21,062	24,401	20,777	26,977	30,943	32,726	94,142	111,818	29,071	6
Margins (%)	25.8	19.9	20.3	22.7	27.1	26.0	25.3	24.5	22.3	25.6	24.9	
Depreciation	6,884	6,684	6,730	6,724	6,512	6,771	6,739	6,806	27,022	26,828	6,837	-1
Interest	5,029	5,071	4,708	5,048	3,943	3,579	3,563	3,411	19,857	14,495	3,468	3
Other Income	1,347	1,475	1,682	1,979	2,788	1,350	2,679	1,725	6,478	8,542	1,400	91
PBT before EO expense	18,928	8,900	11,306	14,608	13,110	17,977	23,320	24,234	53,742	79,036	20,165	16
Extra-Ord expense	0	0	1,332	-21,120	1,574	3,357	0	0	-19,788		0	
PBT after EO Expense	18,928	8,900	9,973	35,728	11,536	14,620	23,320	24,234	73,530	79,036	20,165	16
Tax	6,118	3,113	2,862	3,320	3,603	5,662	7,474	7,253	15,413	23,991	6,251	20
Rate (%)	32.3	35.0	28.7	9.3	31.2	38.7	32.0	29.9	21.0	30.4	31.0	
Reported PAT	12,810	5,787	7,112	32,408	7,933	8,958	15,846	16,981	58,117	55,045	13,914	14
Minority Interest	1	3	8	14	9	(6)	-3	(7)	32	-5	(10)	
Adj PAT	12,811	5,790	8,069	13,265	9,024	12,310	15,843	16,975	39,935	54,152	13,904	14
YoY Change (%)	92.3	62.2	103.7	24.2	-29.6	112.6	96.3	28.0	60.9	35.6	72.3	

E: MOFSL Estimates

Reference: Motilal Oswal, January 2021

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UltraTech Cement – Valuation

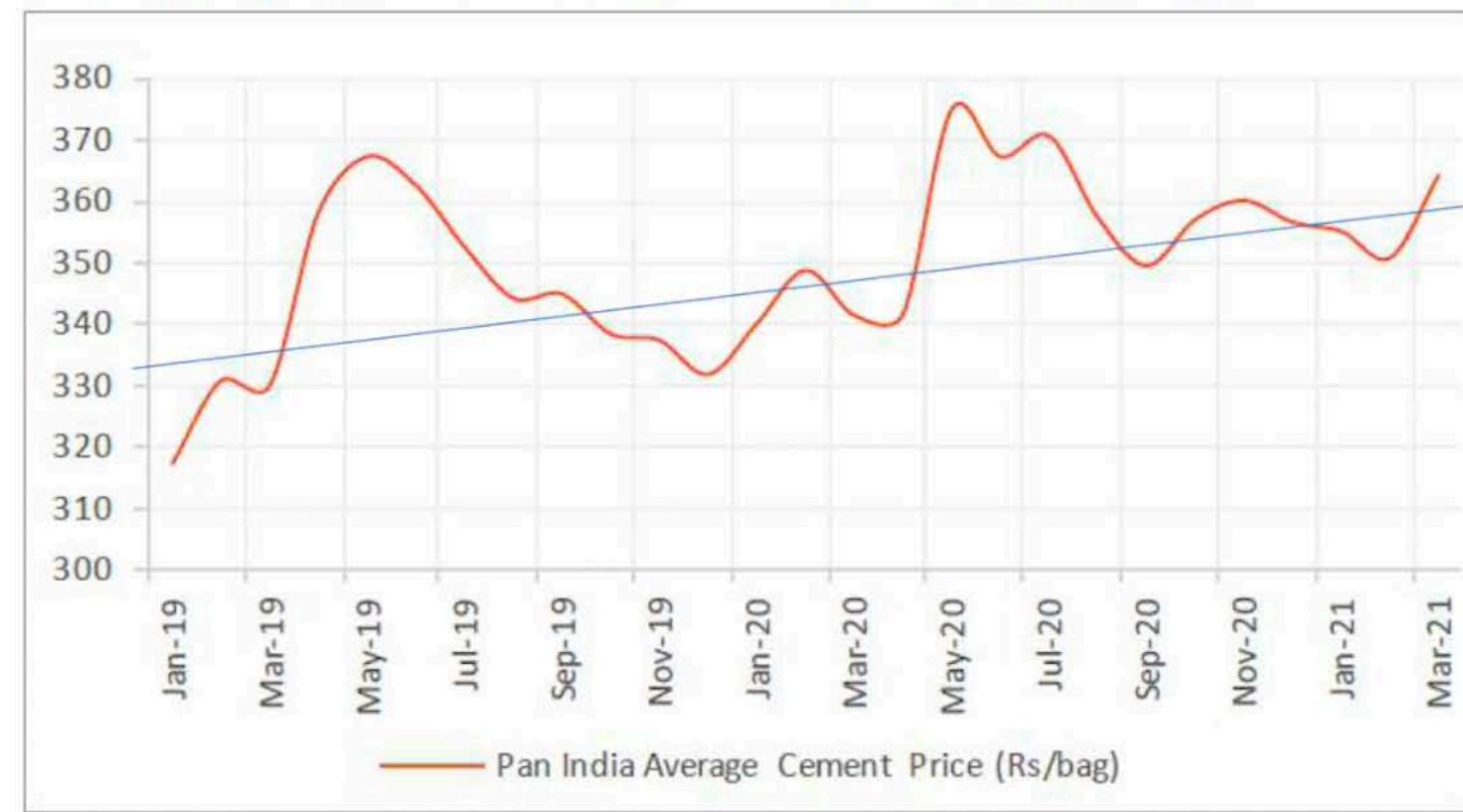
Valuation (Standalone)	FY20	FY21E	FY22E	FY23E	Rs cr
Particulars					
Revenue	40,649	41,131	46,484	52,492	
OPM (%)	23.1%	26.1%	25.5%	25.7%	
Adjusted PAT	3,652	4,687	5,413	6,449	
% YoY growth	44.6%	28.3%	15.5%	19.1%	
Adjusted EPS (Rs.)	126.5	162.4	187.5	223.4	
P/E (x)	53.5	41.7	36.1	30.3	
P/B (x)	5.1	4.6	4.1	3.6	
EV/EBITDA (x)	23.5	20.1	17.8	15.0	
RoNW (%)	10.2%	11.6%	12.0%	12.7%	
RoCE (%)	8.8%	9.5%	10.2%	11.1%	



Reference: Sharekhan, March 2021

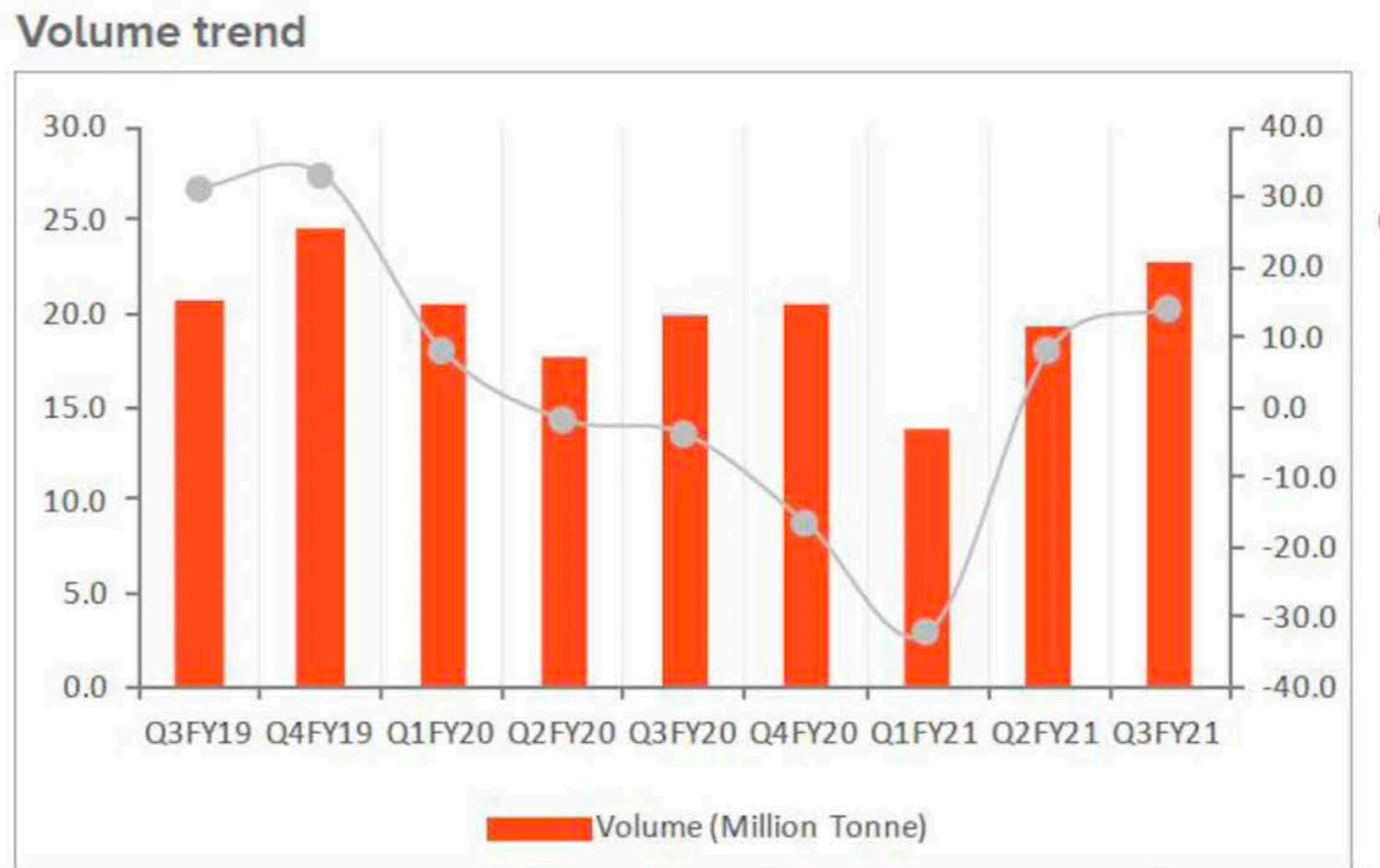
UltraTech Cement – Price trend

Pan-India price 3.9%/-0.3% (Q4FY21 vs. y-o-y/m-o-m)



Reference: Sharekhan, March 2021

UltraTech Cement – Volume trend



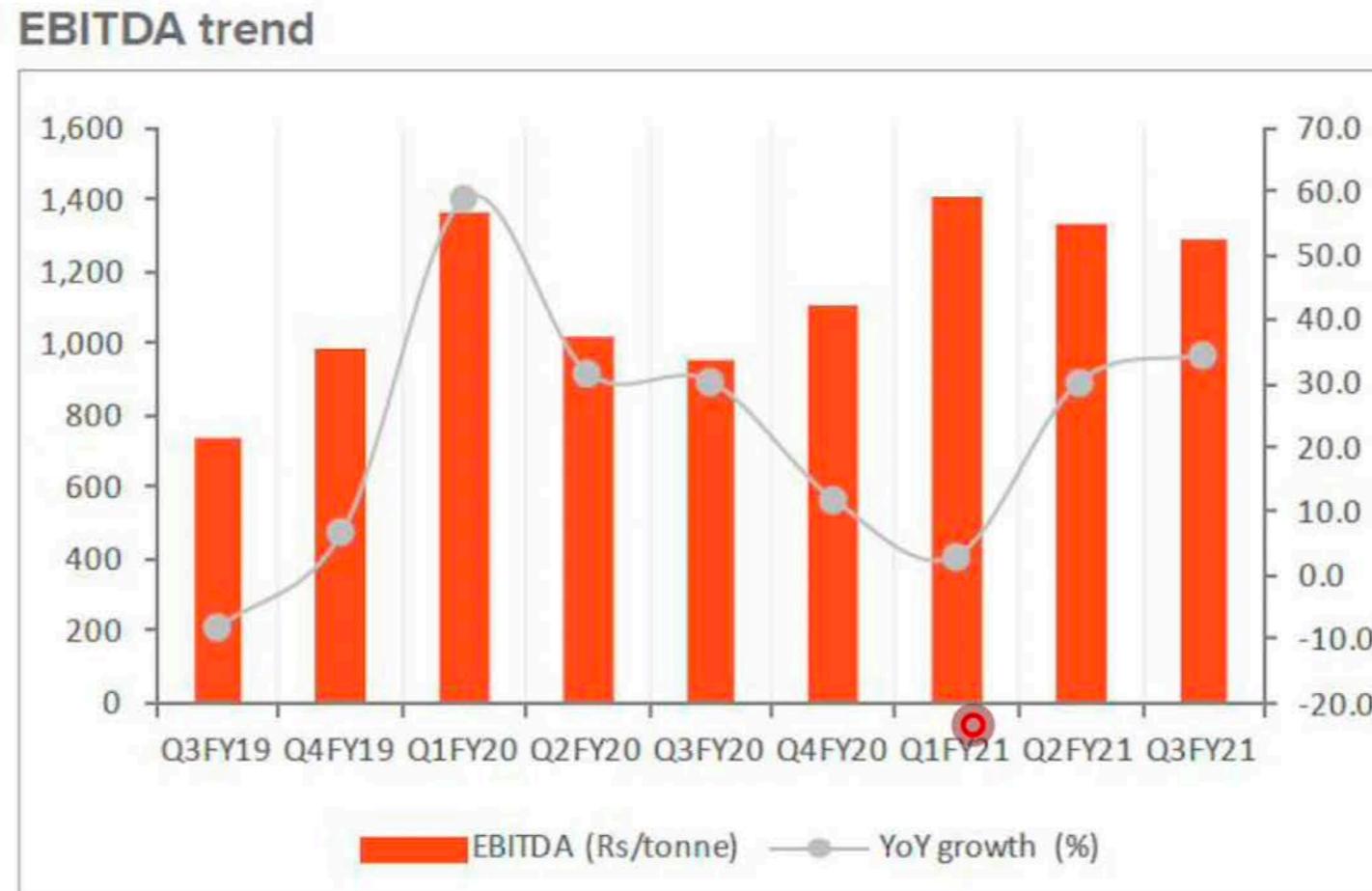
Reference: Sharekhan, March 2021

UltraTech – Profit & Loss

Y/E March	FY16	FY17	FY18	FY19	FY20	FY21E	FY22E	FY23E
Total Income from Operations	251,532	253,749	309,786	416,088	421,248	436,812	497,871	547,805
Change (%)	3.3	0.9	22.1	34.3	1.2	3.7	14.0	10.0
Raw Materials	44,175	44,926	52,888	69,831	63,131	66,971	71,959	79,387
Employees Cost	14,450	15,223	18,102	22,911	25,094	23,717	25,919	27,686
Other Expenses	143,898	141,476	177,344	249,877	239,167	234,307	277,067	299,889
Total Expenditure	202,523	201,625	248,335	342,619	327,106	324,994	374,945	406,962
% of Sales	80.5	79.5	80.2	82.3	77.7	74.4	75.3	74.3
EBITDA	49,010	52,124	61,452	73,469	94,142	111,818	122,926	140,843
Margin (%)	19.5	20.5	19.8	17.7	22.3	25.6	24.7	25.7
Depreciation	13,772	13,484	18,479	24,507	27,022	26,828	27,460	28,738
EBIT	35,238	38,640	42,972	48,962	67,121	84,989	95,466	112,105
Int. and Finance Charges	5,663	6,401	12,376	17,779	19,857	14,495	9,723	7,359
Other Income	4,638	6,481	5,886	4,634	6,478	8,542	8,551	11,365
PBT bef. EO Exp.	34,213	38,721	36,482	35,818	53,742	79,036	94,294	116,111
EO Items	0	0	-3,466	-1,139	19,788	-1,574	0	0
PBT after EO Exp.	34,213	38,721	33,016	34,679	73,530	77,462	94,294	116,111
Total Tax	9,417	11,586	10,770	10,681	15,413	23,991	29,178	35,920
Tax Rate (%)	27.5	29.9	32.6	30.8	21.0	31.0	30.9	30.9
Minority Interest	16	-14	24	-37	-32	5	5	5
Reported PAT	24,780	27,149	22,222	24,035	58,148	53,466	65,111	80,186
Adjusted PAT	24,780	27,149	24,557	24,823	38,360	54,552	65,111	80,186
Change (%)	18.1	9.6	-9.5	1.1	54.5	42.2	19.4	23.2
Margin (%)	9.9	10.7	7.9	6.0	9.1	12.5	13.1	14.6

Reference: Motilal Oswal, January 2021

UltraTech Cement – EBITDA trend



Reference: Sharekhan, March 2021

UltraTech – Balance sheet

Y/E March	FY16	FY17	FY18	FY19	FY20	FY21E	FY22E	FY23E
Equity Share Capital	2,744	2,745	2,746	2,746	2,886	2,886	2,886	2,886
Total Reserves	216,712	241,171	261,066	334,738	388,269	438,271	499,341	574,331
Net Worth	219,456	243,916	263,812	337,484	391,155	441,157	502,227	577,218
Minority Interest	155	97	160	122	75	80	85	90
Total Loans	106,160	84,745	194,802	253,370	228,979	168,979	108,979	108,979
Deferred Tax Liabilities	24,411	27,824	31,827	63,856	49,120	56,793	66,046	77,409
Capital Employed	350,182	356,582	490,601	654,832	669,329	667,010	677,337	763,697
Gross Block	255,050	274,135	430,455	571,407	602,593	614,235	630,890	672,559
Less: Accum. Deprn.	13,018	25,943	43,665	68,172	95,194	122,022	149,482	178,221
Net Fixed Assets	242,032	248,192	386,790	503,235	507,400	492,213	481,408	494,338
Goodwill on Consolidation	11,062	10,851	10,363	62,989	62,525	62,525	62,525	62,525
Capital WIP	14,691	9,215	15,112	11,486	9,095	13,095	23,095	8,095
Current Investment	23,651	54,110	39,491	15,165	42,437	33,149	33,149	33,149
Non-current Investment	27,301	12,795	14,978	14,048	16,850	19,138	19,138	19,138
Curr. Assets, Loans&Adv.	93,194	86,926	104,677	158,335	144,307	161,653	178,522	271,525
Inventory	24,546	24,006	32,676	40,990	41,483	41,370	47,154	51,848
Account Receivables	19,282	17,571	22,206	27,870	22,383	22,528	25,675	28,183
Cash and Bank Balance	22,670	22,488	2,191	7,397	5,392	20,047	22,209	108,094
Loans and Advances	26,697	22,861	47,604	82,079	75,049	77,708	83,484	83,400
Curr. Liability & Prov.	61,852	65,605	80,904	110,548	119,152	120,632	126,369	130,944
Account Payables	17,173	18,573	23,849	31,671	35,014	36,308	41,383	45,534
Other Current Liabilities	40,292	42,453	50,526	71,206	76,240	76,420	77,076	77,494
Provisions	4,388	4,579	6,529	7,671	7,898	7,904	7,910	7,916
Net Current Assets	31,343	21,321	23,773	47,787	25,155	41,021	52,153	140,581
Deferred Tax assets	102	98	94	121	60	61	61	62
Net Assets held for sale	0	0	0	0	5,808	5,808	5,808	5,808
Appl. of Funds	350,182	356,582	490,601	654,832	669,329	667,010	677,337	763,697

E: MOFSL Estimates

Reference: Motilal Oswal, January 2021

UltraTech – Cash flow

Y/E March	FY16	FY17	FY18	FY19	FY20	FY21E	FY22E	FY23E
OP/(Loss) before Tax	34,213	38,721	33,015	34,685	52,423	77,462	94,294	116,111
Depreciation	13,772	13,484	18,479	24,507	27,022	26,828	27,460	28,738
Interest & Finance Charges	5,042	5,822	12,376	17,779	19,857	14,495	9,723	7,359
Direct Taxes Paid	-8,517	-7,437	-8,429	-7,101	-8,914	-16,319	-19,926	-24,557
(Inc)/Dec in WC	4,293	5,176	-12,554	-6,957	4,503	-1,211	-8,970	-2,543
CF from Operations	48,803	55,765	42,888	62,913	94,889	101,255	102,581	125,108
Others	1,494	-8	-4,010	-3,356	-5,869	-8,542	-8,551	-11,365
CF from Operating incl EO	50,297	55,756	38,877	59,557	89,020	92,713	94,029	113,743
(Inc)/Dec in FA	-21,315	-13,557	-18,828	-16,482	-17,037	-15,641	-26,655	-26,669
Free Cash Flow	28,982	42,199	20,050	43,075	71,983	77,072	67,374	87,074
(Pur)/Sale of Investments	3,537	-11,209	16,246	26,614	-26,266	7,000	0	0
Others	-73	0	21,197	1,007	1,210	8,542	8,551	11,365
CF from Investments	-17,851	-24,766	18,616	11,138	-42,093	-99	-18,104	-15,304
Issue of Shares	27	66	157	52	27	0	0	0
Inc/(Dec) in Debt	-5,503	-22,297	-42,069	-46,482	-26,663	-60,000	-60,000	0
Interest Paid	0	0	-12,099	-16,850	-19,445	-14,495	-9,723	-7,359
Dividend Paid	-2,973	-3,119	-3,340	-3,462	-3,800	-3,464	-4,041	-5,195
Others	9	0	0	-827	-31	0	0	0
CF from Fin. Activity	-8,440	-25,350	-57,351	-67,568	-49,911	-77,959	-73,764	-12,554
Inc/Dec of Cash	24,005	5,640	142	3,127	-2,984	14,655	2,162	85,884
Opening Balance	9,198	33,203	38,843	38,986	42,113	39,129	53,784	55,946
Closing Balance	33,203	38,843	38,986	42,113	39,129	53,784	55,946	141,830

UltraTech Ratios

FY20 current ratio =
 curr assets/curr liab.
 = 144307/119152
 = 1.21

Y/E March	FY16	FY17	FY18	FY19	FY20	FY21E	FY22E	FY23E
Basic (INR)								
EPS	90.2	98.9	89.4	90.4	132.9	189.0	225.6	277.8
Cash EPS	140.5	148.0	156.7	179.6	226.5	282.0	320.7	377.4
BV/Share	800.4	889.4	961.4	1,229.8	1,424.9	1,606.5	1,828.7	1,999.9
DPS	8.9	9.4	9.5	10.5	11.0	13.0	13.0	13.0
Payout (%)	11.8	11.5	14.0	14.5	8.6	8.3	6.7	6.7
Valuation (x)								
P/E				61.2	41.6	29.3	24.5	19.9
Cash P/E				30.8	24.4	19.6	17.3	14.7
P/BV				4.5	3.9	3.4	3.0	2.8
EV/Sales				4.2	4.2	3.9	3.3	2.9
EV/Ton (Cap-USD)				221.8	221.0	212.5	199.0	167.0
EV/EBITDA				23.6	18.7	15.2	13.4	11.1
Dividend Yield (%)				0.2	0.2	0.2	0.2	0.2
FCF per share				156.8	249.4	267.0	233.4	301.7
Return Ratios (%)								
RoE	12.1	11.7	9.7	8.3	10.5	13.1	13.8	14.9
RoCE	9.4	9.7	8.4	7.1	9.6	10.5	11.8	13.1
RoIC	9.2	9.7	8.2	6.4	8.6	9.7	11.0	12.8
Working Capital Ratios								
Inventory (Days)	36	35	38	36	36	35	35	35
Debtor (Days)	28	25	26	24	19	19	19	19
Creditor (Days)	25	27	28	28	30	30	30	30
Leverage Ratio (x)								
Current Ratio	1.5	1.3	1.3	1.4	1.2	1.3	1.4	2.1
Interest Cover Ratio	6.2	6.0	3.5	2.8	3.4	5.9	9.8	15.2
Net Debt/Equity	0.3	0.0	0.6	0.7	0.5	0.3	0.1	-0.1

Reference: Motilal Oswal, January 2021



Page Industries



Page Industries – Financial snapshot

Financial Snapshot (Standalone)

(Rs mn)	FY20	FY21	FY22E	FY23E	FY24E
Revenue	29,454	28,356	37,153	44,764	51,341
EBITDA	5,326	5,292	7,772	10,053	11,712
EBITDA Margin (%)	18.1	18.7	20.9	22.5	22.8
APAT	3,432	3,432	5,308	7,023	8,222
EPS (Rs)	307.7	307.7	475.9	629.6	737.1
EPS (% chg)	(12.9)	0.0	54.7	32.3	17.1
ROE (%)	43.0	40.3	54.8	59.6	56.3
P/E (x)	103.2	103.2	66.8	50.4	43.1
EV/EBITDA (x)	66.3	66.1	45.0	34.7	29.6
P/BV (x)	43.2	40.0	33.7	27.1	22.0

20% CAGR

Reference: Emkay, May 2021

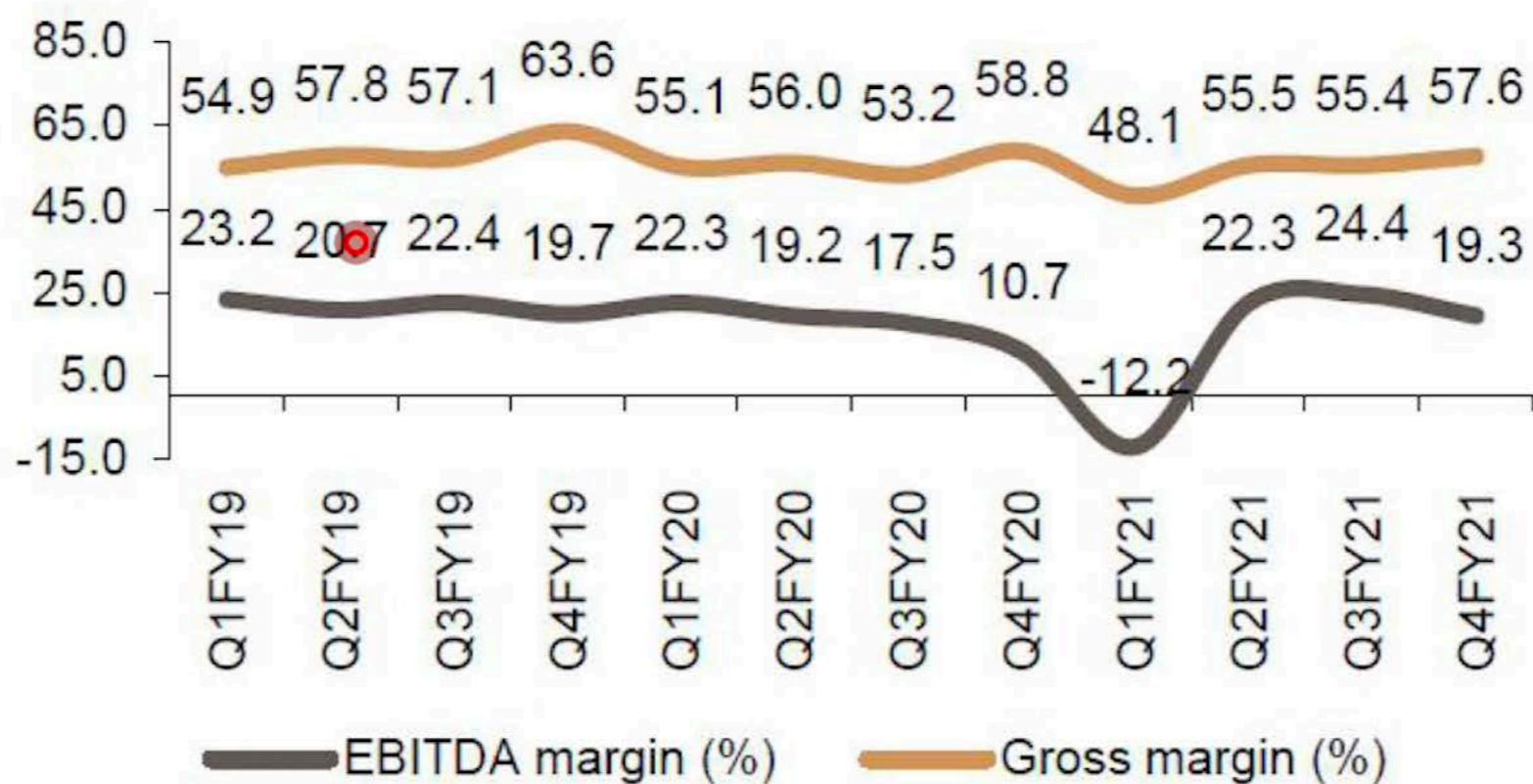


Page Industries – Sales trend



Reference: Emkay, May 2021

Page Industries – EBITDA trend



Reference: Emkay, May 2021

Page Industries – Profit & Loss

Total operating Income	2,945.4	2,679.9	3,613.1	4,203.6
Growth (%)	3.3	(9.0)	34.8	16.3
Raw Material Expenses	1,310.8	1,183.4	1,590.7	1,841.9
Employee Expenses	531.7	538.7	621.4	706.2
Other Expenses	570.3	458.3	625.1	731.4
Total Operating Expenditure	2,412.8	2,180.3	2,837.2	3,279.6
EBITDA	532.6	499.6	775.9	924.0
Growth (%)	(13.7)	(6.2)	55.3	19.1
Depreciation	61.4	65.0	73.5	80.4
EBIT	471.2	434.6	702.3	843.7
Growth (%)	(19.6)	(7.8)	61.6	20.1
Interest	33.9	35.5	36.0	40.5
Other Income	24.6	24.1	28.9	34.5
PBT	462.0	423.2	695.3	837.7
Growth (%)	(23.8)	(8.4)	64.3	20.5
Total Tax	118.8	106.7	175.2	211.1
PAT	343.2	316.6	520.0	626.6
Growth (%)	(12.9)	(7.8)	64.3	20.5
EPS (₹)	307.7	283.8	466.2	561.7

Reference: ICICI Direct, February 2021

(Year-end March)	FY20A	FY21E	FY22E	FY23E
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Page Industries – Balance sheet

(Year-end March)	FY20A	FY21E	FY22E	FY23E
Liabilities				
Equity Capital	11.2	11.2	11.2	11.2
Reserve and Surplus	808.7	851.8	1,033.8	1,253.1
Total Shareholders funds	819.9	862.9	1,044.9	1,264.2
Total Debt	26.8	65.0	45.0	45.0
Deferred Tax Liability	0.2	0.2	0.2	0.2
Other long term liabilities	147.6	149.0	150.5	152.0
Total Liabilities	994.5	1,077.2	1,240.7	1,461.5
Assets				
Gross Block	417.9	487.9	557.9	627.9
Less: Acc Depreciation	120.2	160.2	203.7	252.1
Net Block	297.7	327.7	354.2	375.8
Capital WIP	28.7	25.0	25.0	25.0
Intangible Assets	3.3	3.3	3.3	3.3
Total Fixed Assets	329.8	356.0	382.5	404.1
Investments				
Inventory	718.6	719.5	871.1	978.9
Debtors	73.8	88.1	99.0	115.2
Loans and Advances	-	5.9	5.4	7.2
Cash	116.9	152.7	169.7	265.3
Total Current Assets	1,014.5	1,071.5	1,250.4	1,471.8
Sundry Creditors	93.8	88.1	128.7	149.7
Current Liabilities	397.3	403.3	404.3	405.3
Provisions	27.3	27.6	27.9	28.2
Total Current Liabilities	518.5	519.0	560.9	583.2
Net Current Assets	496.1	552.5	689.5	888.7
Other Non-current Assets	168.7	168.7	168.7	168.7
Application of Funds	994.5	1,077.2	1,240.7	1,461.5

Reference: ICICI Direct, February 2021

Page Industries – Cash flow

Appreciation of Rupee

334.3 1,077.2 1,240.7 1,401.0

(Year-end March)	FY20A	FY21E	FY22E	FY23E
Profit after tax	343.2	316.6	520.0	626.6
Add: Depreciation	61.4	65.0	73.5	80.4
(Inc)/dec in Current Assets	63.1	(21.2)	(161.9)	(125.9)
Inc/(dec) in CL and Provisions	37.3	0.6	41.9	22.3
Others	-	-	-	-
CF from operating activities	505.0	361.0	473.5	603.4
(Inc)/dec in Investments	-	-	-	-
(Inc)/dec in Fixed Assets	(34.9)	(70.0)	(70.0)	(70.0)
(Inc)/dec in CWIP	(21.5)	3.7	-	-
Others	(26.2)	-	-	-
CF from investing activities	(82.6)	(66.3)	(70.0)	(70.0)
Issue/(Buy back) of Equity	-	-	-	-
Inc/(dec) in loan funds	(45.7)	38.2	(20.0)	-
Others	(303.9)	(297.1)	(366.5)	(437.8)
CF from financing activities	(349.6)	(258.9)	(386.5)	(437.8)
Net Cash flow	72.8	35.8	17.0	95.6
Opening Cash	44.1	116.9	152.7	169.7
Closing Cash	116.9	152.7	169.7	265.3

Reference: ICICI Direct, February 2021

Page Industries – Ratios

FY20 current ratio =
 curr assets/curr liab.
 = 1014.5/518.5
 = 1.96

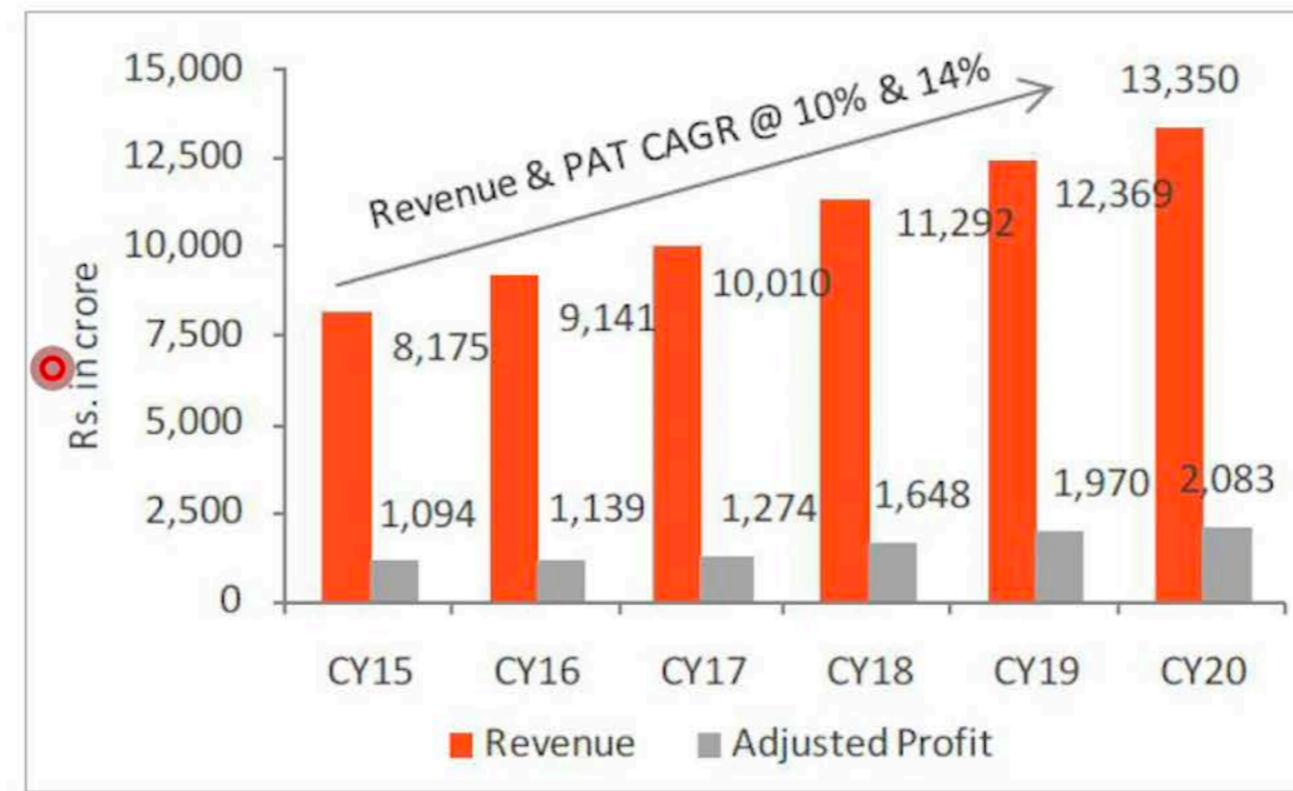
Reference: ICICI Direct, February 2021

(Year-end March)	FY20A	FY21E	FY22E	FY23E
Per share data (₹)				
EPS	307.7	283.8	466.2	561.7
Cash EPS	362.7	342.1	532.2	633.8
BV	735.1	773.7	936.8	1,133.5
DPS	202.0	245.2	303.1	365.1
Cash Per Share	104.8	136.9	152.1	237.8
Operating Ratios				
EBITDA Margin (%)	18.1	18.6	21.5	22.0
PBT Margin (%)	15.7	15.8	19.2	19.9
PAT Margin (%)	11.7	11.8	14.4	14.6
Inventory days	89.0	98.0	88.0	85.0
Debtor days	9.1	12.0	10.0	10.0
Creditor days	11.6	12.0	13.0	13.0
Return Ratios (%)				
RoE	41.9	36.7	49.8	49.6
RoCE	55.7	46.8	64.4	64.4
Valuation Ratios (x)				
P/E	99.1	107.5	65.4	54.3
EV / EBITDA	63.7	67.9	43.7	36.6
EV / Net Sales	11.5	12.7	9.4	8.0
Market Cap / Sales	11.5	12.7	9.4	8.1
Price to Book Value	41.5	39.4	32.6	26.9
Solvency Ratios				
Debt/EBITDA	0.1	0.1	0.1	0.0
Debt / Equity	0.0	0.1	0.0	0.0
Current Ratio	2.0	2.1	2.2	2.5
Quick Ratio	0.6	0.7	0.7	0.8

Nestle



Nestle India Limited – Revenue and PAT trend



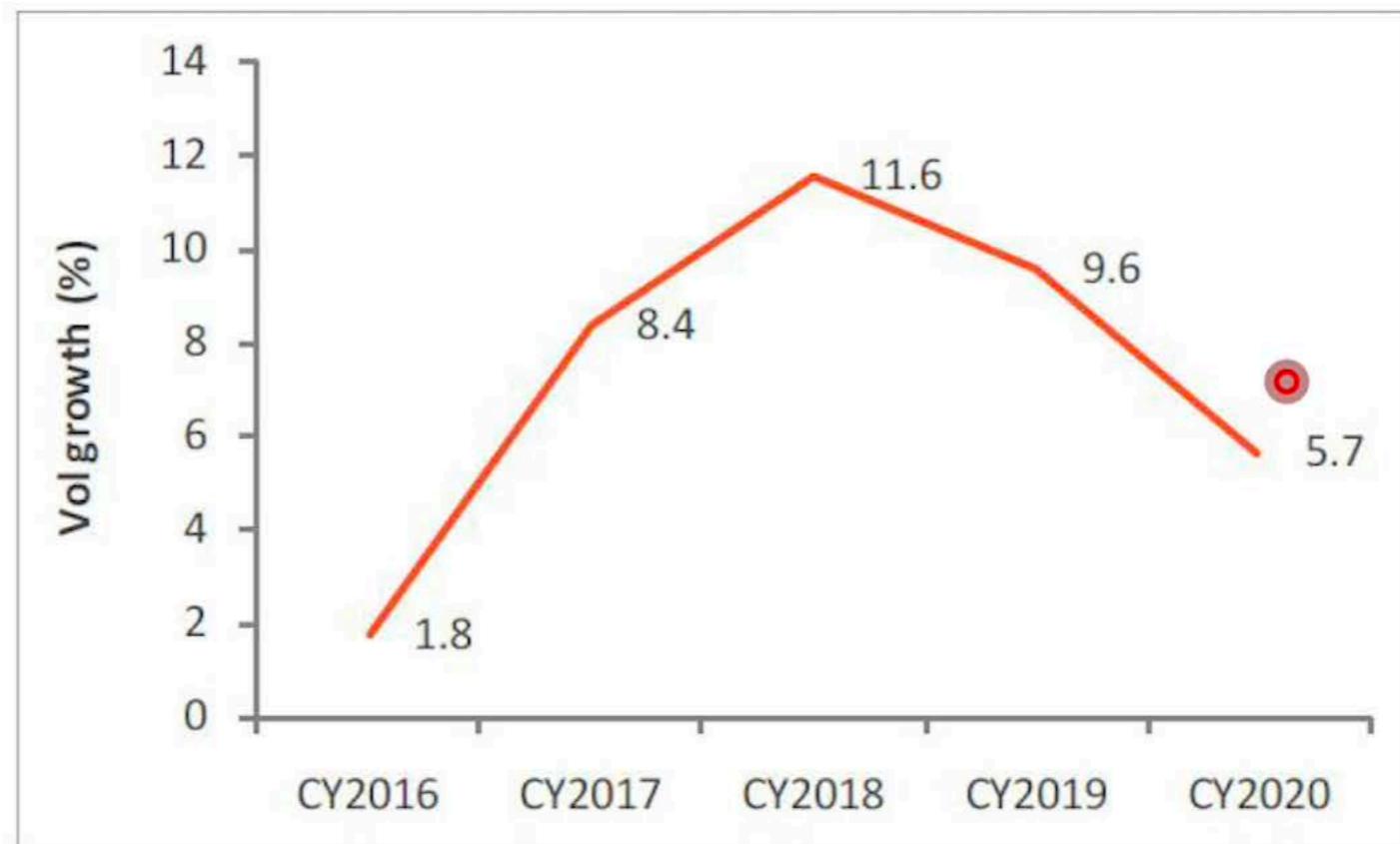
Reference: Sharekhan, February 2021

Nestle India Limited – Valuation

Valuation						Rs cr
Particulars	CY18	CY19	CY20	CY21E	CY22E	
Revenue	11,292	12,369	13,350	15,087	16,878	
OPM (%)	23.6	23.2	24.0	24.5	24.9	
Adjusted PAT	1,648	1,970	2,082	2,559	2,921	
% YoY growth	29.3	19.5	5.7	22.9	14.1	
Adjusted EPS (Rs.)	171.0	204.3	216.0	265.4	303.0	
P/E (x)	100.7	84.3	79.7	64.9	56.8	
P/B (x)	45.2	85.9	82.2	73.6	58.1	
EV/EBIDTA (x)	61.6	57.5	51.4	44.8	39.2	
RoNW (%)	46.5	70.3	105.4	119.7	114.2	
RoCE (%)	42.7	50.2	57.8	63.4	65.3	

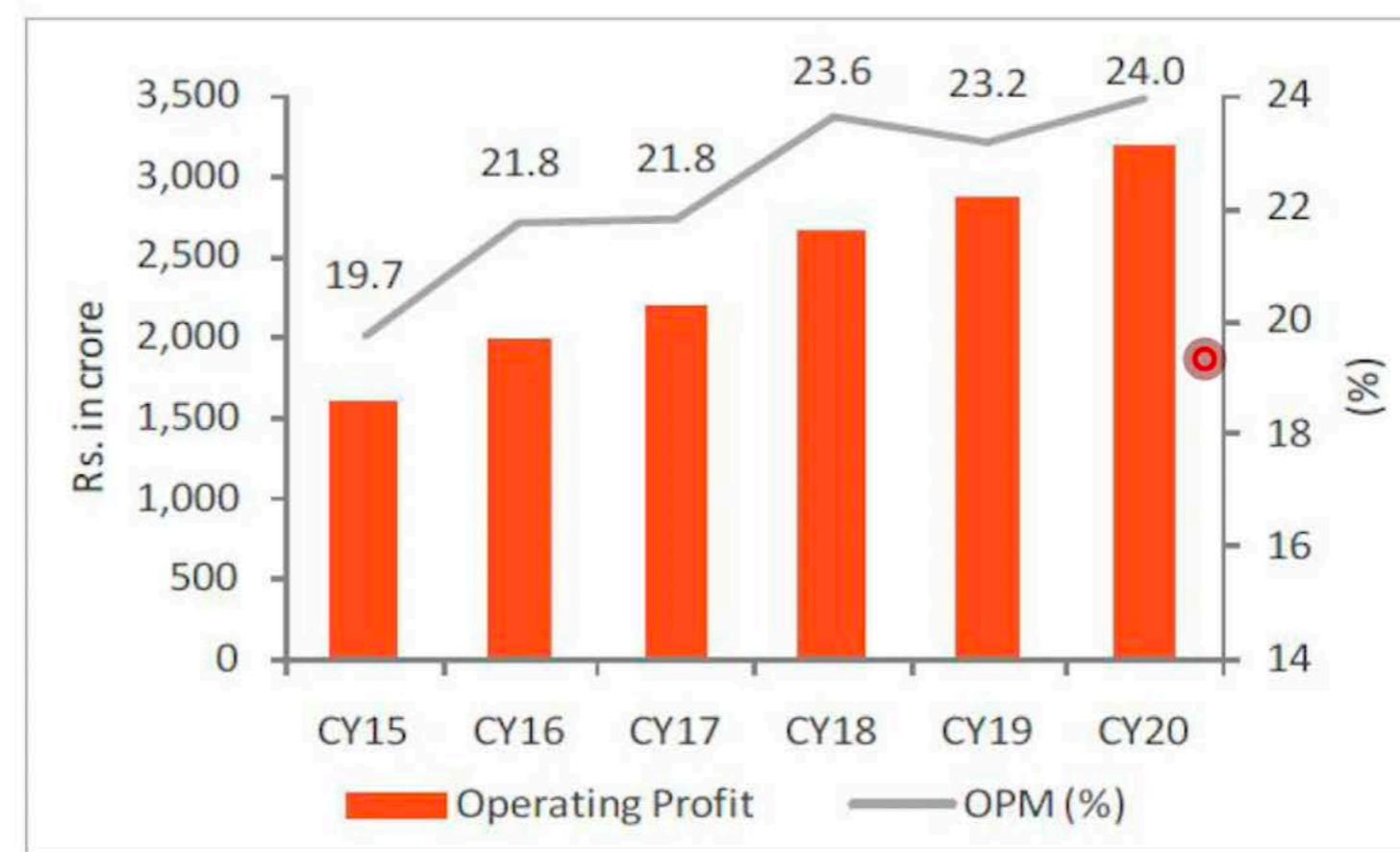
Reference: Sharekhan, February 2021

Nestle India Limited – Volume trend



Reference: Sharekhan, February 2021

Nestle India Limited – Operating profit trend



Reference: Sharekhan, February 2021

Nestle India Limited – Profit & Loss

	2019	2020	2021	2022	2023
Revenue	11,292	12,369	13,350	14,885	16,670
% change	10.8	9.5	7.9	11.5	12.0
EBITDA	2,687	2,926	3,202	3,644	4,135
% change	26.5	8.9	9.4	13.8	13.5
Depreciation	336	370	370	327	336
EBIT	2,351	2,556	2,831	3,317	3,799
Interest	112	129	164	130	173
Other Income	190	247	146	175	196
PBT	2,429	2,673	2,813	3,362	3,822
% change	62.1	10.1	5.2	19.5	13.7
Tax	822	705	730	873	992
Tax Rate (%)	33.8	26.4	26.0	26.0	26.0
Reported PAT	1,607	1,968	2,082	2,489	2,830
Adj*	-	-	-	-	-
Adj PAT	1,607	1,968	2,082	2,489	2,830
% change	31.2	22.5	5.8	19.5	13.7
No. of shares (cr)	9.6	9.6	9.6	9.6	9.6
Adj EPS (Rs.)	166.7	204.2	216.0	258.1	293.5
% change	31.2	22.5	5.8	19.5	13.7
DPS (Rs.)	115.0	342.0	200.0	239.0	272.0
CEPS (Rs.)	201.5	242.6	254.4	292.1	328.3

Reference: GEOJIT, February 2021

Nestle India Limited – Balance Sheet

Reference: GEOJIT, February 2021

Y.E December (Rs. cr)	CY18A	CY19A	CY20A	CY21E	CY22E
Cash	1,610	1,308	1,770	2,345	3,067
Accounts Receivable	125	124	165	169	181
Inventories	966	1,283	1,416	1,631	1,817
Other Cur. Assets	2,037	1,102	834	997	1,199
Investments	733	744	741	741	741
Gross Fixed Assets	3,485	3,637	4,111	4,496	4,926
Net Fixed Assets	2,295	2,198	1,541	1,566	1,628
CWIP	105	143	639	671	704
Intangible Assets	-	-	-	-	-
Def. Tax (Net)	-	-	-	-	-
Other Assets	217	271	794	865	951
Total Assets	8,088	7,173	7,900	8,985	10,288
Current Liabilities	1,855	2,191	2,489	2,984	3,623
Provisions	2,465	2,907	3,268	3,675	4,131
Debt Funds	35	53	35	35	35
Other Liabilities	59	103	88	88	88
Equity Capital	96	96	96	96	96
Reserves & Surplus	3,577	1,822	1,923	2,108	2,315
Shareholder's Fund	3,674	1,919	2,019	2,204	2,411
Minority Interest	-	-	-	-	-
Total Liabilities	8,088	7,173	7,900	8,985	10,288
BVPS (Rs.)	381	199	209	229	250

Nestle India Limited – Ratios

FY20 current ratio =
curr assets/curr liab.
= 4929/2489
= 1.98 

Y.E December	CY18A	CY19A	CY20A	CY21E	CY22E
Profitab. & Return					
EBITDA margin (%)	23.8	23.7	24.0	24.5	24.8
EBIT margin (%)	20.8	20.7	21.2	22.3	22.8
Net profit mgn. (%)	14.2	15.9	15.6	16.7	17.0
ROE (%)	43.7	102.6	103.1	112.9	117.4
ROCE (%)	63.4	129.6	137.8	148.2	155.3
W.C & Liquidity					
Receivables (days)	4.0	3.7	4.5	4.1	4.0
Inventory (days)	76.8	89.6	91.1	94.8	98.4
Payables (days)	98.6	104.2	97.6	93.9	90.3
Current ratio (x)	2.6	1.7	1.7	1.7	1.7
Quick ratio (x)	2.0	1.1	1.1	1.1	1.2
Turnover & Leverage					
Gross asset T.O (x)	3.3	3.5	3.4	3.5	3.5
Total asset T.O (x)	1.5	1.6	1.8	1.8	1.7
Int. coverage ratio (x)	21.0	19.8	17.2	25.5	21.9
Adj. debt/equity (x)	0.0	0.0	0.0	0.0	0.0
Valuation					
EV/Sales (x)	9.3	11.4	13.2	10.5	9.3
EV/EBITDA (x)	39.2	48.3	54.8	42.7	37.4
P/E (x)	66.5	72.4	85.2	63.4	55.8
P/BV (x)	29.1	74.3	87.8	71.6	65.5

Reference: GEOJIT, February 2021

Tata Consultancy
Services

TCS: Marketshare



Exhibit 1: TCS Market Share

Particulars	FY11	FY21
Industry Size (\$Bn)	1,014.0	1,355.0
TCS Size (\$Bn)	8.2	22.2
TCS Market Share (%)	0.8	1.6

Source: DART, Company

TCS: Competitive position

Exhibit 4: Europe Survey Result

Particulars	TCS	Industry Avg
Customer Satisfaction	82%	72%
Service Delivery Quality	82%	73%
Cloud Capability	81%	72%
Account Management	83%	74%
Proactivity	73%	64%
Innovation	71%	62%
Business Understanding	79%	72%

Source: DART, Company, based on studies conducted by whitelane research, pa consulting, quint wellington redwood, navisco and vlerick business school in 2020

TCS: Division performance

Exhibit 9: Vertical Performance Trend

Vertical	Amount (\$ mn)	YoY (%) (CC)	Mix (%)	Incremental Revenue (\$ mn)	% Contribution of Incremental Revenue
BFSI	7,037	2.4	32	328	231
Communication & Media	1,467	(5.9)	7	(75)	(53)
Retail & CPG	3,195	(6.2)	14	(170)	(120)
Manufacturing	2,123	(4.1)	10	(64)	(45)
Technology & Services	1,937	0.2	9	31	22
Life Sciences and Healthcare	2,157	17.1	10	362	255
Regional Markets & Others	4,258	(5.9)	19	(270)	(190)
Total	22,174	(0.8)	100	142	100

Source: DART, Company

TCS: Key cost components

Exhibit 12: Cost of Services/Revenue Analysis

Particulars (INR Mn)	FY21	FY20	FY21 (% of Sales)	FY20 (% of Sales)	Incremental Cost
Salaries, others and PF contribution	7,19,460	6,56,520	43.8	41.8	62,940
Payment to subcontractors	1,26,480	1,25,000	7.7	8.0	1,480
Cost of equipment and software licenses	14,620	19,050	0.9	1.2	(4,430)
Depreciation	30,850	26,870	1.9	1.7	3,980
Travel	8,830	22,910	0.5	1.5	(14,080)
Communication	14,340	12,320	0.9	0.8	2,020
Facility Exp/Rent	14,010	17,980	0.9	1.1	(3,970)
Other costs	42,790	42,570	2.6	2.7	220
Total	9,71,380	9,23,220	59.2	58.8	48,160

Source: DART, Company



TCS: Geographical growth trends

Exhibit 11: Geographic Growth Trend

Geography	Amount (\$ mn)	YoY (%) (CC)	Mix (%)	Incremental Revenue (\$ mn)	% Contribution of Incremental Revenue
North America	11,017	-0.9%	50%	-87	-61%
Latin America	371	-1.2%	2%	-37	-26%
UK	3,468	-4.3%	16%	-18	-13%
Continental Europe	3,603	5.5%	16%	354	249%
India	1,143	-0.5%	5%	-118	-83%
Asia Pacific	2,138	-5.9%	10%	78	55%
MEA	433	-2.7%	2%	-30	-21%
Total	22,174	5.9%	100%	142	100%

Source: DART, Company

TCS: SGA cost analysis

Exhibit 13: SG&A Expense Analysis

Particulars (INR Mn)	FY21	FY20	FY21 (% of Sales)	FY20 (% of Sales)	Incremental Cost
Salaries, others and PF contribution	1,98,680	2,03,000	12.1	12.9	(4,320)
Fees to external consultant	5,690	4,370	0.3	0.3	1,320
Provision of doubtful debts	2,010	1,440	0.1	0.1	570
Depreciation	9,800	8,430	0.6	0.5	1,370
Facility expenses	7,290	9,060	0.4	0.6	(1,770)
Travel	1,980	10,040	0.1	0.6	(8,060)
Communication	4,620	3,600	0.3	0.2	1,020
Other Costs	27,690	20,530	1.7	1.3	7,160
Total	2,57,760	2,60,470	15.7	16.6	(2,710)

Source: DART, Company

Profit and Loss Account

(Rs Mn)	FY20A	FY21A	FY22E	FY23E
Revenue	15,69,490	16,41,770	18,98,127	21,11,189
Total Expense	11,48,390	11,88,490	13,73,792	15,35,310
COGS	8,96,350	9,40,530	10,90,224	12,12,387
Employees Cost	0	0	0	0
Other expenses	2,52,040	2,47,960	2,83,568	3,22,923
EBIDTA	4,21,100	4,53,280	5,24,335	5,75,879
Depreciation	35,300	40,650	45,555	49,184
EBIT	3,85,800	4,12,630	4,78,780	5,26,695
Interest	9,130	6,370	5,316	5,014
Other Income	45,810	31,340	37,723	27,845
Exc. / E.O. items	0	0	0	0
EBT	4,22,480	4,37,600	5,11,187	5,49,526
Tax	98,010	1,11,980	1,28,819	1,38,481
RPAT	3,23,400	3,24,300	3,81,648	4,10,076
Minority Interest	1,070	1,320	720	970
Profit/Loss share of associates	0	0	0	0
APAT	3,23,400	3,24,300	3,81,648	4,10,076

Balance Sheet

(Rs Mn)	FY20A	FY21A	FY22E	FY23E
Sources of Funds				
Equity Capital	3,750	3,700	3,700	3,645
Minority Interest	6,230	6,750	7,470	8,440
Reserves & Surplus	8,37,510	8,60,630	10,20,108	10,75,065
Net Worth	8,41,260	8,64,330	10,23,808	10,78,711
Total Debt	0	0	0	0
Net Deferred Tax Liability	(20,490)	(31,640)	(32,426)	(33,228)
Total Capital Employed	8,27,000	8,39,440	9,98,851	10,53,922
 Applications of Funds				
Net Block	2,09,280	2,10,210	2,10,205	2,10,071
CWIP	9,060	9,260	7,760	7,260
Investments	12,360	26,840	26,840	26,840
Current Assets, Loans & Advances	9,50,010	10,21,970	12,15,870	13,03,155
Inventories	50	80	80	80
Receivables	3,66,620	3,69,900	4,14,606	4,54,972
Cash and Bank Balances	86,460	68,580	2,09,567	2,77,825
Loans and Advances	85,040	1,15,010	1,17,304	1,19,645
Other Current Assets	1,50,440	1,76,800	1,83,713	1,85,033
Less: Current Liabilities & Provisions	3,53,710	4,28,840	4,61,824	4,93,404
Payables	1,03,520	1,27,070	1,46,885	1,64,080
Other Current Liabilities	2,50,190	3,01,770	3,14,939	3,29,323
<i>sub total</i>				
Net Current Assets	5,96,300	5,93,130	7,54,046	8,09,751
Total Assets	8,27,000	8,39,440	9,98,851	10,53,922

E – Estimates

FY20 current ratio =
 curr assets/curr liab.
 = 950010/353710
 = 2.69

Important Ratios				
Particulars	FY20A	FY21A	FY22E	FY23E
(A) Margins (%)				
Gross Profit Margin	42.9	42.7	42.6	42.6
EBIDTA Margin	26.8	27.6	27.6	27.3
EBIT Margin	24.6	25.1	25.2	24.9
Tax rate	23.2	25.6	25.2	25.2
Net Profit Margin	20.6	19.8	20.1	19.4
(B) As Percentage of Net Sales (%)				
COGS	57.1	57.3	57.4	57.4
Employee	0.0	0.0	0.0	0.0
Other	16.1	15.1	14.9	15.3
(C) Measure of Financial Status				
Gross Debt / Equity	0.0	0.0	0.0	0.0
Interest Coverage	42.3	64.8	90.1	105.0
Inventory days	0	0	0	0
Debtors days	85	82	80	79
Average Cost of Debt	4150.0			
Payable days	24	28	28	28
Working Capital days	139	132	145	140
FA T/O	7.5	7.8	9.0	10.0
(D) Measures of Investment				
AEPS (Rs)	86.2	87.6	103.1	112.4
CEPS (Rs)	95.6	98.6	115.4	125.9
DPS (Rs)	66.0	38.0	60.0	60.9
Dividend Payout (%)	76.6	43.4	58.2	54.2
BVPS (Rs)	227.2	233.4	276.5	291.3
RoANW (%)	37.3	38.0	40.4	39.0
RoACE (%)	39.0	39.8	42.2	40.5

(E) Valuation Ratios

CMP (Rs)	3082	3082	3082	3082
P/E	35.8	35.2	29.9	27.4
Mcap (Rs Mn)	1,14,12,163	1,14,12,163	1,14,12,163	1,14,12,163
MCap/ Sales	7.3	7.0	6.0	5.4
EV	1,10,64,303	1,10,51,983	1,09,11,997	1,08,68,739
EV/Sales	7.0	6.7	5.7	5.1
EV/EBITDA	26.3	24.4	20.8	18.9
P/BV	13.6	13.2	11.1	10.6
Dividend Yield (%)	2.1	1.2	1.9	2.0

(F) Growth Rate (%)

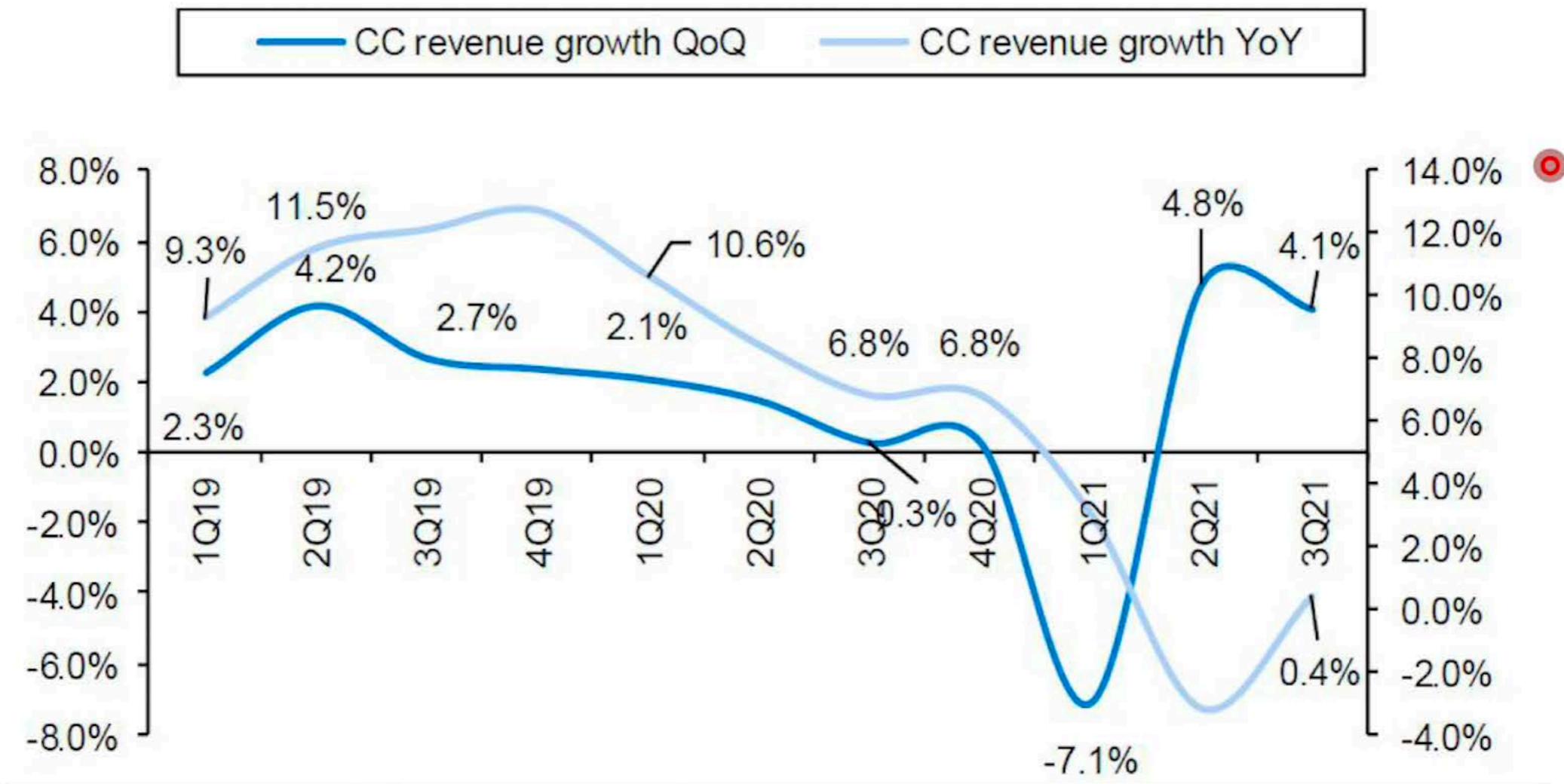
Revenue	7.2	4.6	15.6	11.2
EBITDA	6.6	7.6	15.7	9.8
EBIT	3.0	7.0	16.0	10.0
PBT	1.6	3.6	16.8	7.5
APAT	2.8	0.3	17.7	7.4
EPS	2.8	1.6	17.7	9.1

Revenue growth QoQ \$ Terms	2QFY20	3QFY20	4QFY20	1QFY21	2QFY21	3QFY21
Vertical wise QoQ						
BFSI	1.2%	-0.7%	-4.8%	-2.1%	9.3%	3.1%
Retail & CPG	-0.8%	4.0%	-1.3%	-15.5%	11.8%	4.4%
Comm & media	2.0%	1.3%	0.2%	-8.4%	-1.8%	6.7%
Mfg	0.6%	3.3%	-1.6%	-10.8%	3.9%	7.4%
Life Sc & Healthcare	3.1%	3.8%	3.3%	1.4%	9.4%	5.1%
E&U	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Tech Services	-0.6%	-2.2%	0.9%	-2.8%	4.9%	1.6%
Regional Markets & Others	-0.4%	1.7%	-5.4%	-11.2%	5.5%	9.0%
Geography Wise QoQ						
Americas	0.8%	0.5%	-2.5%	-5.3%	4.2%	3.5%
- North America	0.6%	0.3%	-2.2%	-5.0%	4.1%	3.4%
- Ibero America	6.2%	6.6%	-12.3%	-12.2%	7.2%	5.1%
Europe	0.9%	3.3%	-1.3%	-8.0%	10.3%	5.5%
- UK	-0.7%	3.2%	-1.9%	-11.1%	8.6%	6.5%
- Continental	2.7%	3.3%	-0.6%	-4.6%	12.0%	4.5%
India	-4.4%	1.3%	-6.0%	-27.3%	24.7%	17.7%
Others	1.5%	0.4%	-5.1%	-2.9%	6.3%	5.1%
- AsiaPac	0.6%	0.2%	-2.5%	-2.1%	6.1%	5.1%
- Middle East & Africa	5.4%	1.3%	-15.8%	-7.1%	7.2%	5.1%

Source: Company, PL

Revenue growth QoQ \$ Terms	2QFY20	3QFY20	4QFY20	1QFY21	2QFY21	3QFY21
Vertical wise QoQ						
BFSI	1.2%	-0.7%	-4.8%	-2.1%	9.3%	3.1%
Retail & CPG	-0.8%	4.0%	-1.3%	-15.5%	11.8%	4.4%
Comm & media	2.0%	1.3%	0.2%	-8.4%	-1.8%	6.7%
Mfg	0.6%	3.3%	-1.6%	-10.8%	3.9%	7.4%
Life Sc & Healthcare	3.1%	3.8%	3.3%	1.4%	9.4%	5.1%
E&U	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Tech Services	-0.6%	-2.2%	0.9%	-2.8%	4.9%	1.6%
Regional Markets & Others	-0.4%	1.7%	-5.4%	-11.2%	5.5%	9.0%
Geography Wise QoQ						
Americas	0.8%	0.5%	-2.5%	-5.3%	4.2%	3.5%
- North America	0.6%	0.3%	-2.2%	-5.0%	4.1%	3.4%
- Ibero America	6.2%	6.6%	-12.3%	-12.2%	7.2%	5.1%
Europe	0.9%	3.3%	-1.3%	-8.0%	10.3%	5.5%
- UK	-0.7%	3.2%	-1.9%	-11.1%	8.6%	6.5%
- Continental	2.7%	3.3%	-0.6%	-4.6%	12.0%	4.5%
India	-4.4%	1.3%	-6.0%	-27.3%	24.7%	17.7%
Others	1.5%	0.4%	-5.1%	-2.9%	6.3%	5.1%
- AsiaPac	0.6%	0.2%	-2.5%	-2.1%	6.1%	5.1%
- Middle East & Africa	5.4%	1.3%	-15.8%	-7.1%	7.2%	5.1%

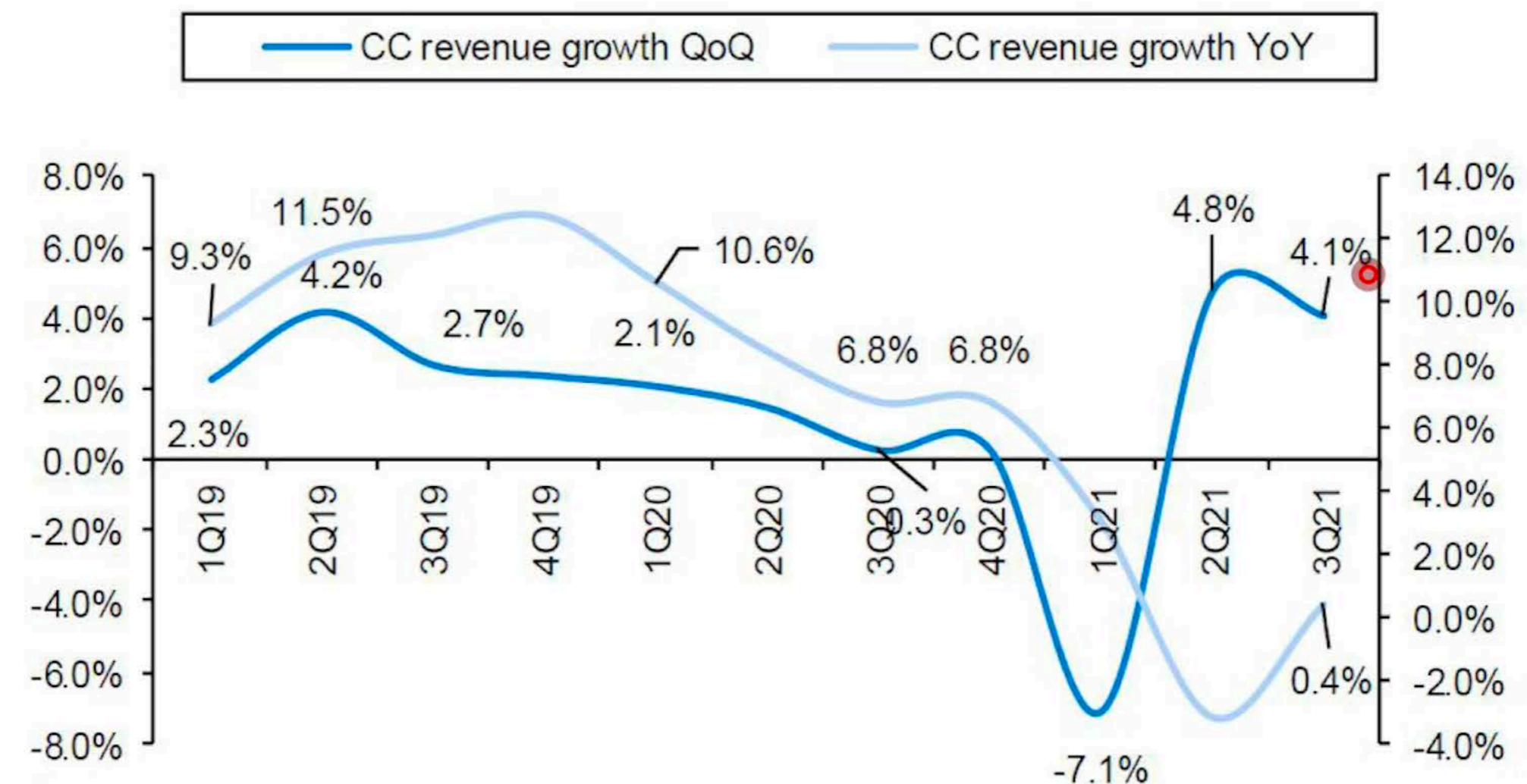
Source: Company, PL



Source: Company, PL

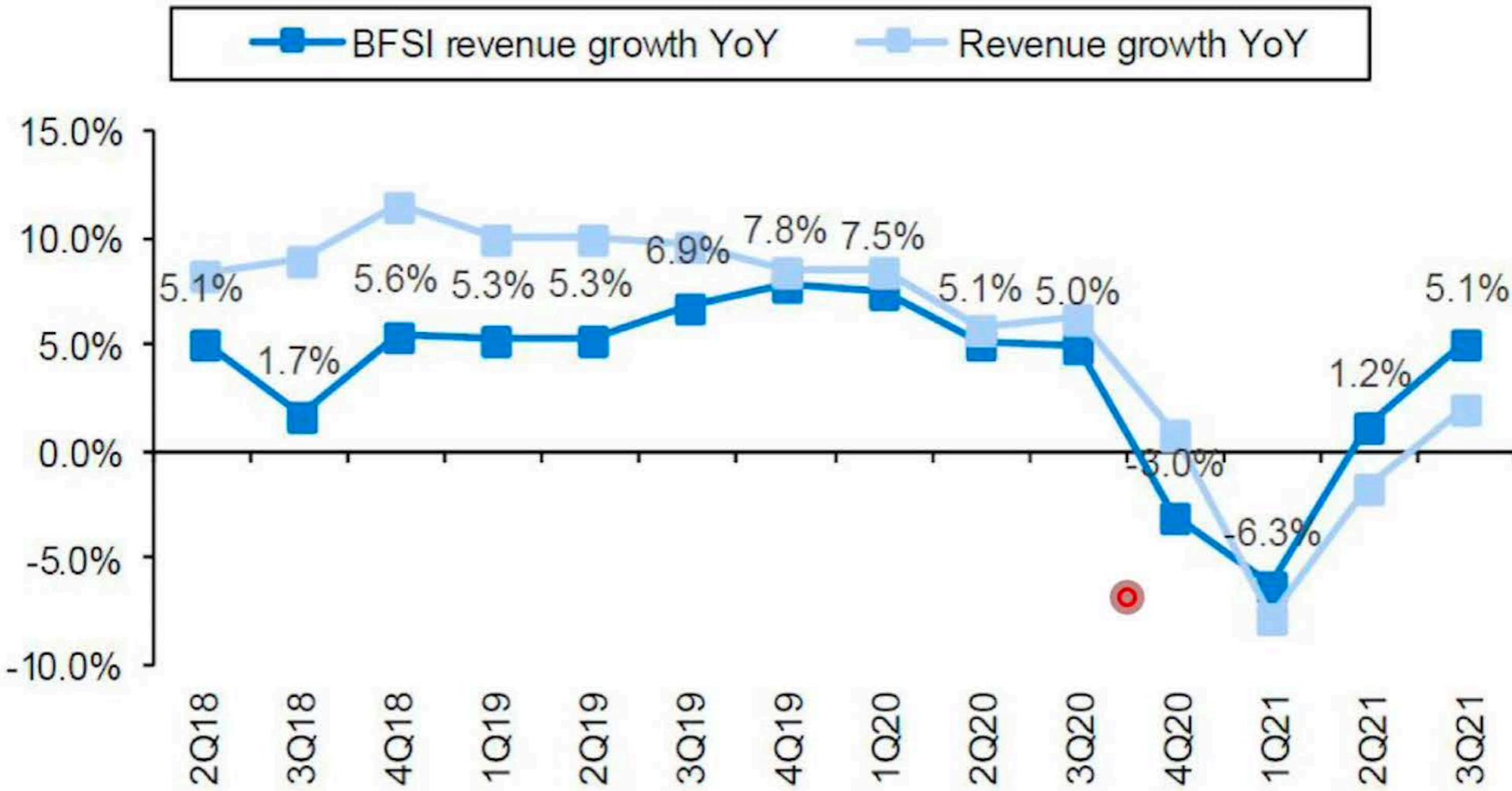
Exhibit 4: BFSI had good growth (+3.1%QoQ USD) in seasonally weak quarter

Exhibit 3: Revenue growth strongest in 3Q in 9 years



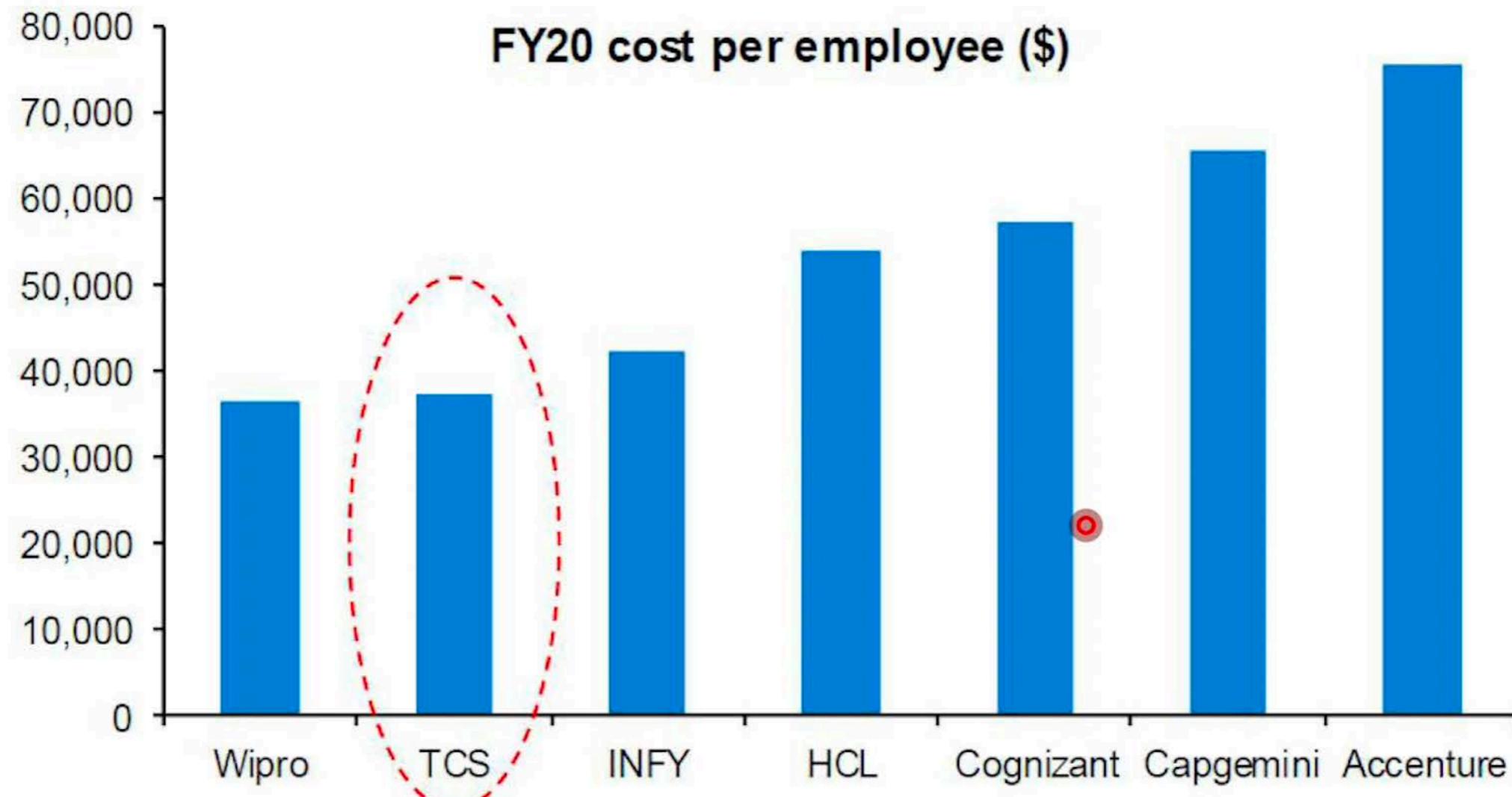
Source: Company, PL

EXHIBIT 4. BFSI revenue growth (YoY %) over three seasons (weak quarter)



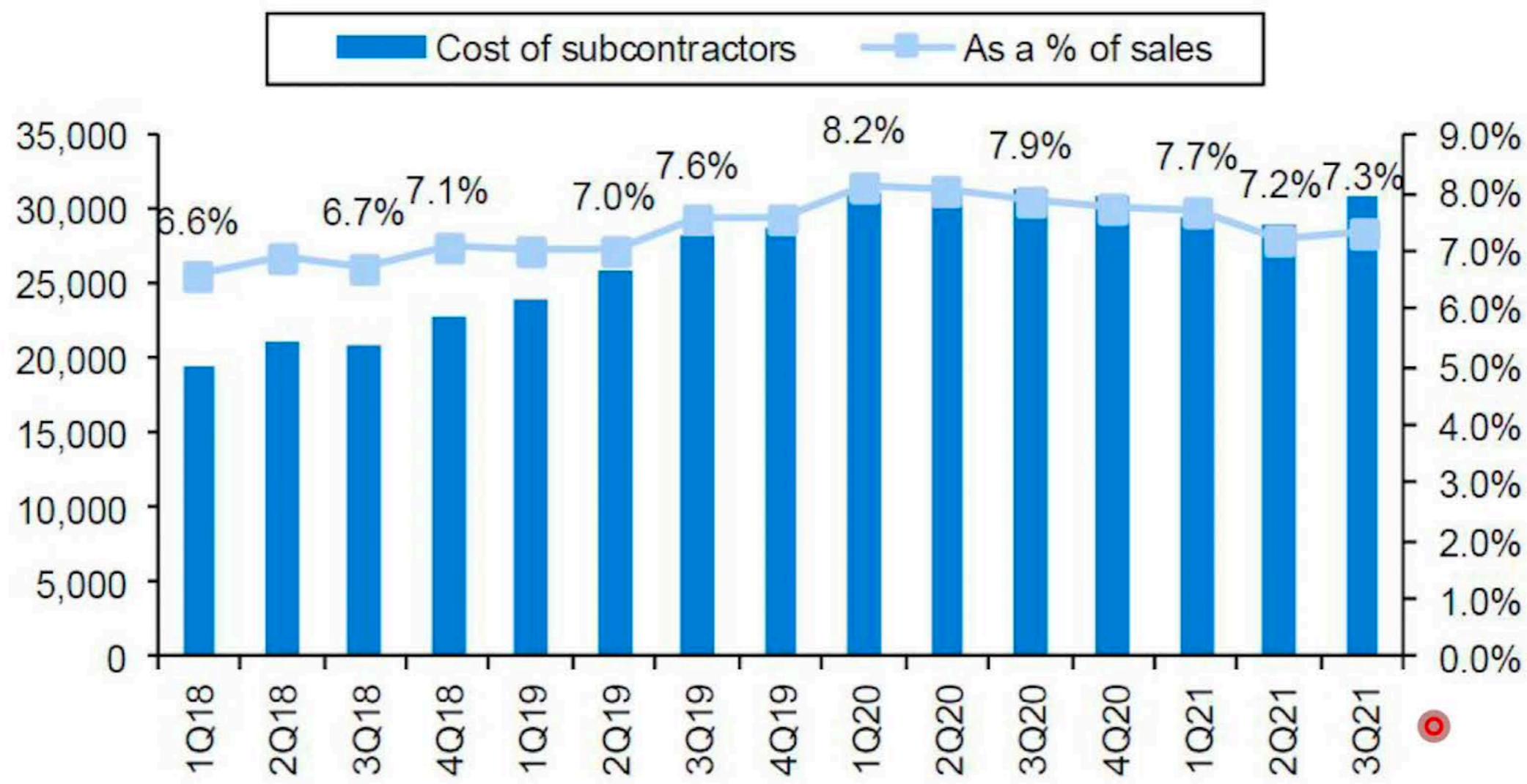
Source: Company, PL

Exhibit 5: TCS has lowest cost / employee



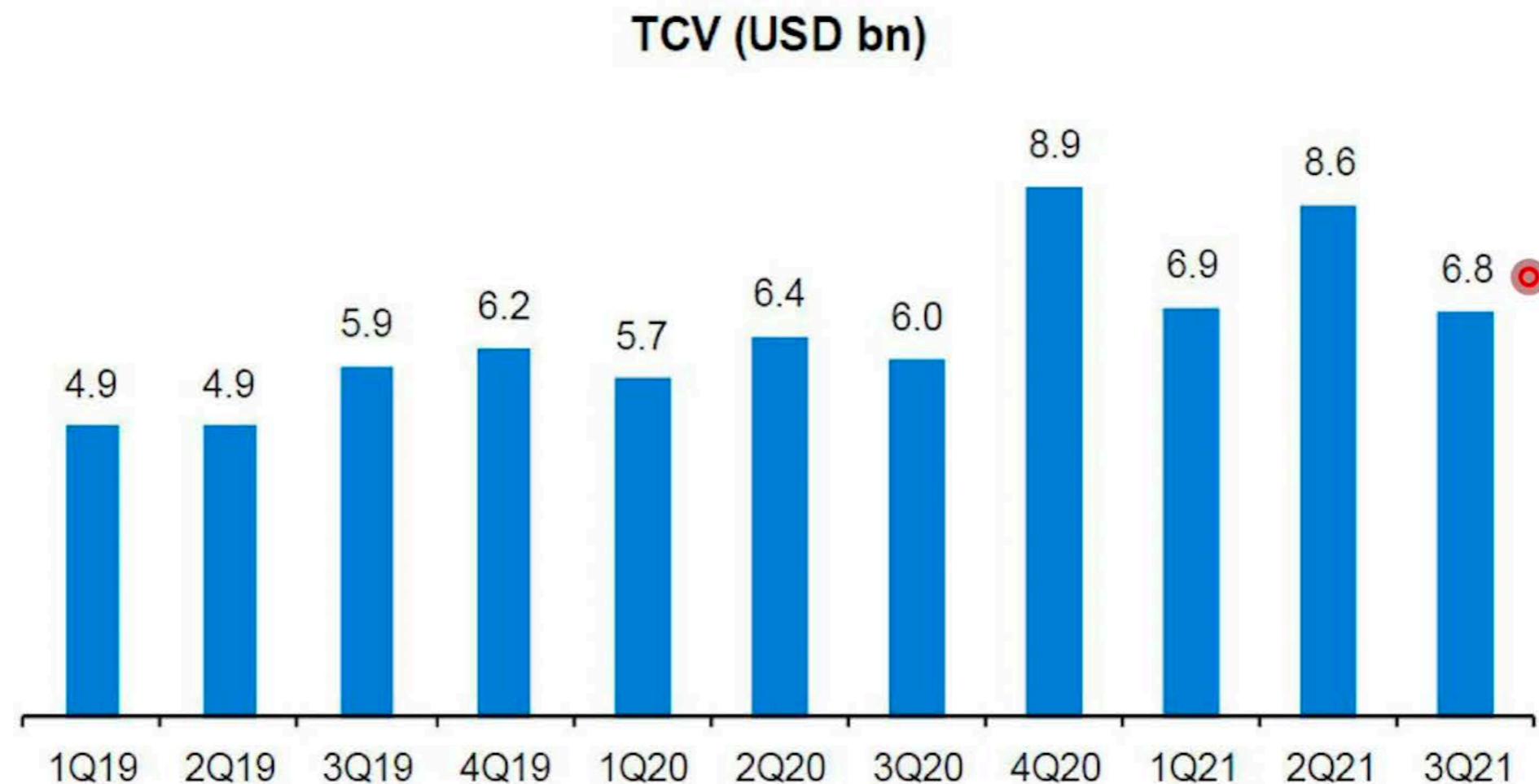
Source: Company, PL

Exhibit 9: Sub-Contracting building new normal level



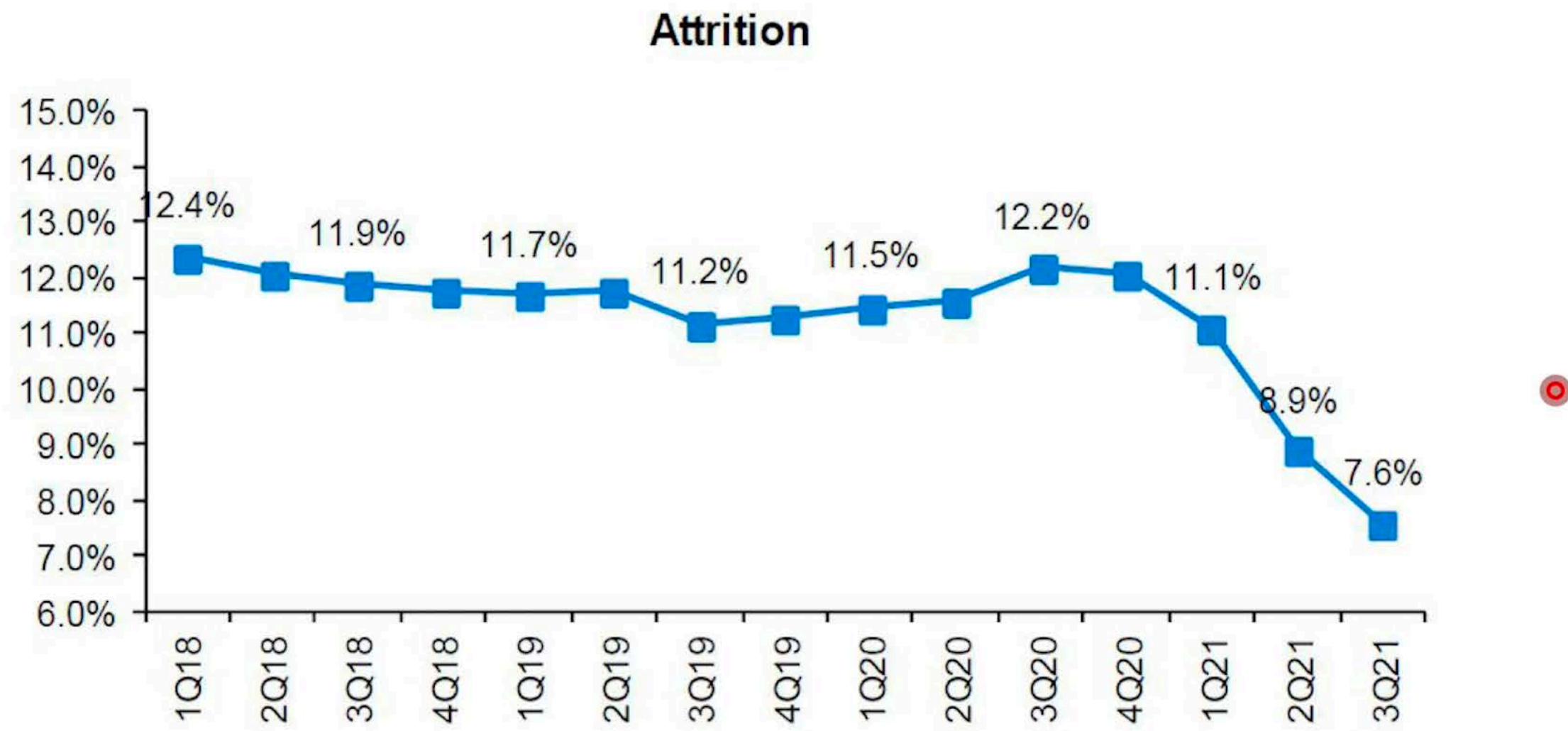
Source: Company, PL

Exhibit 10: TCV Deal Pipeline continues to remain strong



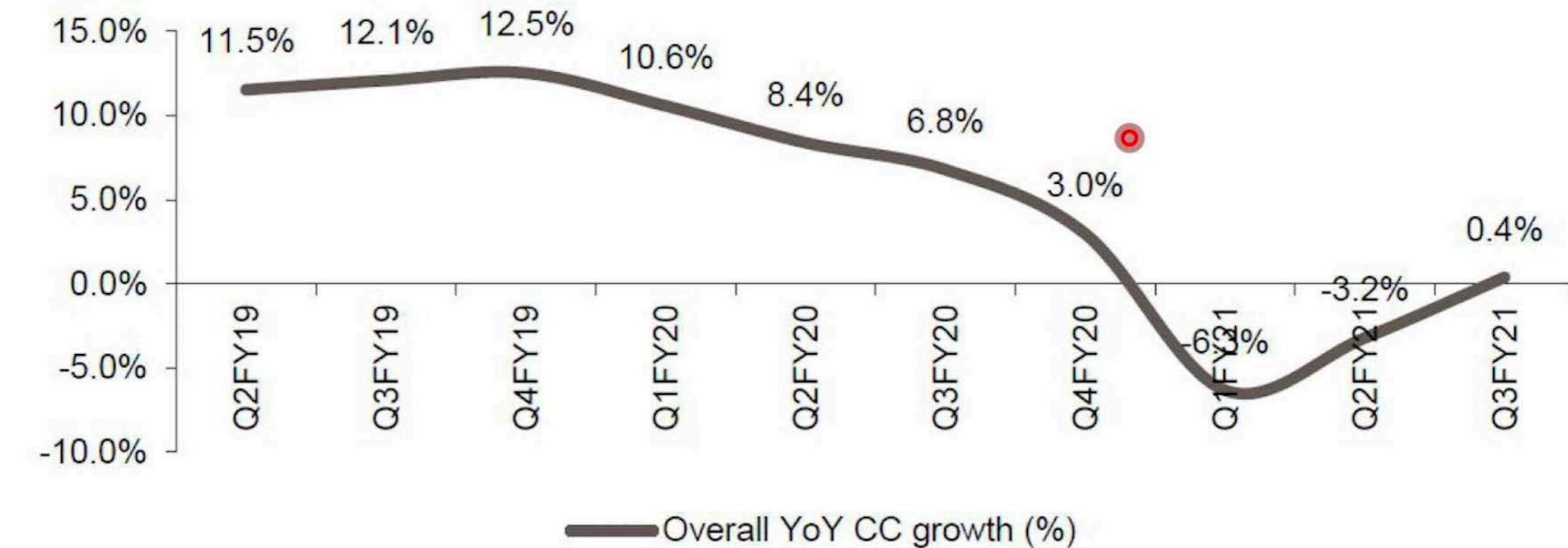
Source: Company, PL

Exhibit 11: Attrition at historical low



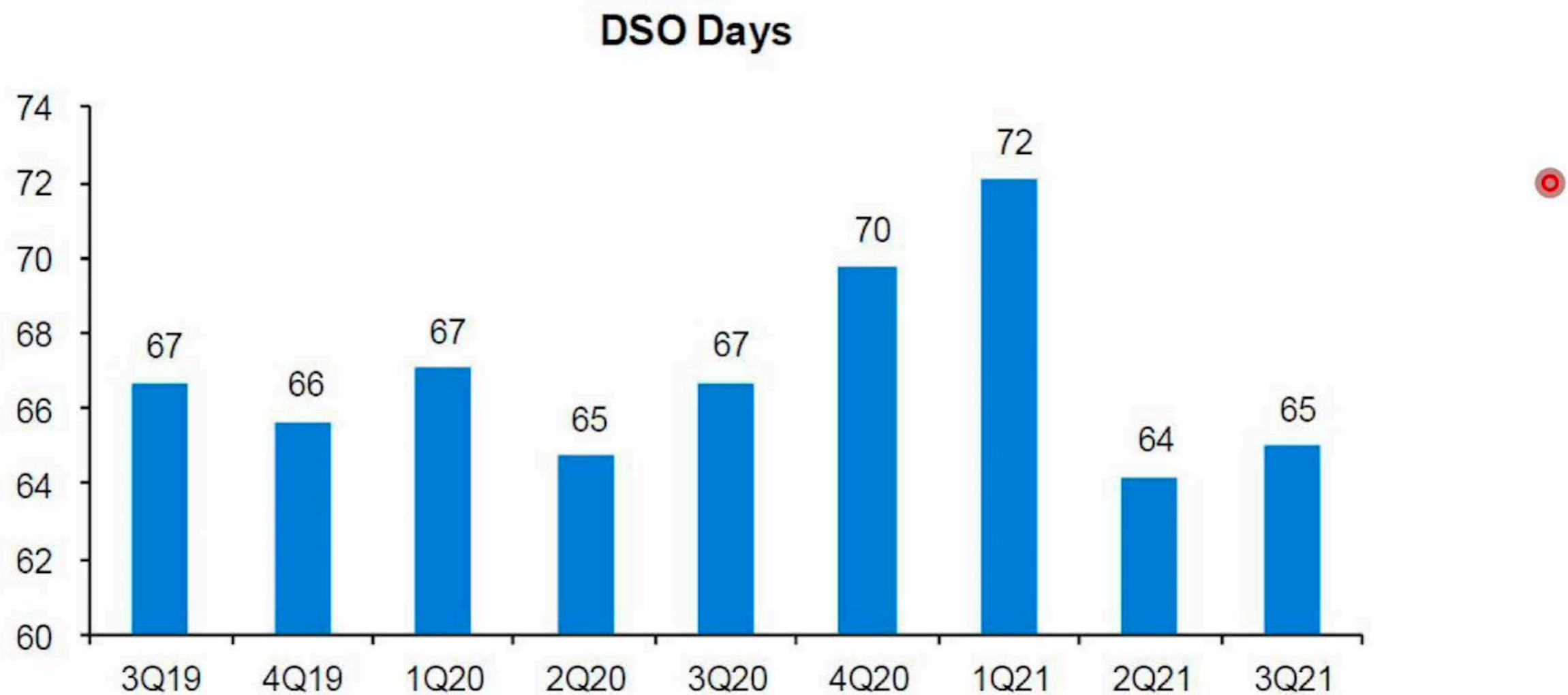
Source: Company, PL

Exhibit 1: Overall YoY CC growth returned to positive territory after two quarters



Source: Company, Emkay Research

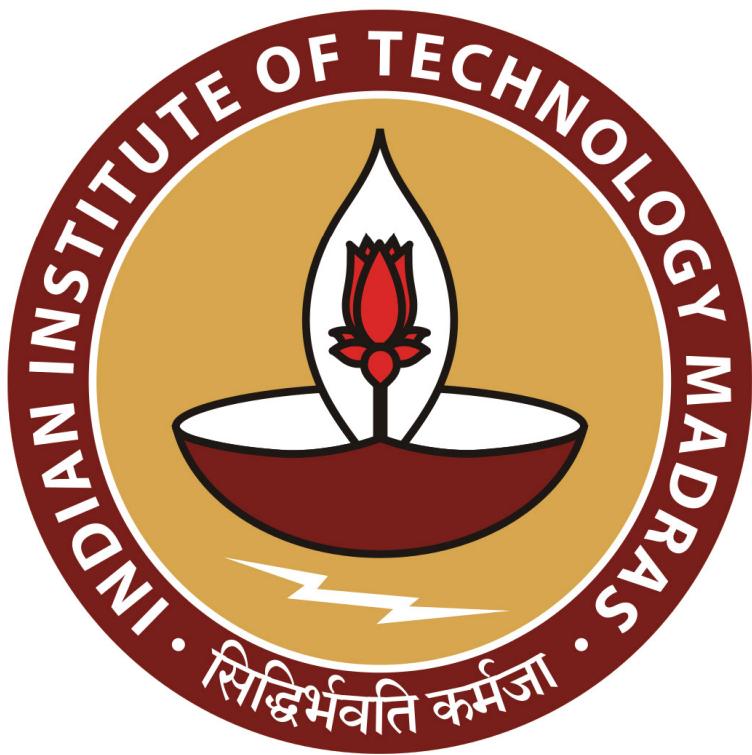
Exhibit 12: DSO days maintained



Source: Company, PL

2019 Global Software Outsourcing Rates

Title of Full Time Employee (FTE)	United States	Latin America	Eastern Europe	Asia
Business Analyst	\$110 - \$205	\$45 - \$55	\$40 - \$63	\$30 - \$42
Architect	\$198 - \$292	\$60 - \$72	\$50 - \$77	\$35 - \$48
Project Manager	\$133 - \$233	\$55 - \$66	\$45 - \$70	\$35 - \$48
Jr. Developer	\$105 - \$111	\$35 - \$44	\$25 - \$42	\$18 - \$24
Mid-level Developer	\$132 - \$140	\$30 - \$52	\$35 - \$56	\$24 - \$35
Lead Developer	\$176 - \$187	\$50 - \$61	\$45 - \$70	\$30 - \$42
Sr. Developer	\$154 - \$163	\$45 - \$55	\$45 - \$70	\$30 - \$42
Junior QA	\$77 - \$81	\$30 - \$39	\$25 - \$42	\$15 - \$24
Mid-level QA	\$99 - \$105	\$35 - \$44	\$30 - \$49	\$20 - \$30
Senior QA	\$143 - \$169	\$40 - \$50	\$40 - \$63	\$25 - \$36
Graphic Designer	\$79 - \$163 	\$40 - \$50	\$35 - \$56	\$25 - \$36

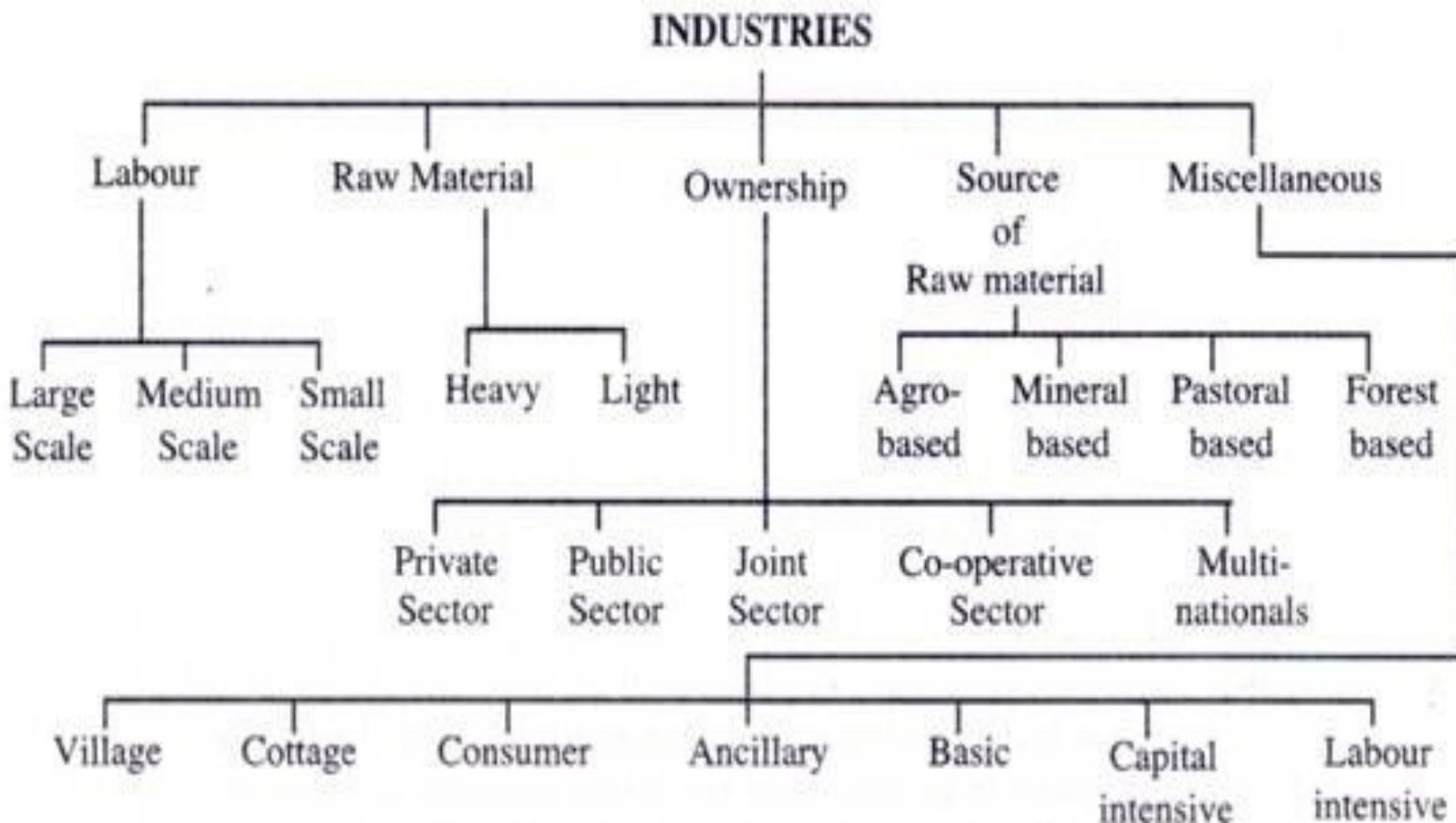


IIT Madras

ONLINE DEGREE

Classification of Industries

Industries can be classified into several groups. The following figure gives an understanding about them.



Large Scale Industry:

- Industries which employ a large number of labourers in each unit are called large-scale industries. Cotton or jute textile industries are large scale industries.

Medium Scale Industries:

- The industries which employ neither very large nor very small number of labourers are put in the category of medium scale industries. Cycle industry, radio and television industries are some examples of medium scale industries.

Small Scale Industries:

- Industries which are owned and run by individuals and which employ a small number of labourers are called small scale industries.

Heavy Industries:

- Industries which use heavy and bulky raw-materials and produce products of the same category are called heavy industries. Iron and steel industry presents a good example of heavy industries.

Light Industries:

- The light industries use light raw-materials and produce light finished products. Electric fans, sewing machines are light industries.

Private Sector Industries:

- Industries owned by individuals or firms such as Bajaj Auto or TISCO are called private sector industries.

Public Sector Industries:

- Industries owned by the state and its agencies like Bharat Heavy Electricals Ltd., or Bhilai Steel Plant or Durgapur Steel Plant are public sector industries.

Joint Sector Industries:

- Industries owned jointly by the private firms and the state or its agencies such as Gujarat Alkalies Ltd., or Oil India Ltd. fall in the group of joint sector industries.

Co-operative Sector Industries:

- Industries owned and run co-operatively by a group of people who are generally producers of raw materials of the given industry such as a sugar mill owned and run by farmers are called co-operative sector industries.

On the basis of source of raw materials, industries are classified as under:

1. Agro Based Industries:

Agro based industries are those industries which obtain raw-material from agriculture. Cotton textile, jute textile, sugar and vegetable oil are representative industries of agro-based group of industries

2. Mineral Based Industries:

The industries that receive raw materials primarily from minerals such as iron and steel, aluminium and cement industries fall in this category.

3. Pastoral-Based Industries:

These industries depend upon animals for their raw material. Hides, skins, bones, horns, shoes, dairy, etc. are some of the pastoral-based industries.

4. Forest Based Industries:

Paper card-board, lac, rayon, resin, tanning of leather, leave- utensils, basket industries are included in this type of industries.

Village Industries:

- Village industries are located in villages and primarily cater to the needs of the rural people. They usually employ local machinery such as oil extraction, grain grinding and agricultural implements.

Cottage Industries:

- Industries which artisans set up in their own houses, work with wood, cane, brass, stone, etc. are called cottage industries. Handloom, khadi and leather work at the artisans house fall in this category.

Consumer Goods Industries:

- Consumer industries convert raw materials or primary products into commodities directly used by the people. Textiles, bakeries, sugar, etc. are some of the consumer goods industries.

Ancillary Industries:

- The industries which manufacture parts and components to be used by big industries for manufacturing heavy articles like trucks, buses, railway engines, tractors, etc. are called ancillary industries.

Basic Industries:

- Industries on which depend many other industries for their manufacturing processes are called basic industries. Iron and steel industry and power generating industry are included in this category.

Capital-Intensive Industries:

- Industries requiring huge investments are called capital-intensive industries. Iron and steel, cement and aluminium are outstanding examples of capital-intensive industries.

Labour-Intensive Industries:

- Industries which require huge labour force for running them are called labour-intensive industries. In these industries, labour is more important than capital. Shoe-making and bidi-manufacturing, etc. are included in these industries.

- In India significant changes in the organisation and structure of the industries necessitated the revision of earlier classification.
- The revised classification called National Industrial Classification (NIC) was completed in 1970 taking into account the principles enunciated in the International Standard Industrial Classification 1968 Rev.2.
- The CSO finalized in 1987 the revision of the NIC 1970.
- At the one digit level there had not been any major changes in the NIC 1987 as compared to the NIC 1970 and the economy remained divided into 9 sections and the special section X “Activities not Adequately Defined”.
- At the two digit level there had been an expansion of 8 divisions bringing it to 72 divisions as against 64 in NIC 1970.

- National Industrial Classification 2008 (NIC-2008) is a revised version of NIC-2004.
- Repair and installation of machinery and equipment has been classified as a separate division (Division-33) in NIC-2008.
- Repair of Personal & Household goods (5260 of NIC-2004) has been removed from section-G (wholesale and retail trade; repair of motor vehicles and motor cycles) and now included in section-S (other service activities).
- Publishing activity which was included in division-22 of manufacturing section in NIC2004 is now included in division-58 (publishing activities) of NIC-2008 under section-J (information and communication).
- Activity ‘water supply’ under division-41 (Electricity, Gas and Water Supply) of NIC2004 is now included in Section-E (water supply; sewerage, waste management and remediation activities).

Section C **Manufacturing**

Division 10	Manufacture of food products
Group 101	Processing and preserving of meat
Group 102	Processing and preserving of fish, crustaceans and molluscs
Group 103	Processing and preserving of fruit and vegetables
Group 104	Manufacture of vegetable and animal oils and fats
Group 105	Manufacture of dairy products
Group 106	Manufacture of grain mill products, starches and starch products
Group 107	Manufacture of other food products
Group 108	Manufacture of prepared animal feeds
Division 11	Manufacture of beverages
Group 110	Manufacture of beverages
Division 12	Manufacture of tobacco products
Group 120	Manufacture of tobacco products
Division 13	Manufacture of textiles
Group 131	Spinning, weaving and finishing of textiles
Group 139	Manufacture of other textiles
Division 14	Manufacture of wearing apparel

- The Annual Survey of Industries (ASI) has been the principal source for most of the basic statistics of the Industrial Sector.
- The frame of factories, which the ASI uses for conducting the survey, is based on the list of factories maintained by the Chief Inspectors of Factories (CIF).
- A large number of units, which are qualified for inclusion in the CIF's list, have not been included and at the same time many defunct units have not been removed.
- Estimates of the growth rates of industrial production based upon the Index of Industrial Production (IIP) are extensively used for policy-making at various levels in the Government and also for decision-making in the banking and Corporate Sectors.
- The importance of IIP is further increased due to the fact that it is the only indicator generated every month and disseminated on a wide scale.

2 Digit	20-21	22	23	24	25	26	27	28	29	30	31	32	33	34	35-36	37	38	Minin	Manufacturi	Electricit	Genera
Weight	90.83	23.82	55.18	22.58	5.90	25.37	27.01	26.52	11.39	140.02	57.28	43.97	74.53	28.10	95.65	39.84	25.59	104.73	793.58	101.69	1000.00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Apr'94	106.6	103.2	98.0	113.7	95.7	93.5	98.9	102.7	86.9	100.2	98.3	111.2	105.8	114.9	89.3	93.3	95.1	92.7	100.5	102.5	99.9
May'94	100.3	107.2	97.4	110.5	77.0	93.0	103.9	102.8	85.5	98.3	104.6	103.5	110.1	100.6	97.7	101.7	104.6	97.9	101.1	107.1	101.4
Jun'94	98.6	106.9	95.7	109.1	75.5	91.2	94.5	105.9	88.9	107.8	108.4	103.5	105.7	88.2	103.9	104.7	101.5	97.3	102.4	100.2	101.6
Jul'94	107.2	103.8	100.3	119.8	85.2	101.4	88.0	106.0	84.0	102.1	113.1	104.0	107.1	85.2	104.6	109.2	102.6	102.2	103.8	102.0	103.4
Aug'94	85.2	110.8	97.6	117.5	87.9	98.5	93.2	104.0	82.1	105.1	114.6	104.1	111.7	93.5	106.9	109.1	118.5	104.9	103.4	105.5	103.8
Sep'94	100.5	98.3	97.8	107.1	89.8	98.7	92.1	103.3	82.2	102.3	111.2	97.7	109.6	118.9	107.5	107.5	97.4	104.5	103.4	104.7	103.6
Oct'94	90.6	87.8	98.3	104.0	96.6	99.9	95.7	104.5	85.0	108.7	110.1	103.3	113.3	87.0	111.3	108.3	99.8	112.6	103.3	109.8	104.9
Nov'94	127.7	102.9	96.2	107.5	106.2	97.6	90.9	113.3	91.9	109.4	102.2	102.1	114.8	100.3	120.0	104.4	108.2	113.5	109.4	107.1	109.6
Dec'94	161.4	98.5	105.4	121.5	110.7	107.7	103.4	106.7	94.0	102.5	109.5	110.4	118.9	124.8	126.9	120.2	116.3	121.9	117.7	117.8	118.2
Jan'95	159.2	107.7	100.1	125.2	106.9	99.5	132.0	119.9	92.3	112.2	107.3	111.9	123.6	112.6	132.0	122.4	120.2	122.2	121.0	115.6	120.6
Feb'95	156.4	103.4	98.5	114.2	101.8	97.8	100.9	111.4	95.7	105.0	106.6	115.6	114.0	100.3	132.4	115.6	114.3	115.8	115.8	109.9	115.2
Mar'95	165.2	105.0	103.5	123.9	108.2	103.2	98.3	122.2	70.1	110.0	106.4	132.2	123.0	140.6	157.5	158.7	123.9	132.6	127.2	119.6	127.0

INDEX OF INDUSTRIAL PRODUCTION

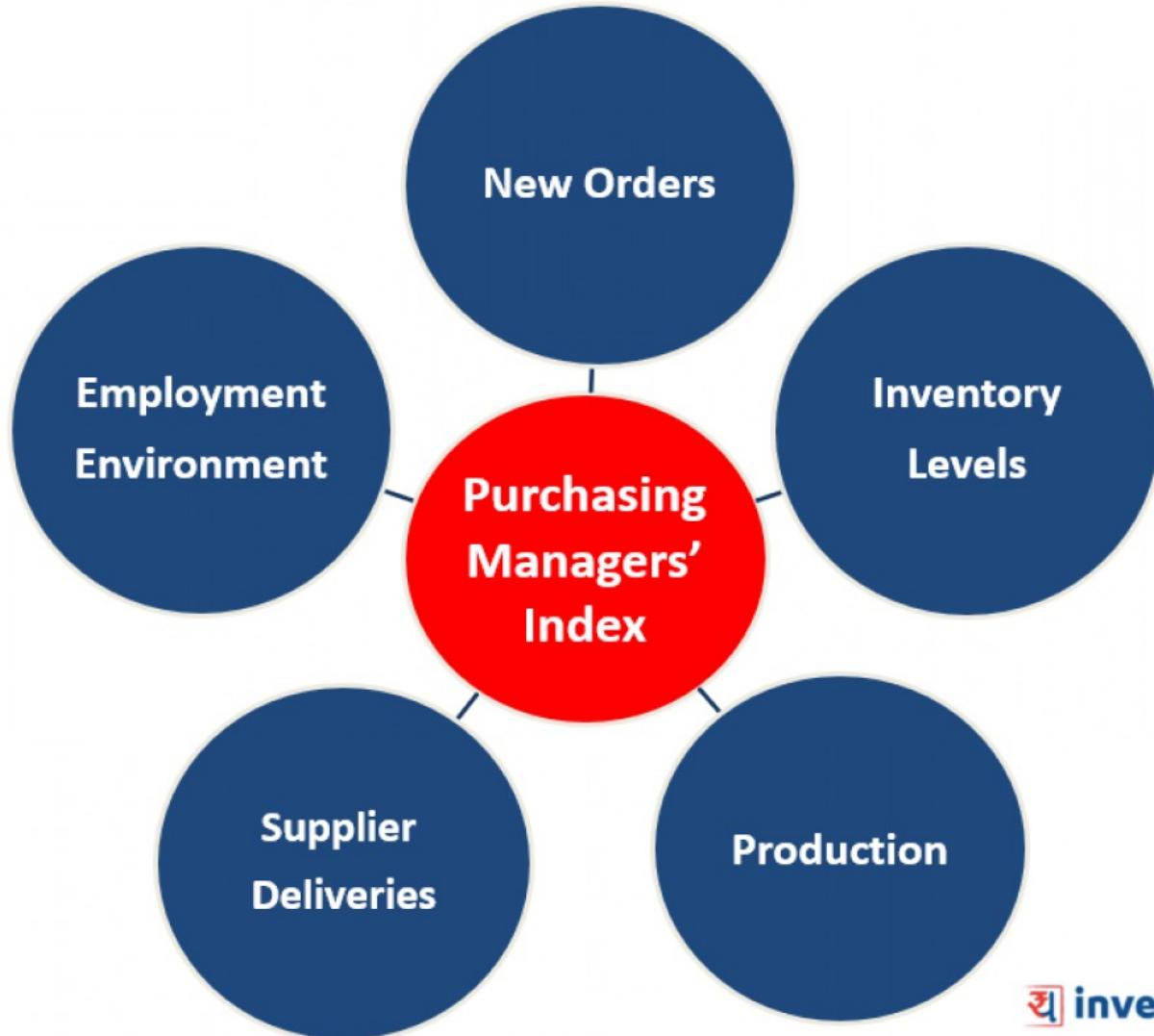
(Base : 2004-05=100)

Use-based indices

Period	Basic	Capital	Intermediate	Consumer goods			General
	goods	goods	goods	Total	Durables	Non-durables	Index
Weight	456.82	88.25	156.86	298.08	84.60	213.47	1000
Apr'05	100.3	85.3	97.9	101.9	107.2	99.8	99.1
May'05	103.5	99.6	102.5	103.8	119.4	97.7	103.1
Jun'05	101.5	105.8	102.6	108.0	115.0	105.2	104.0
Jul'05	100.6	106.6	106.8	101.7	111.7	97.8	102.4
Aug'05	101.8	113.2	105.8	104.0	117.7	98.6	104.1
Sep'05	99.9	125.1	105.0	104.9	122.0	98.1	104.4
Oct'05	106.8	118.4	104.7	106.2	122.9	99.6	107.3
Nov'05	105.5	111.3	99.6	103.9	105.7	103.2	104.6
Dec'05	112.1	127.7	114.7	122.0	102.7	129.7	116.8
Jan'06	114.2	125.9	113.3	125.6	118.3	128.5	118.5
Feb'06	107.0	128.2	106.9	119.0	117.5	119.6	112.4
Mar'06	120.3	169.6	119.8	127.5	133.8	125.1	126.7

- The Purchasing Managers' Index (PMI) is an index of the prevailing direction of economic trends in the manufacturing and service sectors.
- It consists of a diffusion index that summarizes whether market conditions, as viewed by purchasing managers, are expanding, staying the same, or contracting.
- The purpose of the PMI is to provide information about current and future business conditions to company decision makers, analysts, and investors.
- Investors can also use the PMI to their advantage because it is a leading indicator of economic conditions.
- The direction of the trend in the PMI tends to precede changes in the trend in major estimates of economic activity and output, such as the GDP, Industrial Production, and Employment.
- Paying attention to the value and movements in the PMI can yield profitable foresight into developing trends in the overall economy.

5 Key Indicators Under Purchasing Managers' Index (PMI)



Industry Concentration

How can you tell what market structure
an industry has ?

(In other words, how do you know if a business is a monopolist,
perfectly competitive, or something in between?)

Measuring an industry's concentration

1. Concentration ratio
2. Herfindahl Index



There are two ways to measure an industry's concentration. Interpreting that will allow you to see what market structure an industry is in!

1. Concentration ratio

The concentration measures an industry's concentration by examining the share of output controlled by the largest four firms in that industry

- This could be measured in terms of sales, value added, or other metric
- Data are published every 5 years by the Census Bureau in the *Economic Census in the US*

Hypothetical Examples: Concentration Ratios

The Dog Food Industry

Firm	Sales in 2006	Percent of Output as Measured by Sales	Cumulative Percentage
Joe's Dog Food	\$1,000,000,000	34.0%	34.0%
Jim's Kibbles	\$750,000,000	25.5%	59.5%
Sue's Biscuit House	\$650,000,000	22.1%	81.6%
IHOD (Internation House of Dogfood)	\$320,000,000	10.9%	92.5%
All Other Firms	\$220,000,000	7.5%	na
Total	\$2,940,000,000	100.0%	na

For this industry, the Concentration Ratio would be 92.5%.
Production is heavily concentrated in the four largest firms.

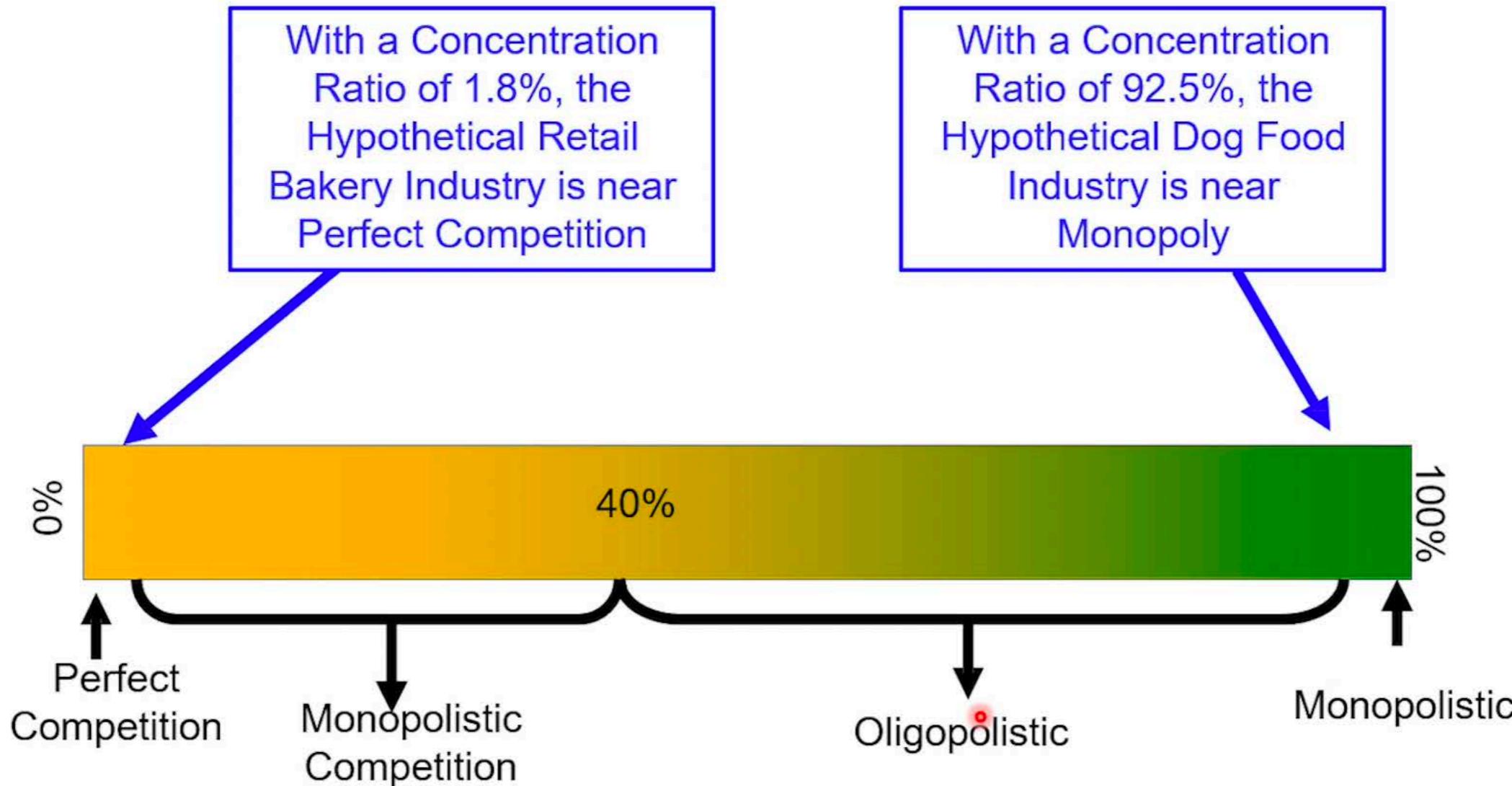
Hypothetical Examples: Concentration Ratios

The Retail Bakery Industry

Firm	Sales in 2006	Percent of Output as Measured by Sales	Cumulative Percentage
Tim's Cakes & Strudels	\$100,000	0.7%	0.7%
Mary's Bakery	\$75,000	0.5%	1.1%
Anna's Muffins	\$65,000	0.4%	1.6%
Flour Power	\$32,000	0.2%	1.8%
All Other Firms	\$15,000,000	98.2%	na
Total	\$15,272,000	100.0%	na

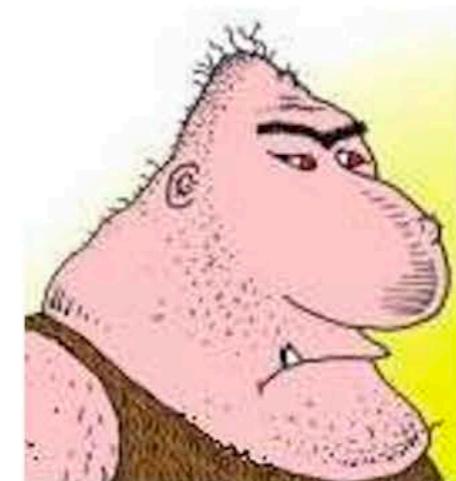
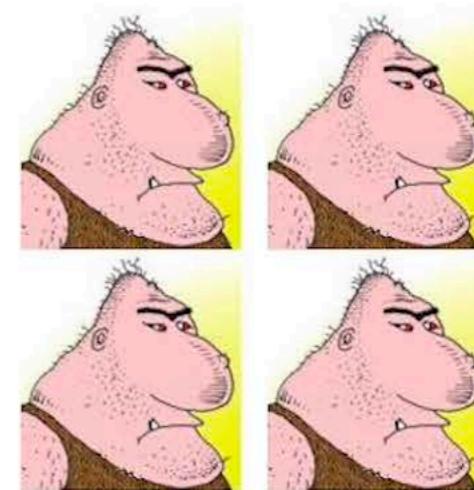
For this industry, the Concentration Ratio would be 1.8%.
Production is **NOT** heavily concentrated in the four largest firms.

Interpreting the Concentration Ratio



There is a problem with the Concentration Ratio

- If four firms share all output, their Concentration Ratio is equal to 100% but they **are not a monopoly**
- But if one firm is the sole producer, its Concentration Ratio is equal to 100% and it **is a monopolist**



The Herfindahl Index solves this problem

The Herfindahl Index is calculated in three steps:

1. Determine the percent of output produced by each of the largest four firms
2. Square each of those share
3. Add all the squared numbers



Hypothetical Example: Herfindahl Index

The Dog Food Industry

Firm	Sales in 2006	Percent of Output as Measured by Sales	Share of Output Squared
Joe's Dog Food	\$1,000,000,000	34.0	1,157
Jim's Kibbles	\$750,000,000	25.5	651
Sue's Biscuit House	\$650,000,000	22.1	489
IHOD (International House of Dogfood)	\$320,000,000	10.9 •	118
All Other Firms	\$220,000,000	7.5	na
Total	\$2,940,000,000	100.0	na
Herindahl Index	na	na	2,415

For this industry, the Herfindahl Index is 2,415. We will interpret that figure soon.

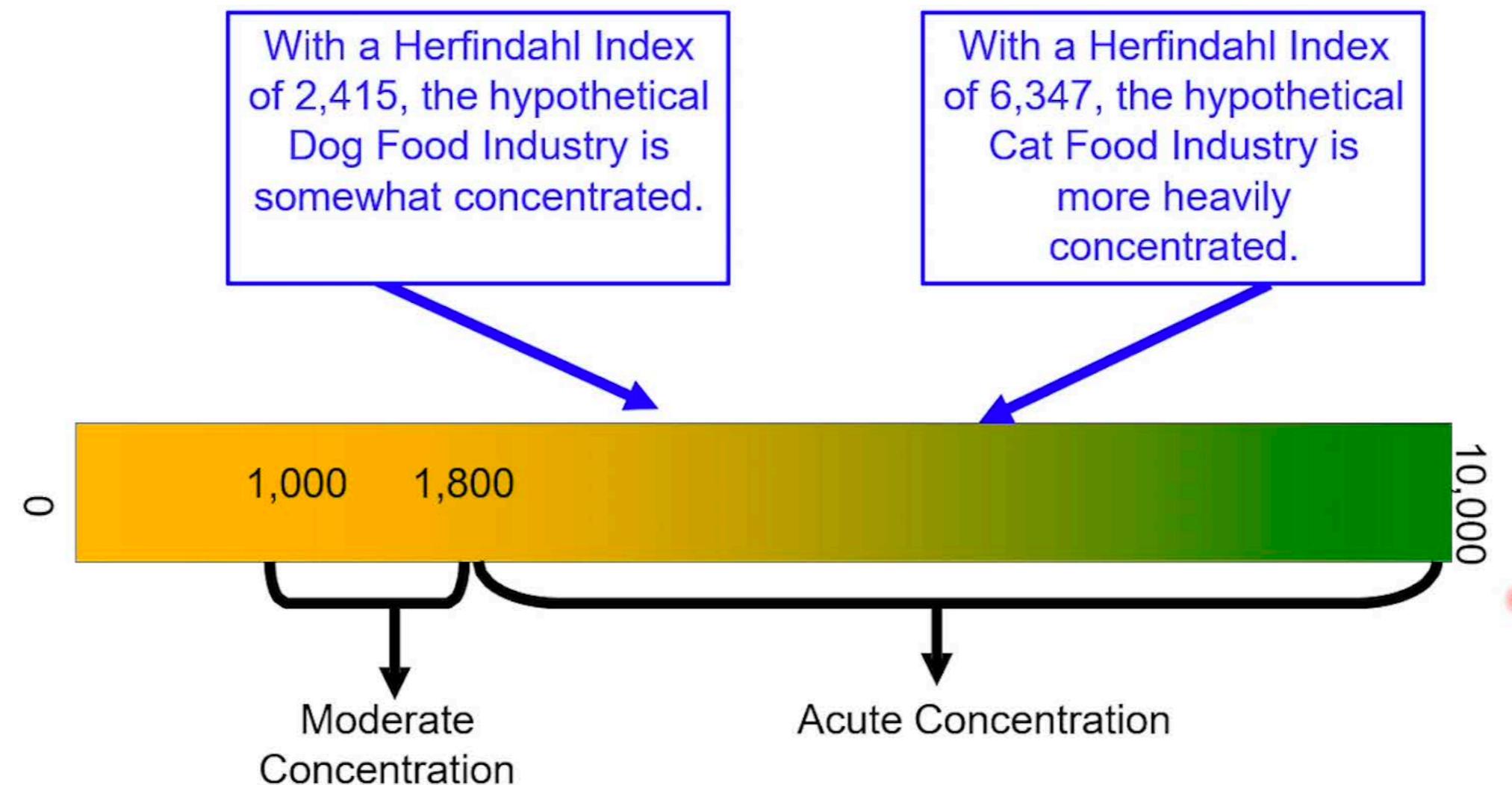
Hypothetical Example: Herfindahl Index

The Cat Food Industry

Firm	Sales in 2006	Percent of Output as Measured by Sales	Share of Output Squared
Joe's Cat Food	\$1,000,000	79.2	6,279
Jim's Cattles	\$75,000	5.9	35
Sue's Meow House	\$65,000	5.2	27
IHOC (Internation House of Catfood)	\$32,000	2.5	6
All Other Firms	\$90,000	7.1	na
Total	\$1,262,000	100.0	na
Herindahl Index	na	na	6,347

For this industry, the Herfindahl Index is 6,347. We will interpret that figure soon.

Interpreting the Concentration Index



Hypothetical Example: Herfindahl Index

The Dog Food Industry

Firm	Sales in 2006	Percent of Output as Measured by Sales	Share of Output Squared
Joe's Dog Food	\$1,000,000,000	34.0	1,157
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IHOD (Internation House of Dogfood)	\$320,000,000	10.9	118
All Other Firms	\$220,000,000	7.5	na
Total	\$2,940,000,000	100.0	na
Herindahl Index	na	na	2,415

The Concentration Ratio would look the same for these two industries, but the Herfindahl Index really shows differences in market concentration

Notice that the top four industries each comprise about 92% of the industry...

But for cat food, the largest is really dominant

The Cat Food Industry

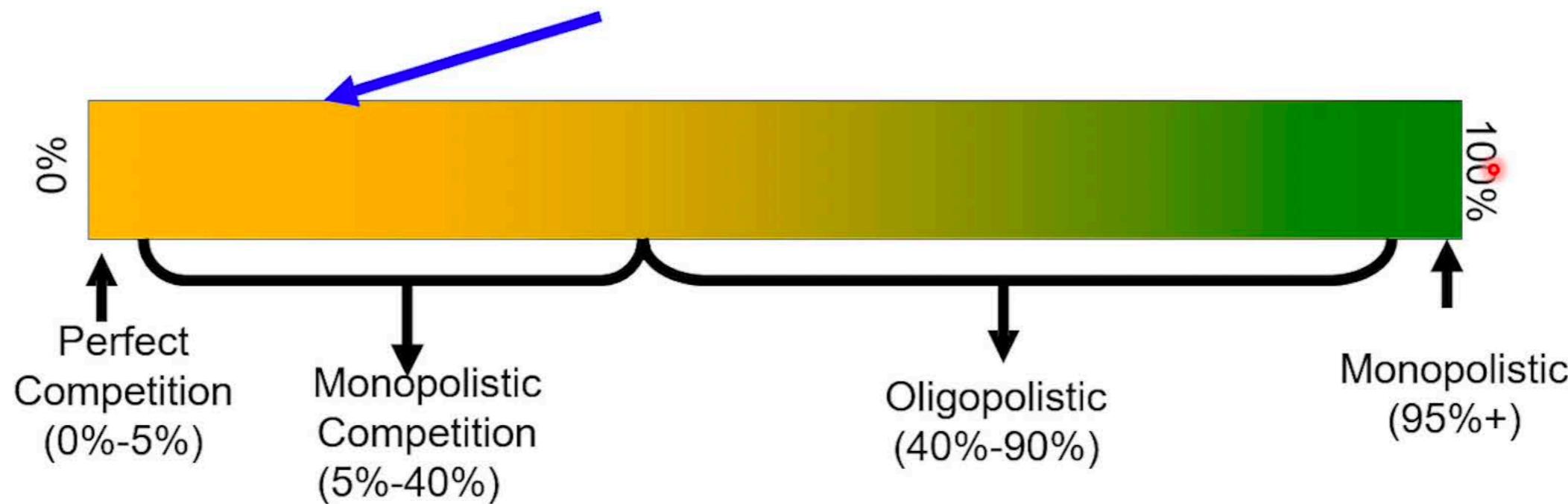
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IHOC (Internation House of Catfood)	\$32,000	2.5	6
All Other Firms	\$90,000	7.1	na
Total	\$1,262,000	100.0	na
Herindahl Index	na	na	6,347

Why is this important?

- **For self employed/ entrepreneurs:**
 - It is a good idea to understand an industry prior to entering competition within that industry
- **For others:**
 - It is a good idea to understand the industry in which you are employed
- The US Anti-Trust Department uses the changes in the Herfindahl Index to decide if a merger between two companies is anti-competitive or not.
 - An increase in Herfindahl Index value by 100 or level of over 1,000 is taken seriously.

Interpret the Concentration Index

Once you have obtained the concentration ratio, use the spectrum below to interpret your business' market structure



Note that these percentages are estimates and subject to interpretation.

Reflect on market's characteristics

Should I advertise a lot? And if so...do I product differentiate?

Do I have pricing power or am I a price taker?

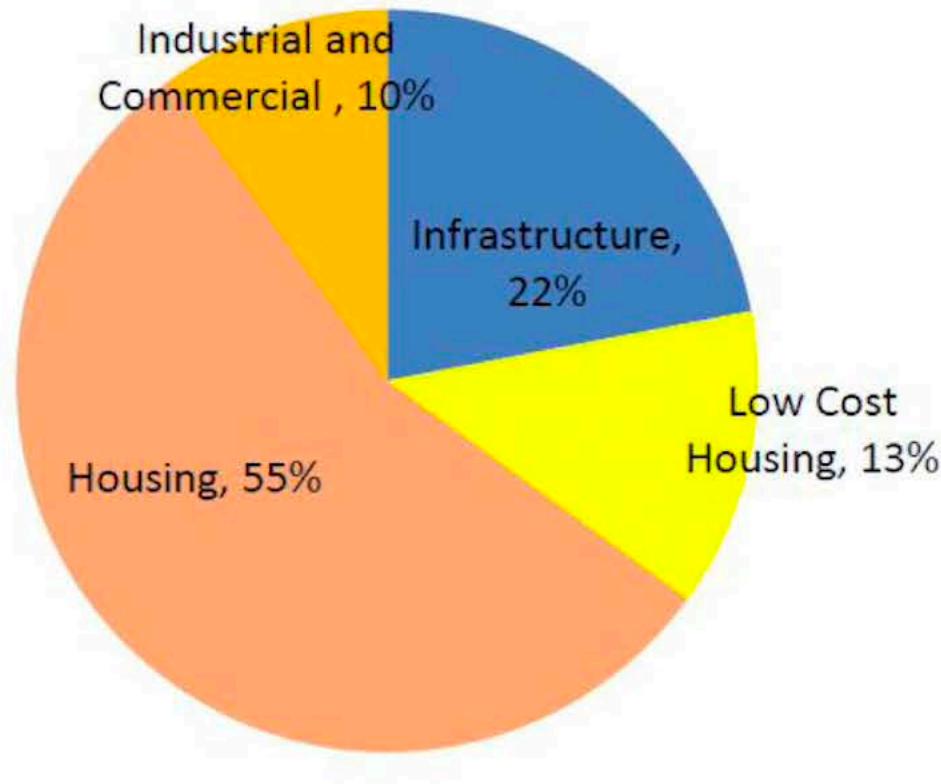
Are my price changes dependent on other firms?

Can I expect tough barriers to entry?

Characteristic	Perfect Competition	Monopolistic Competition	Oligopoly	Pure Monopoly
Number of firms	Many	Large number	Few	One
Relationship with industry	Each firm is an insignificant part of industry	Each firm is a small share of industry	Large firms that dominate the industry	Monopoly is the Industry
Pricing power	None (Firms are price takers)	Limited	Control, with mutual interdependence	Monopolist is a price maker
Product characteristic	Standard or Homogenous	Differentiated (typically by heavy advertising)	Either Homogenous (steel) or Differentiated (Autos)	Product has no substitutes
Barriers to entry	Virtually none	Relatively easy	Relatively hard	Substantial (often insurmountable) barriers to entry
Demand curve	Perfectly Elastic (Horizontal)	Highly Elastic	"Kinked"	Downward sloping

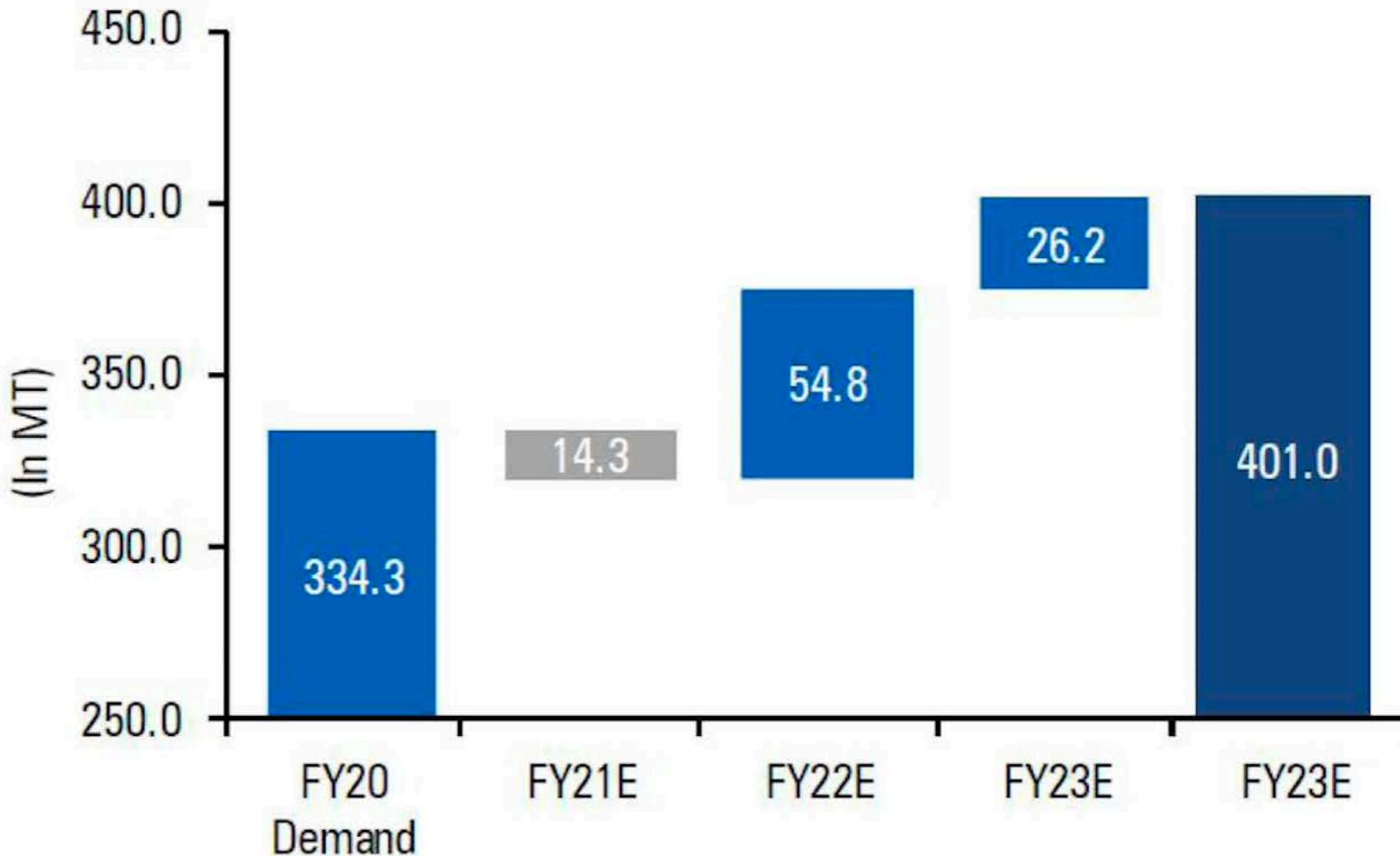
Cement Industry

Key growth drivers for the cement industry



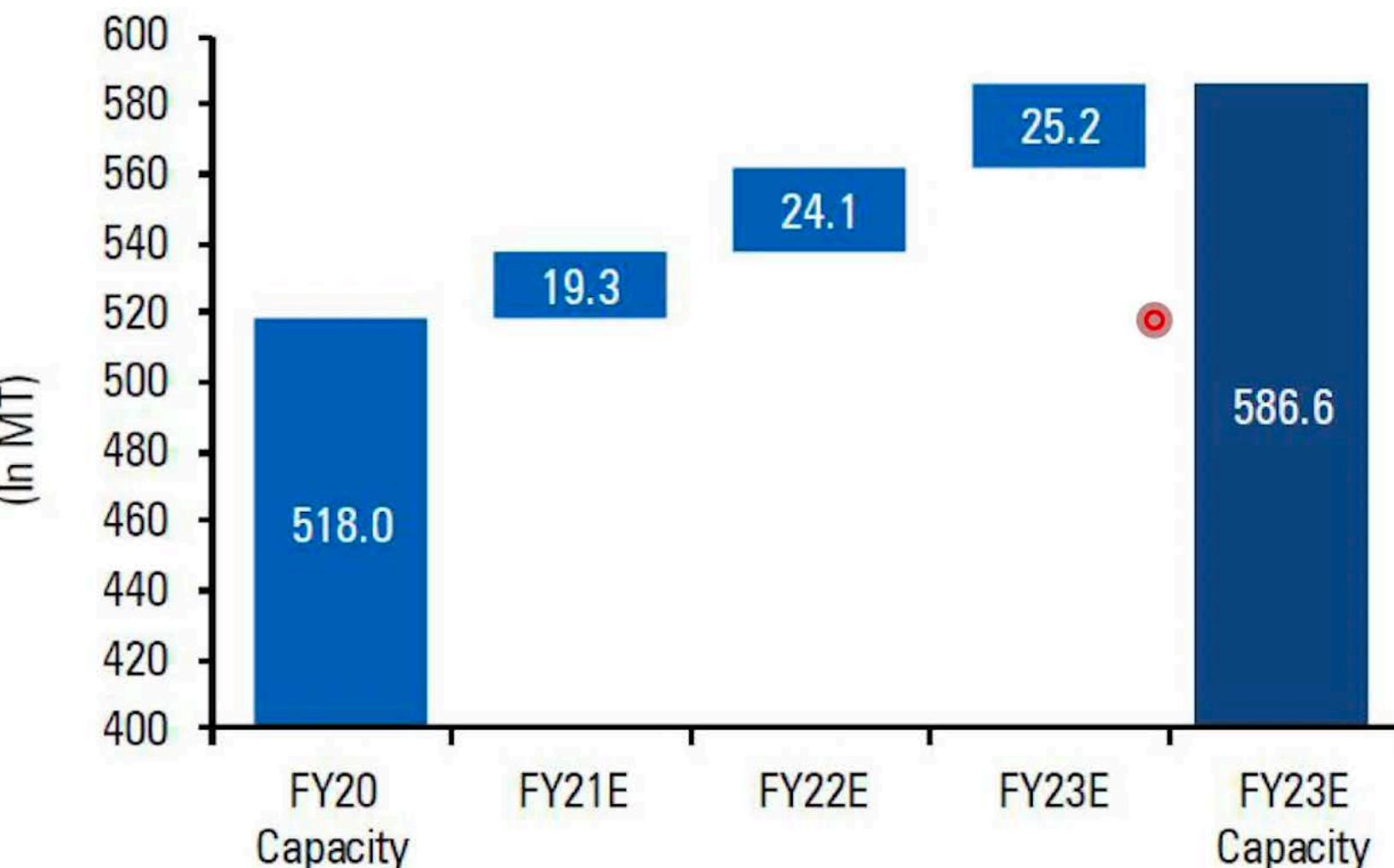
Reference: CARE Ratings, Company Filings

Exhibit 1: Demand to grow at 6.3% CAGR during FY20-23E



Source: Company, ICICI Direct Research

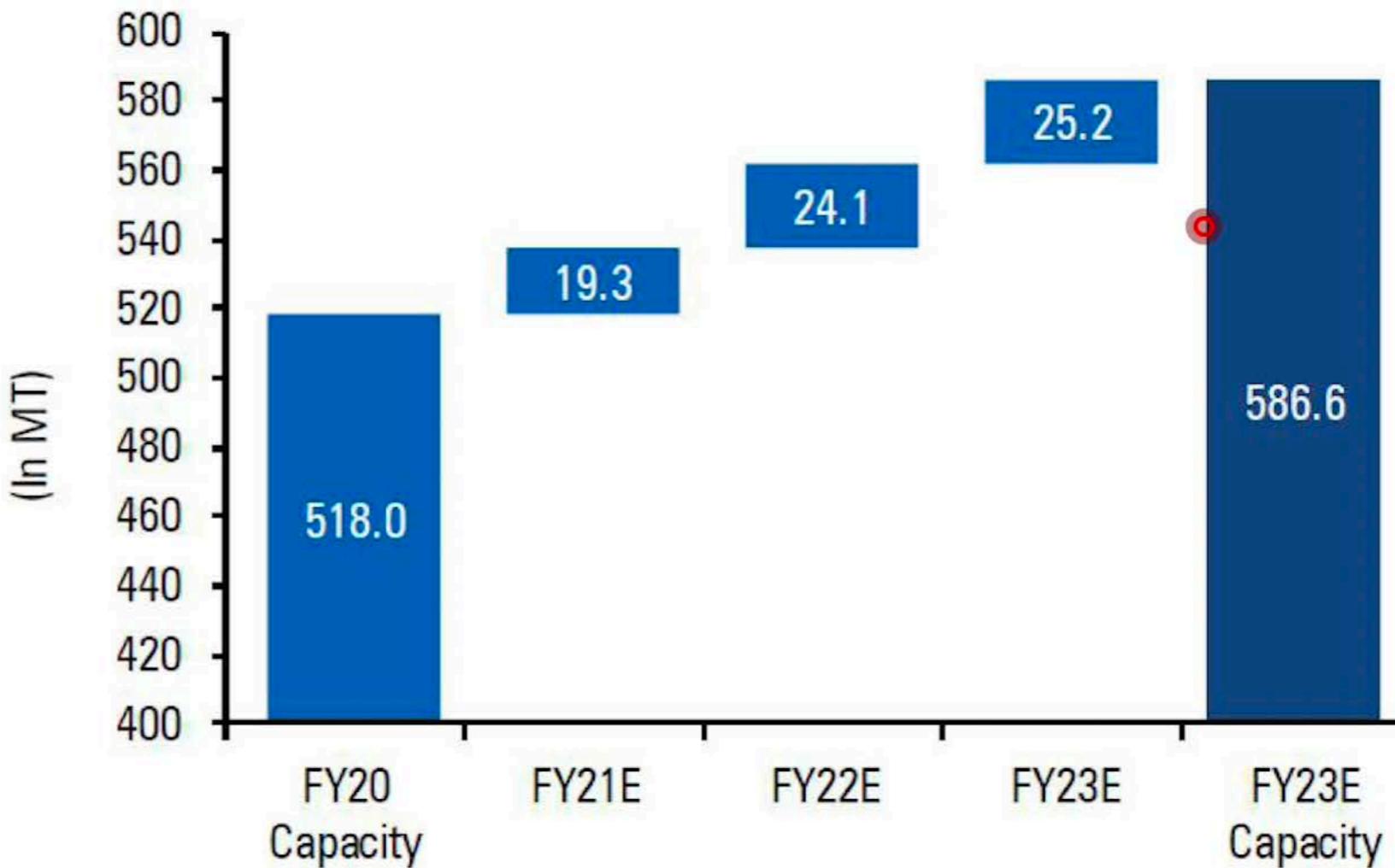
Exhibit 2: Cement capacity to grow at CAGR of 4.2%



Source: Company, ICICI Direct Research

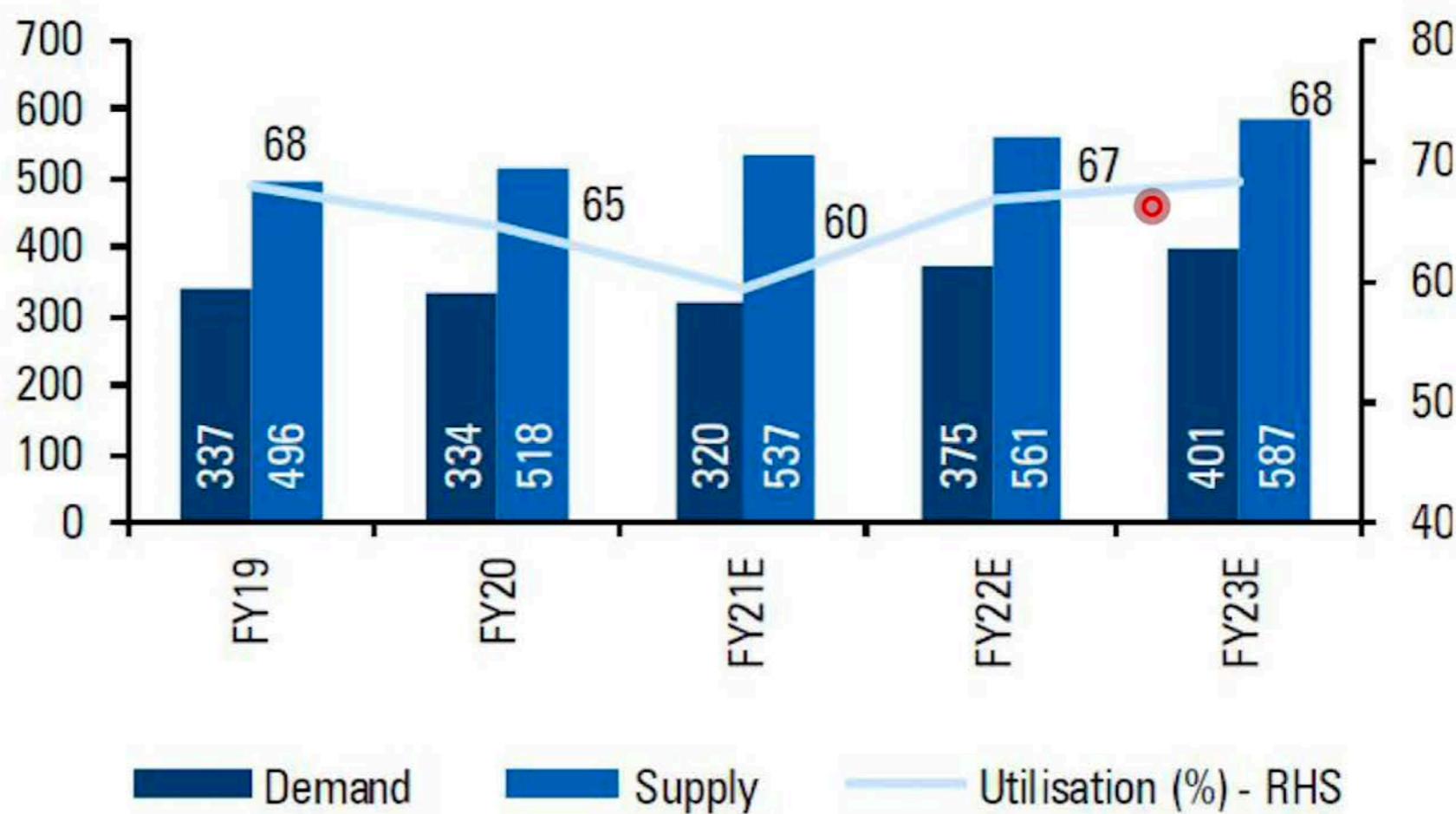
Exhibit 3: All-India utilisation set to improve from FY22E

Exhibit 2: Cement capacity to grow at CAGR of 4.2%



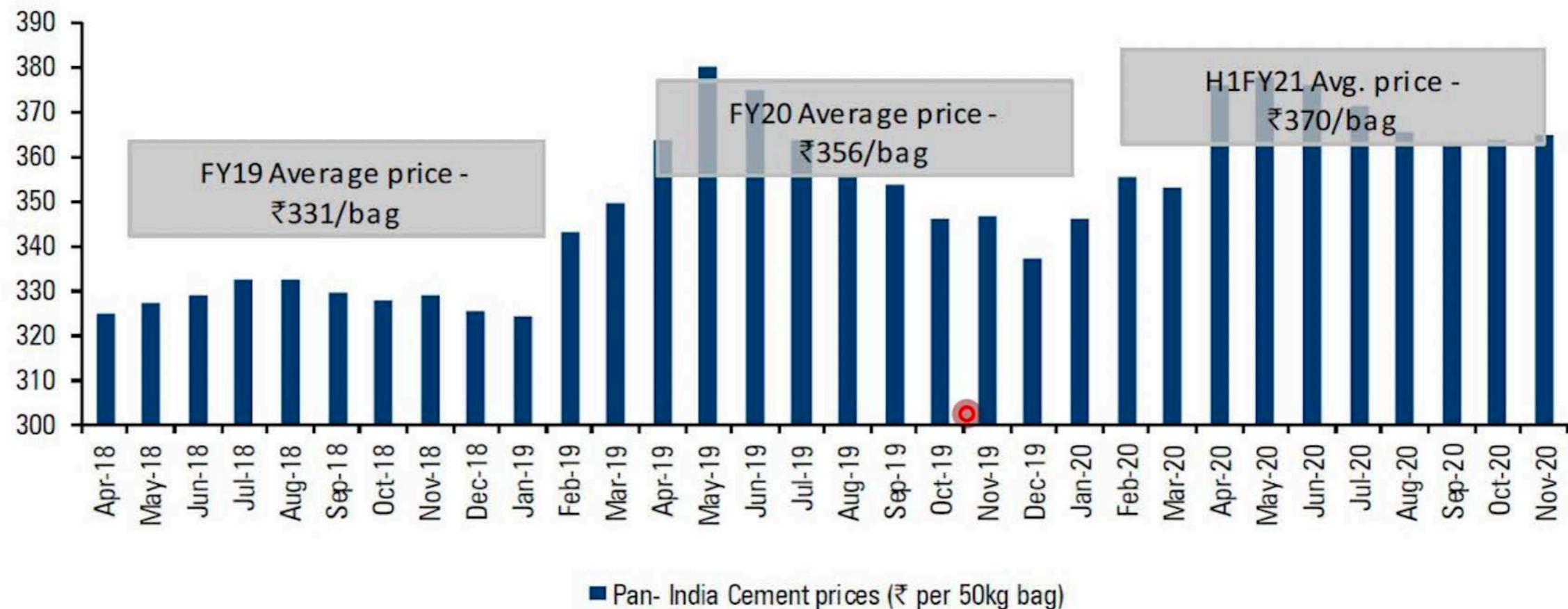
Source: Company, ICICI Direct Research

Exhibit 3: All-India utilisation set to improve from FY22E



Source: Company, ICICI Direct Research

Exhibit 10: Past three years cement price trend across all-India level



Source: Crisil Research, ICICI Direct Research

Exhibit 11: Average cost of production (Coverage universe)

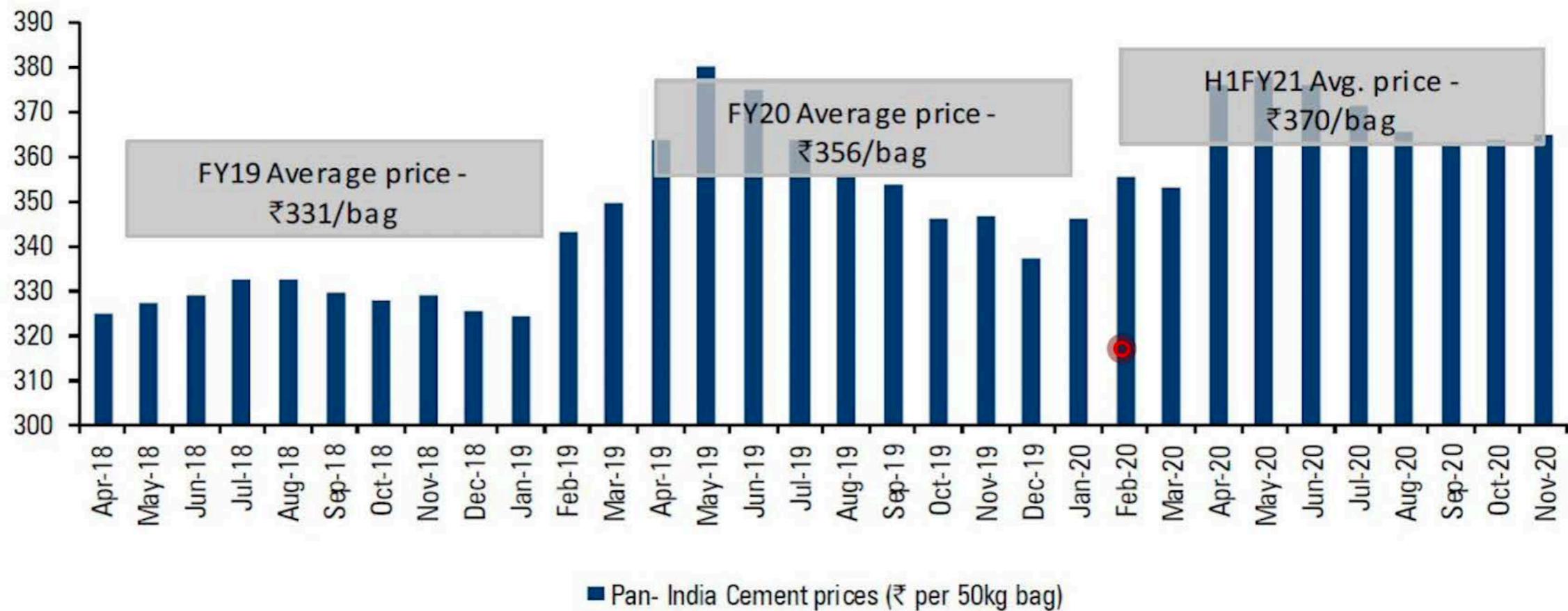
Exhibit 9: East, central region has higher potential to grow followed by north based on per capita consumption

Macro Economic- Potential	North	Central	East*	West	South	India
Rural Population (FY 20E)	67%	75%	77%	53%	54%	67%
PCC (Kg) – FY 20LE	231	173	203	273	263	227
Housing Shortage (FY20E) (Mn) ^	10	8	9	7	12	50
Road Density (kms/ per lac people) #	294	244	307	469	401	358
Power Density (kWh/Capita)	1233	700	800	1758	1461	1181

* Excl. North-East

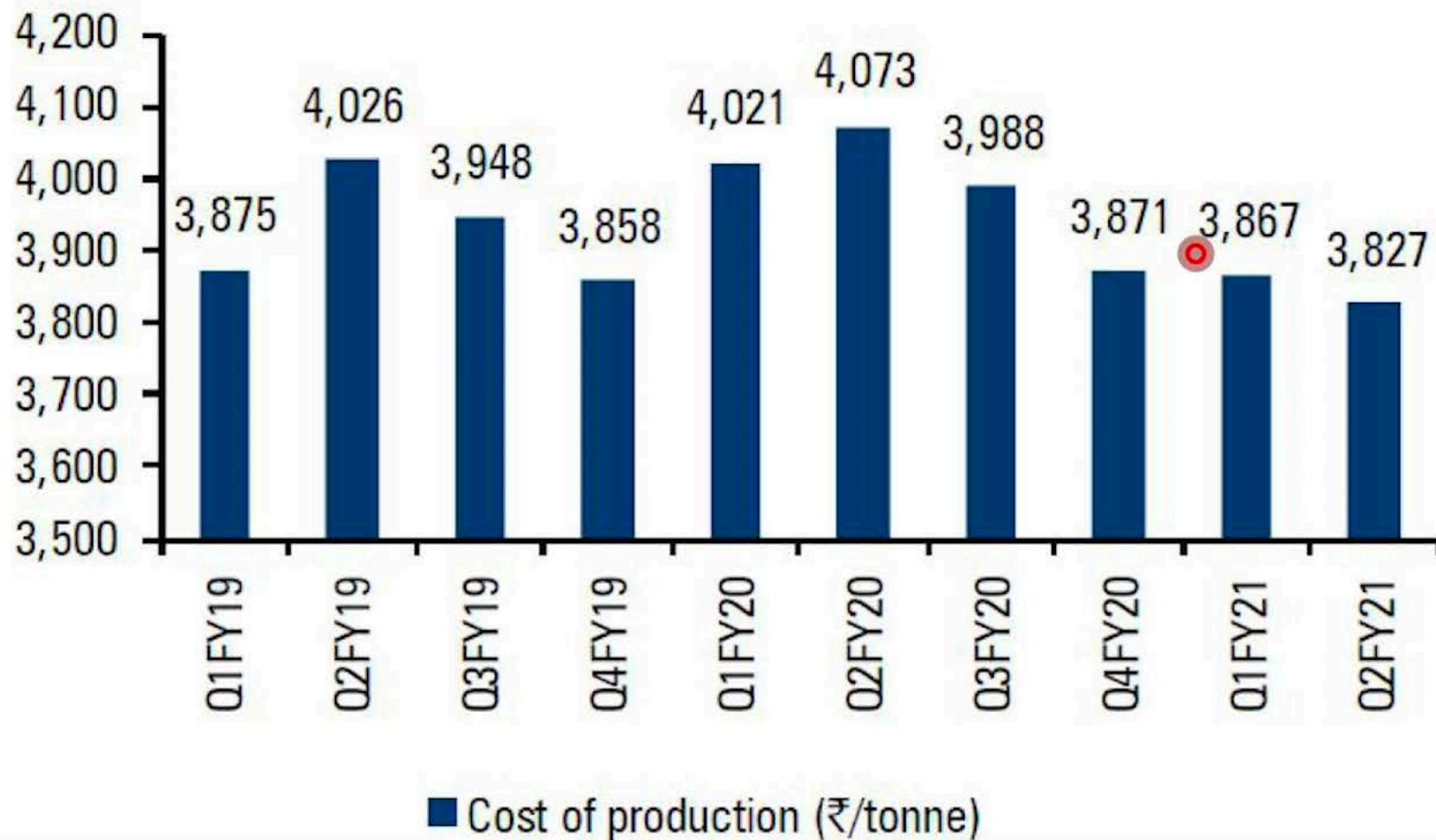
Source: Company presentation, ICICI Direct Research

Exhibit 10: Past three years cement price trend across all-India level



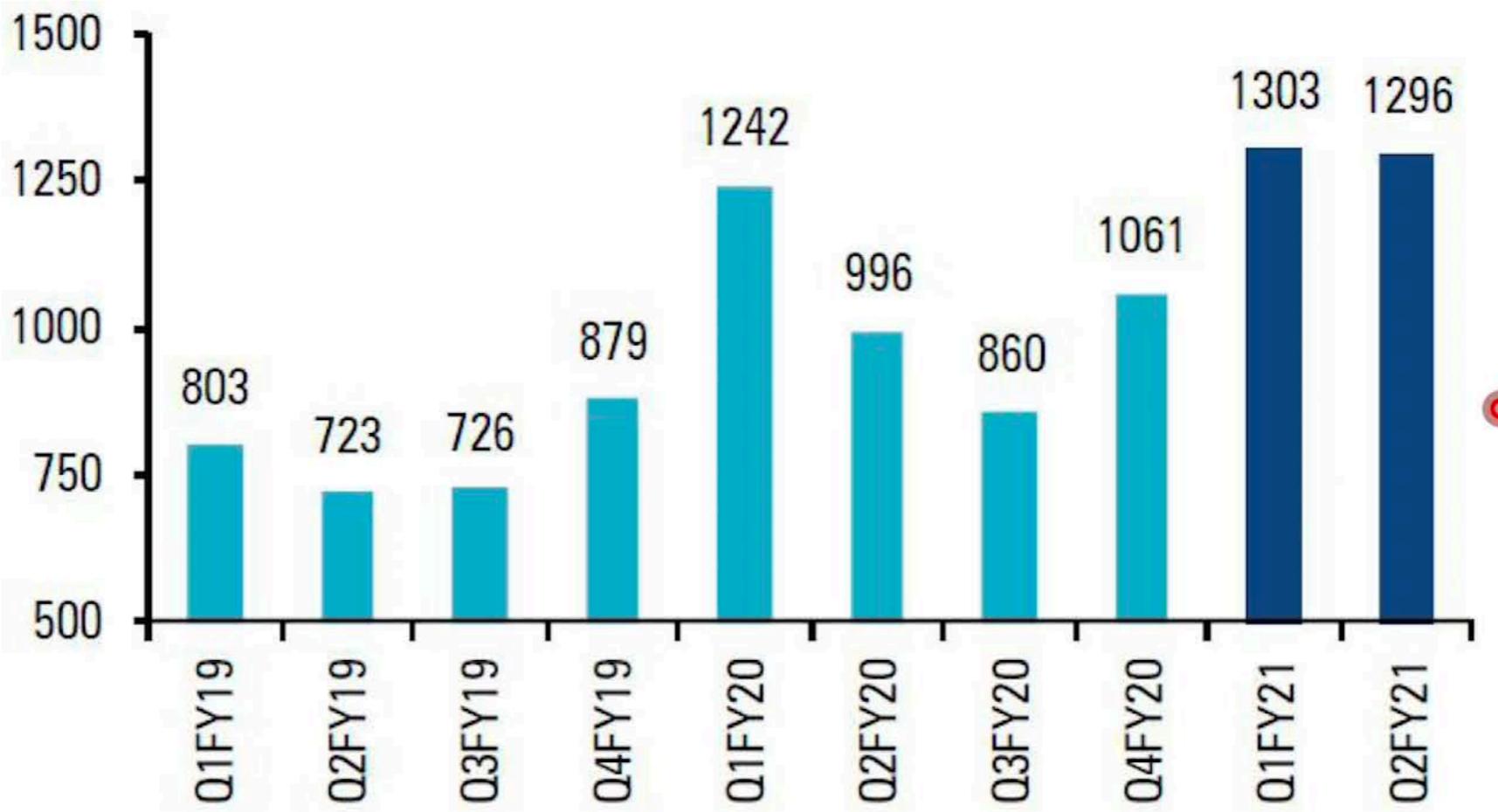
Source: Crisil Research, ICICI Direct Research

Exhibit 11: Average cost of production (Coverage universe)



Source: Company, ICICI Direct Research

Exhibit 12: Average EBITDA/tonne (₹) – (Coverage universe)

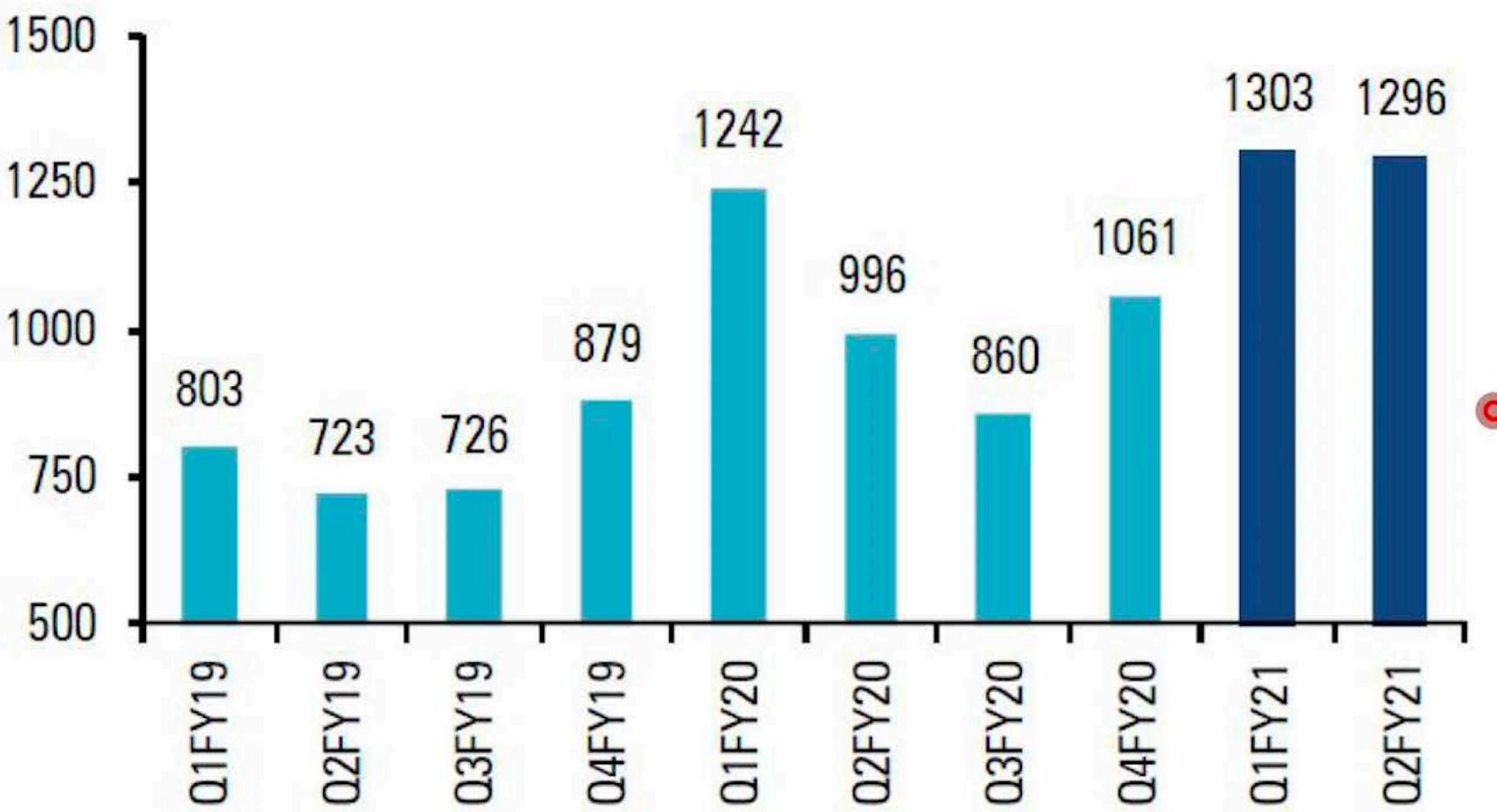


Source: Company, ICICI Direct Research

Exhibit 13: Coverage universe volume CAGR expected at 6.2%

Exhibit 14: More headroom for improvement in capacity utilisation (%)

Exhibit 12: Average EBITDA/tonne (₹) – (Coverage universe)



Source: Company, ICICI Direct Research

Exhibit 13: Coverage universe volume CAGR expected at 6.2%

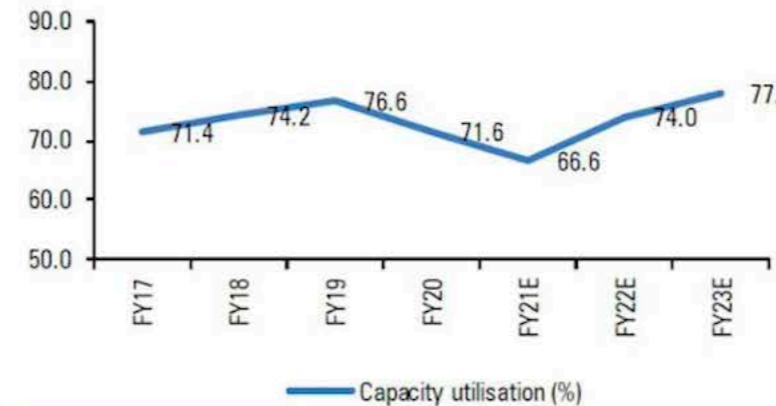
Exhibit 14: More headroom for improvement in capacity utilisation (%)

Exhibit 13: Coverage universe volume CAGR expected at 6.2%



Source: Company, ICICI Direct Research

Exhibit 14: More headroom for improvement in capacity utilisation (%)



Source: Company, ICICI Direct Research

Exhibit 15: Scope for margin expansion limited, going ahead...



Source: Company, ICICI Direct Research

Exhibit 16: ...but volume led growth to push coverage universe RoCE to over 17% by FY23E



Source: Company, ICICI Direct Research

Indian Cement Industry Market Share 2020

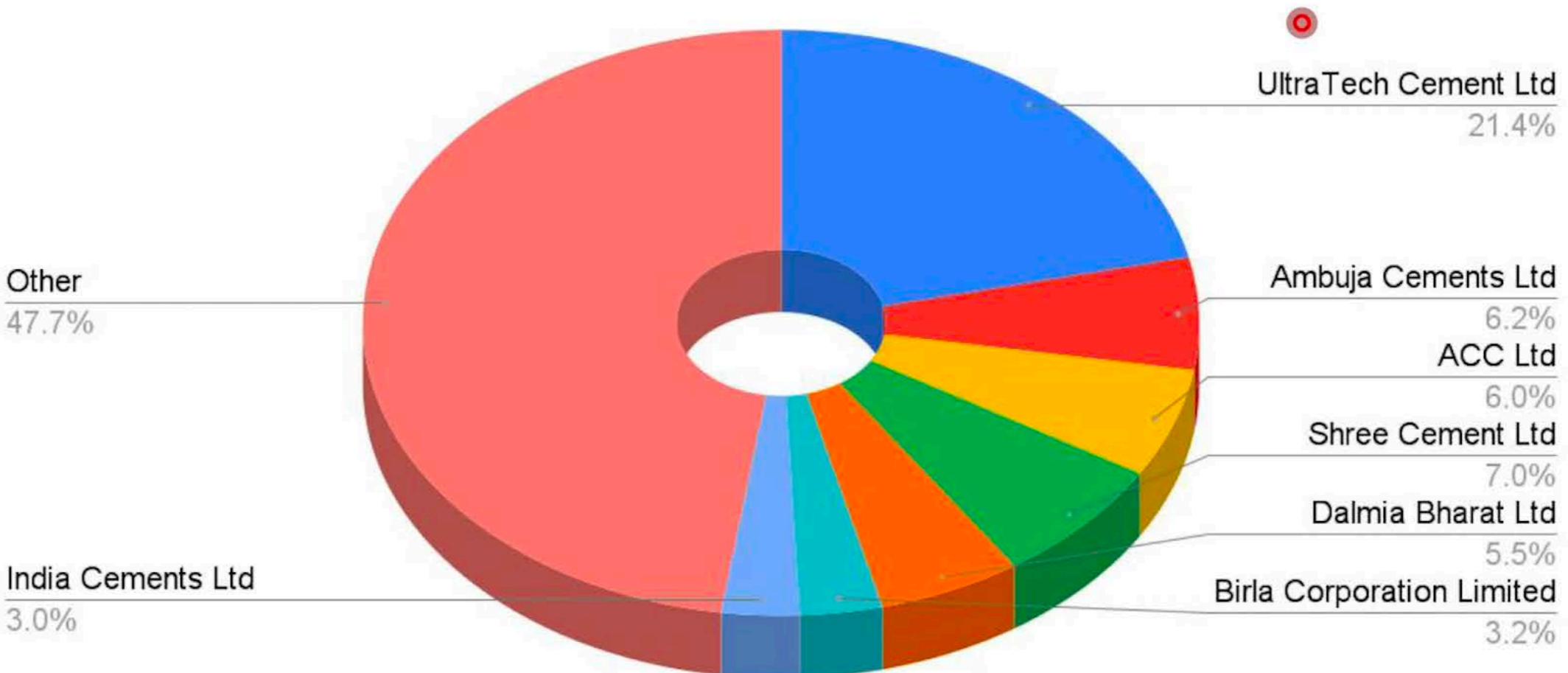


Exhibit 5: New capacity to broadly grow at similar pace during FY20-23E as witnessed in past five years

Exhibit 5: New capacity to broadly grow at similar pace during FY20-23E as witnessed in past five years

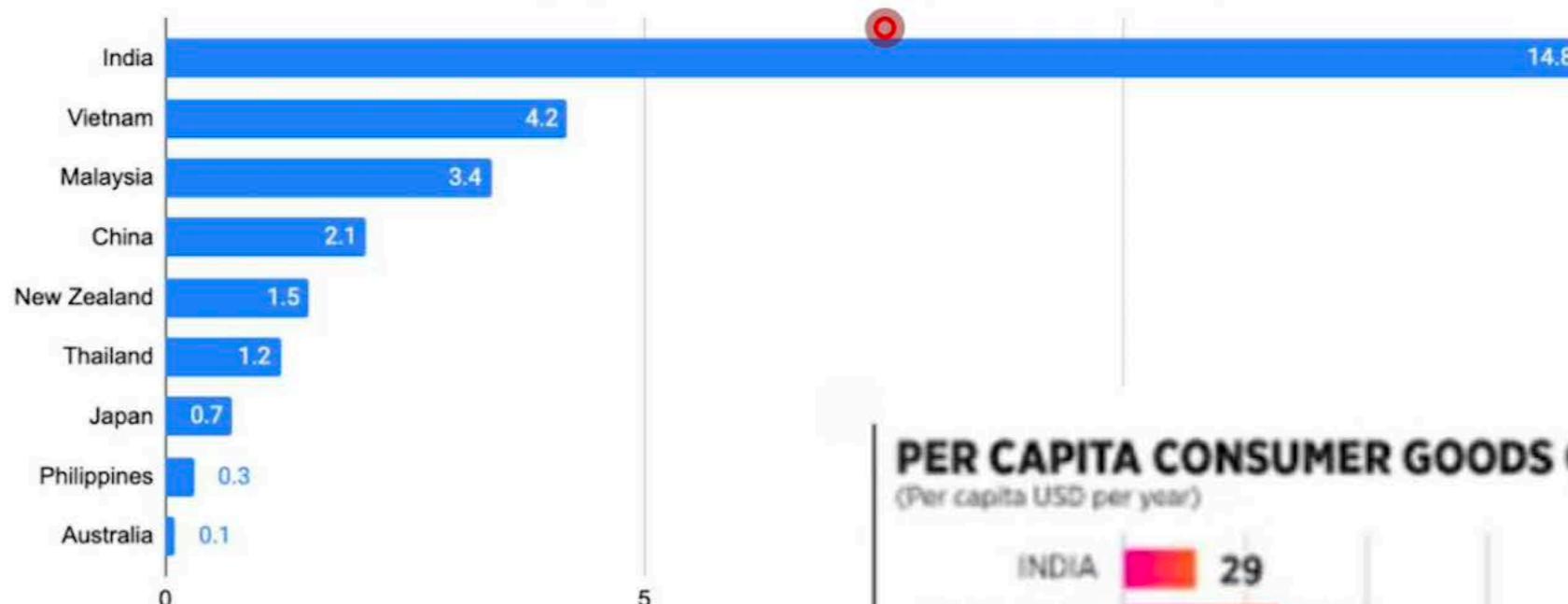
Sr no	Company						CAGR (%)					CAGR (%)	Yearwise additions		
		FY15	FY16	FY17	FY18	FY19		FY20	FY21E	FY22E	FY23E		FY21E	FY22E	FY23E
1	Ultratech	59.3	63.2	66.3	80.6	109.4	16.6	111.4	113.4	118.1	130.9	5.5	2.0	4.7	12.8
2	Shree	22.1	25.6	29.3	34.9	37.9	14.4	40.4	46.4	46.4	46.4	4.7	6.0	0.0	0.0
3	ACC	31.0	31.0	31.0	33.4	33.4	1.9	33.4	33.4	34.5	39.3	5.6	0.0	1.1	4.8
4	Ambuja	28.8	29.7	29.7	29.7	29.7	0.8	29.7	29.7	31.5	31.5	2.0	0.0	1.8	0.0
5	Birla Corp	9.8	9.8	15.4	15.4	15.4	12.0	15.4	15.4	19.3	20.7	10.4	0.0	3.9	1.4
6	Ramco	15.5	16.5	16.5	16.5	16.7	1.8	18.6	19.5	20.5	20.5	3.3	0.9	1.0	0.0
7	India Cements	15.6	15.6	15.6	15.6	15.6	0.0	15.6	15.6	15.6	15.6	0.0	0.0	0.0	0.0
8	JK Cement	10.5	10.5	10.5	10.5	10.5	0.0	14.0	14.7	14.7	14.7	1.6	0.7	0.0	0.0
9	JK Lakshmi	8.2	8.6	10.9	10.9	12.5	11.1	13.3	13.3	13.9	13.9	1.5	0.0	0.6	0.0
10	Sagar	2.7	2.9	4.0	4.3	5.8	20.8	5.8	5.8	8.3	8.3	12.8	0.0	2.5	0.0
11	Orient	8.0	8.0	8.0	8.0	8.0	0.0	8.0	8.0	8.0	8.0	0.0	0.0	0.0	0.0
12	Heidelberg	5.4	5.4	5.4	5.4	5.4	0.0	5.4	6.3	6.3	6.3	5.3	0.9	0.0	0.0
13	Mangalam	3.3	3.3	4.0	4.0	4.0	5.3	4.0	4.0	4.4	4.4	3.2	0.0	0.4	0.0
14	NCL	2.0	2.0	2.0	2.7	2.7	7.8	2.7	2.7	2.7	3.4	8.0	0.0	0.0	0.7
Total		222	232	248	272	307	7.4	318	328	344	364	4.6	10.5	16.0	19.7
Others		195	204	212	202	189	0.5	200	209	217	223	3.6	8.8	8.1	5.5
All India		417	436	460	474	496	4.4	518	537	561	587	4.2	19.3	24.1	25.2

Source: Company, ICICI Direct Research



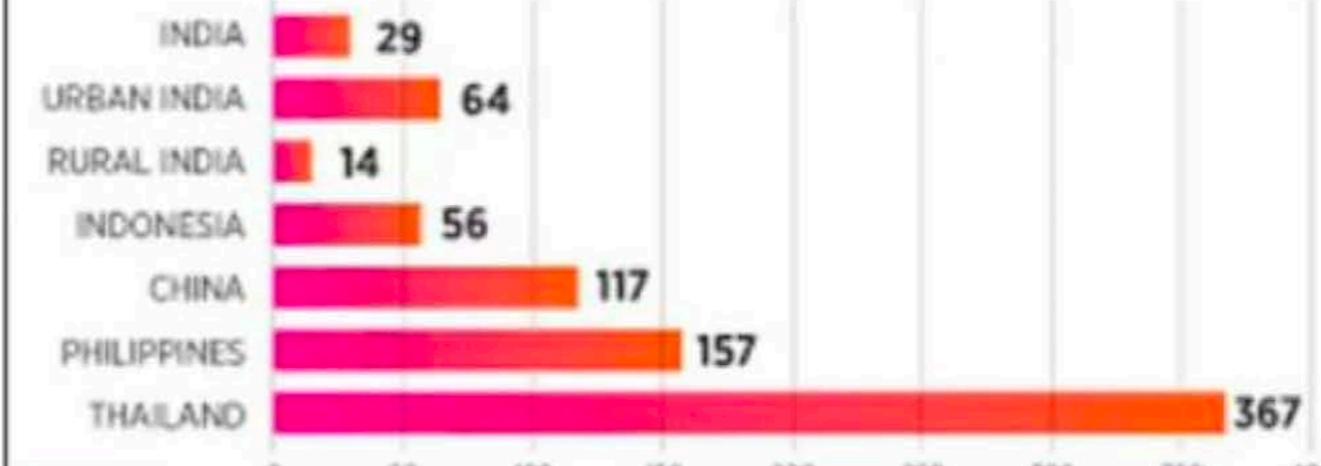
FMCG Industry

Asia-Pacific: FMCG market avg. growth percentage (Q3 & Q4 - 2018)



PER CAPITA CONSUMER GOODS CONSUMPTION

(Per capita USD per year)

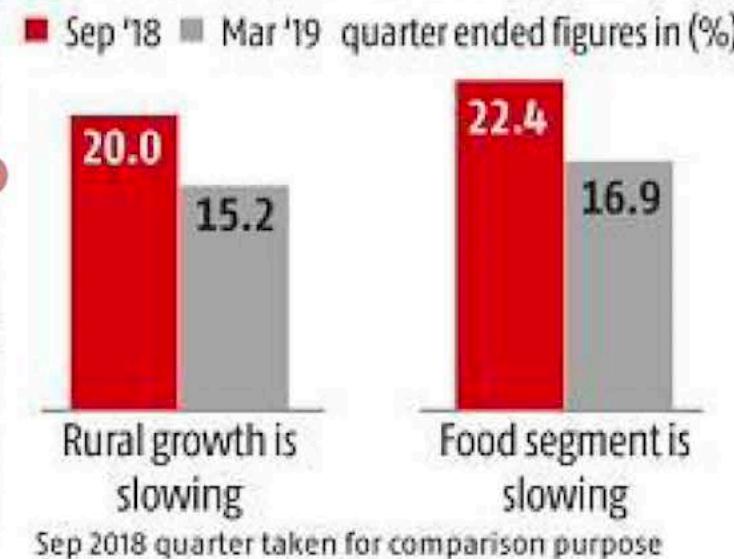


SOURCE: Euromonitor, Nestle Annual Report

FMCG GROWTH TRENDS OVER THE LAST EIGHT QUARTERS



CONTRIBUTORS TO SLOWDOWN



SLOWDOWN TO CONTINUE*

13.0 %
Overall/value growth in Jun 2019 quarter

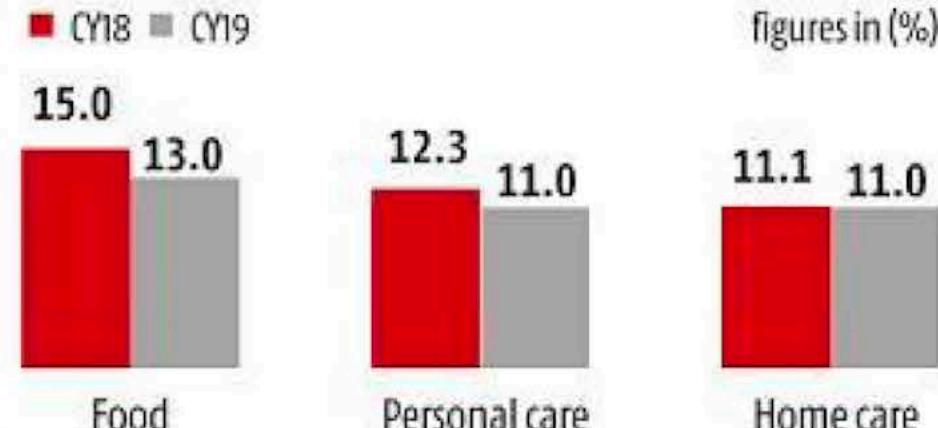
*13% is the upper end of the band forecast by Nielsen;
*Band for overall Q2 growth is 12–13%

ANNUAL FMCG GROWTH TRENDS



*12% and 9.5% are upper end of the band forecast by Nielsen;
*Band for overall growth is 11–12% and volume growth is 8.5–9.5%

GROWTH TRENDS BY SEGMENT

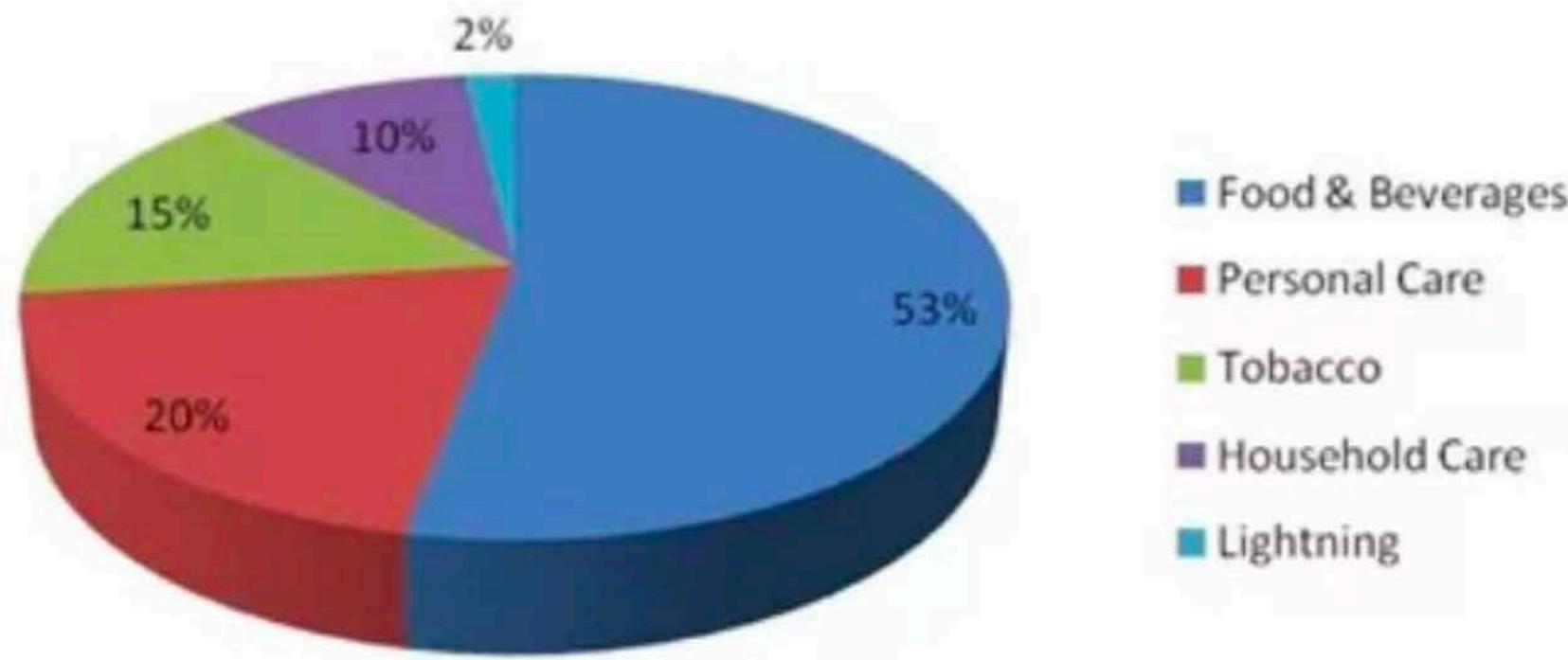


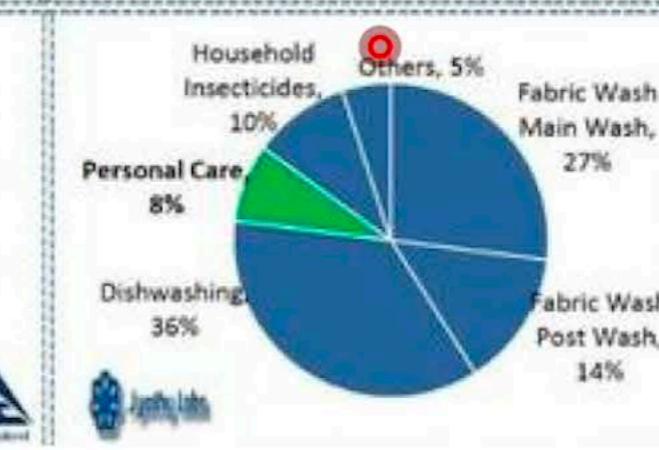
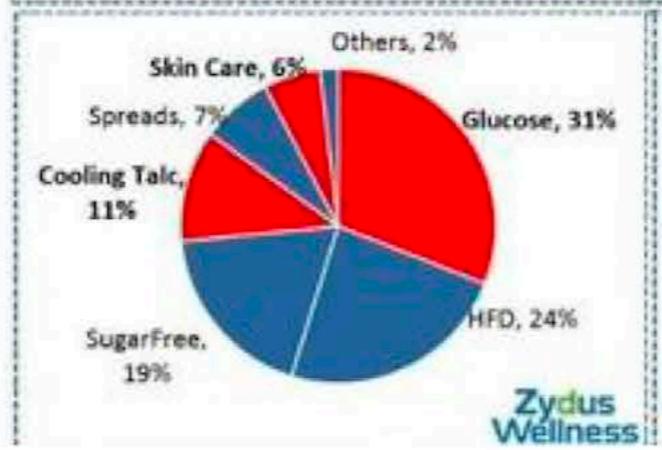
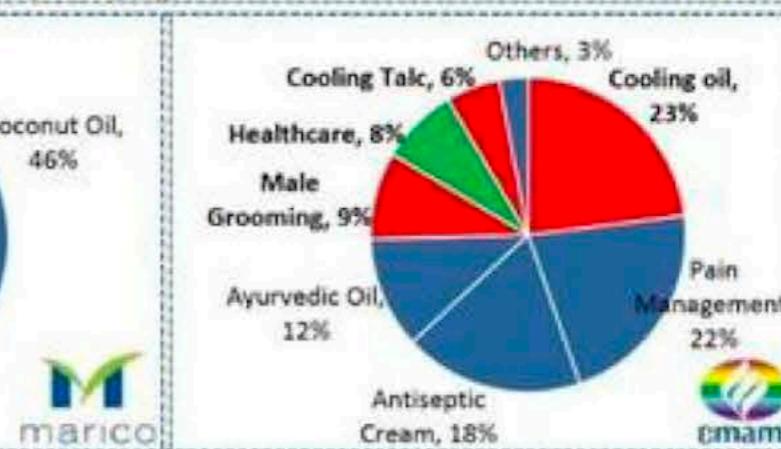
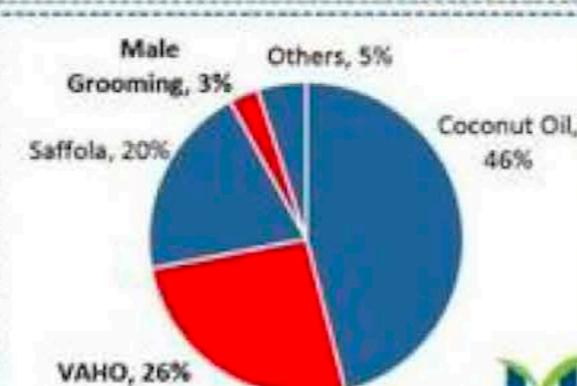
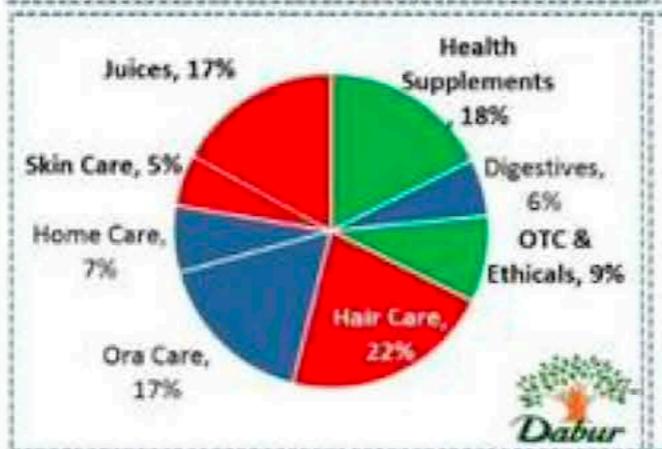
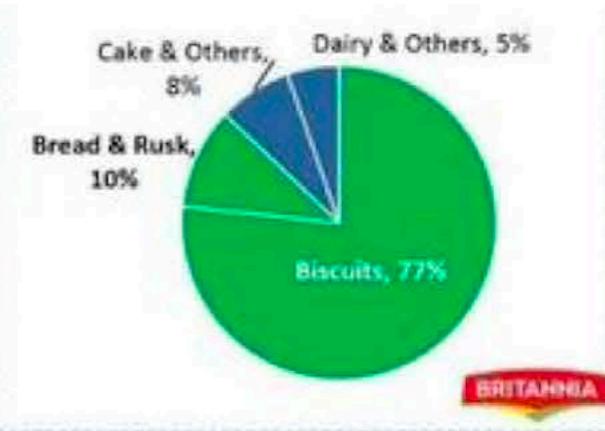
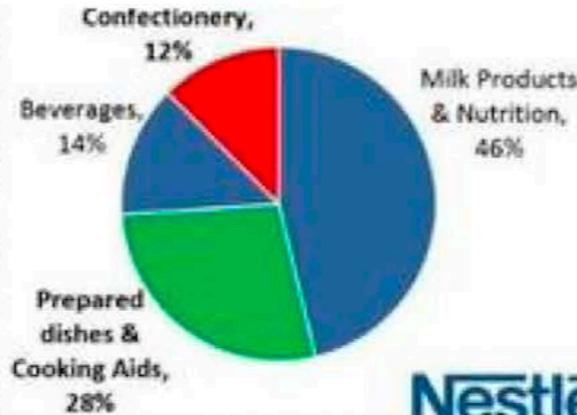
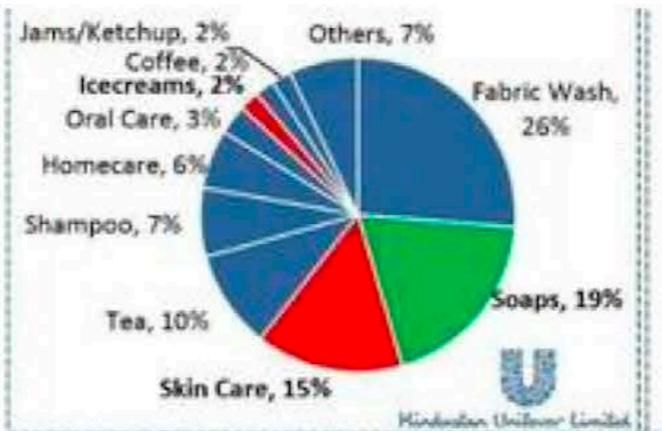
*13% and 11% are upper end of the band forecast by Nielsen
*Band for food growth is 12–13%; bands for personal care and home care are 11–12%

Source: Nielsen

Source: Business Standard

MARKET SEGMENTATION





Nestle's competitive position

Leading With Strong Market Shares

Category	Brand	Market Share (Value)	Nestlé India Position
Infant Cereals	 Cerelac	96.5	
Infant Formula	 LACTOGEN NAN	66.6	
Tea Creamer	 EveryDay	44.1	
Instant Noodles		59.2	
Ketchups & Sauces		20.5	
Instant Pasta		73.7	
White & Wafers	  	63.4	
Instant Coffee		50.5	

Exhibit 1: Estimates for Q1FY22E: (FMCG) (₹ crore)

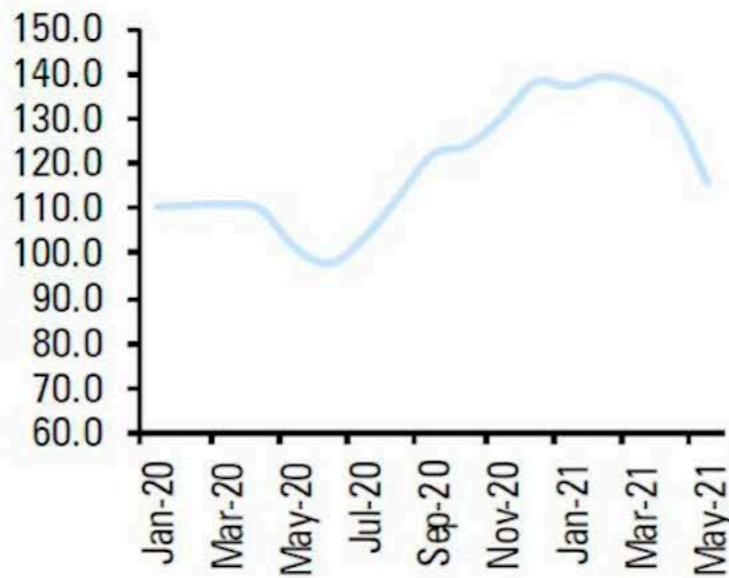
Company	Revenue	Change (%)		EBITDA	Change (%)		PAT	Change (%)	
	Q1FY22E	YoY	QoQ	Q1FY22E	YoY	QoQ	Q1FY22E	YoY	QoQ
Colgate Palmolive	1,198.3	15.2	-6.8	368.3	19.6	-10.0	242.1	22.2	-11.7
Dabur India Ltd	2,491.2	25.8	-1.0	495.8	19.0	-12.9	413.3	21.1	-14.4
HUL	12,807.6	21.3	11.9	2,984.5	12.9	4.0	2,093.4	11.3	4.2
ITC	12,284.9	29.3	2.6	3,858.3	45.8	-5.0	3,125.0	33.4	-3.3
Marico Ltd	2,474.2	28.5	24.4	450.3	-3.5	15.8	335.7	-12.9	23.0
Nestle India	3,707.4	21.5	4.7	883.5	18.2	0.0	583.4	19.9	-0.6
Tata Consumer	3,282.0	20.9	18.0	381.6	-20.9	-4.5	238.3	-31.0	-12.8
VST Industries	284.8	16.0	-5.2	105.6	6.3	-6.6	79.7	5.3	-10.0
Zydus Wellness	635.2	18.2	85.7	149.6	22.2	451.5	137.5	54.1	LP
Total	39,165.7	24.1	3.4	9,677.5	22.0	-2.9	7,248.4	17.9	1.9

Source: Company, ICICI Direct Research

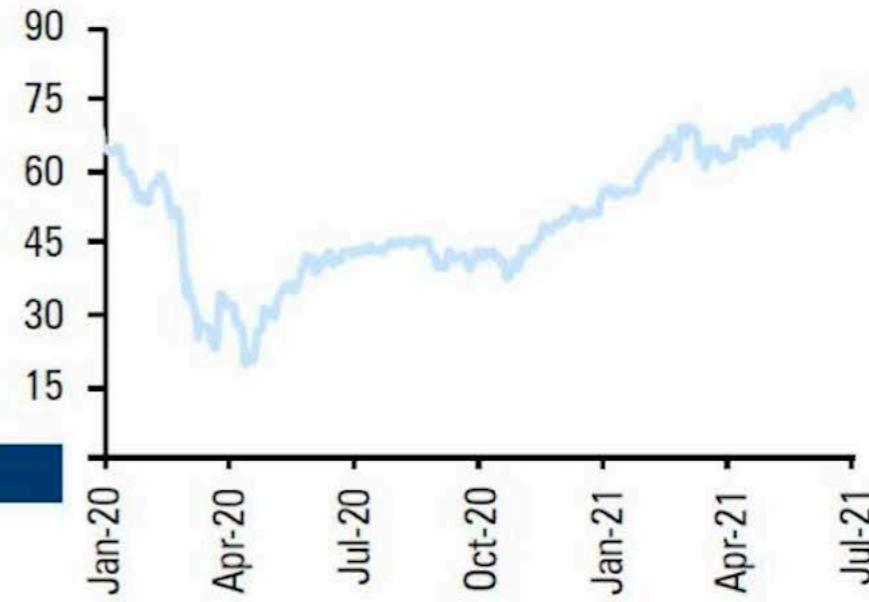
Copra Price Trend (₹/kg)

Crude Price Trend (USD / barrel)

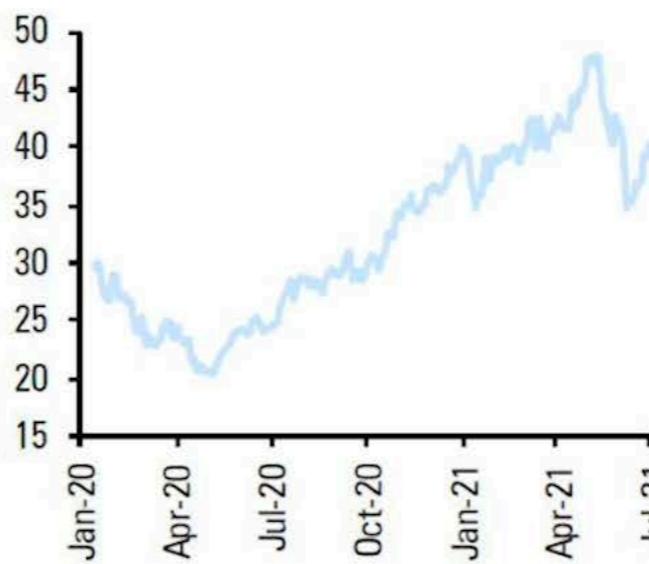
Copra Price Trend (₹/kg)



Crude Price Trend (USD / barrel)



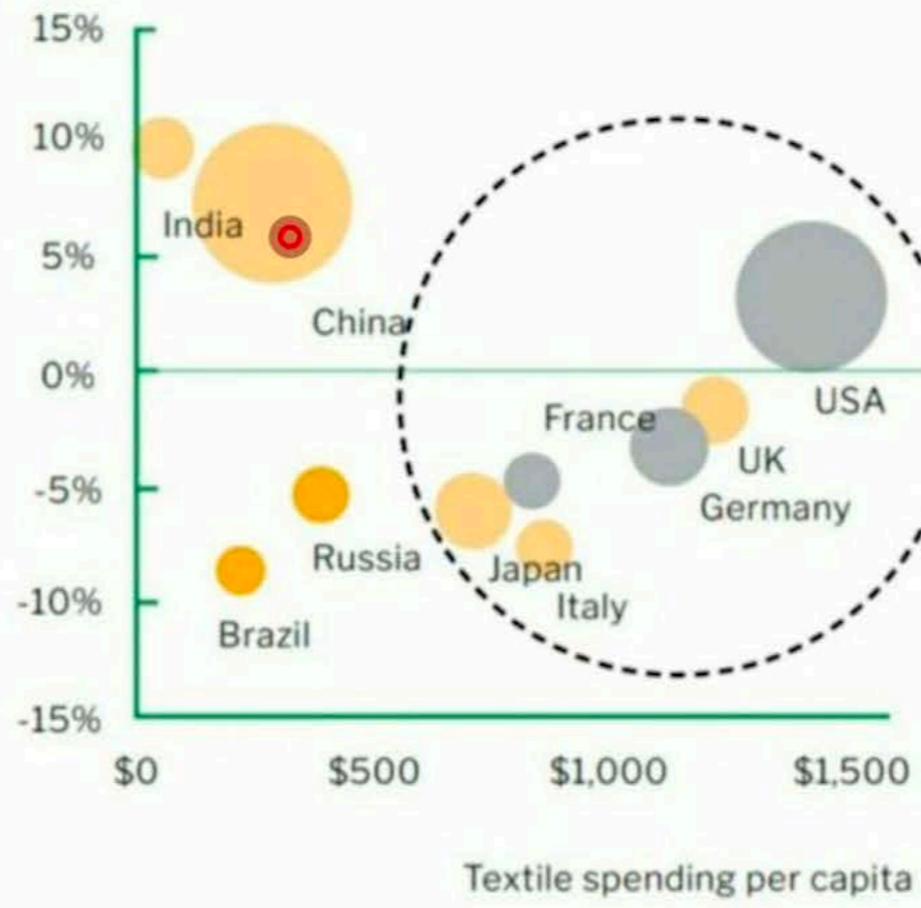
Surge in palm oil prices (₹/kg)



Apparel & Textile Industry

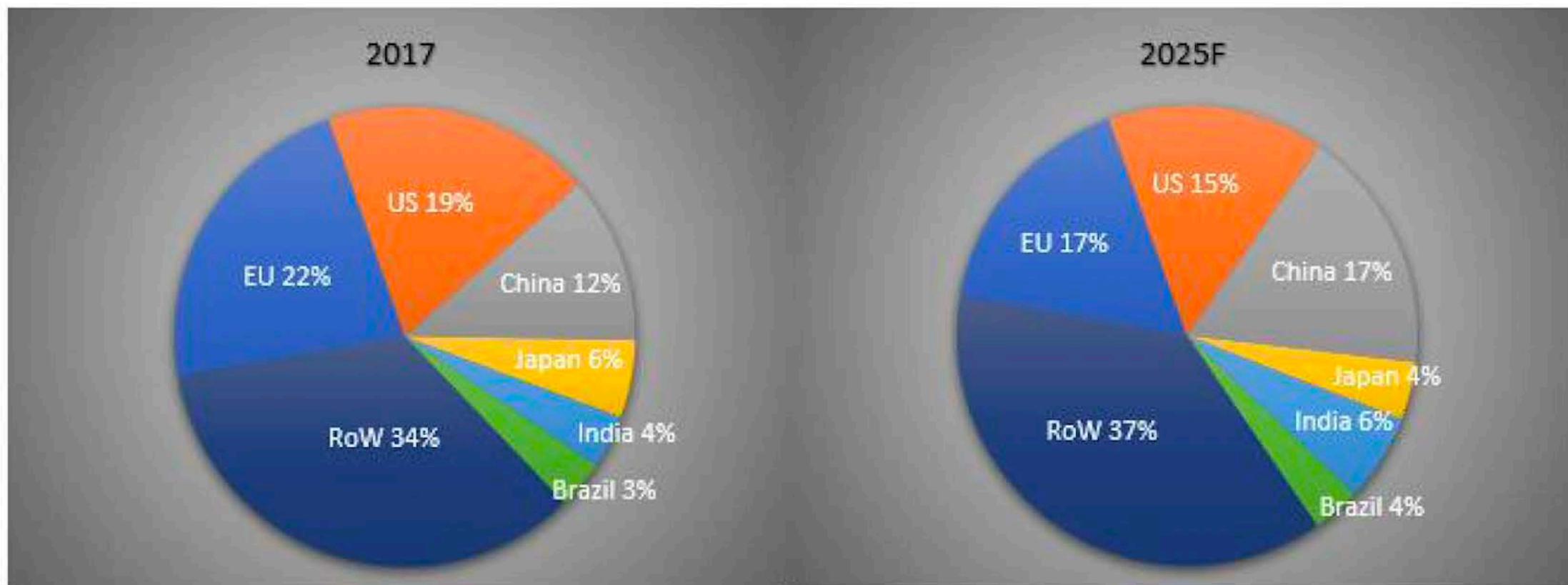
Top 10 textile markets
(size of the bubble = textile sales)

5-year sales CAGR

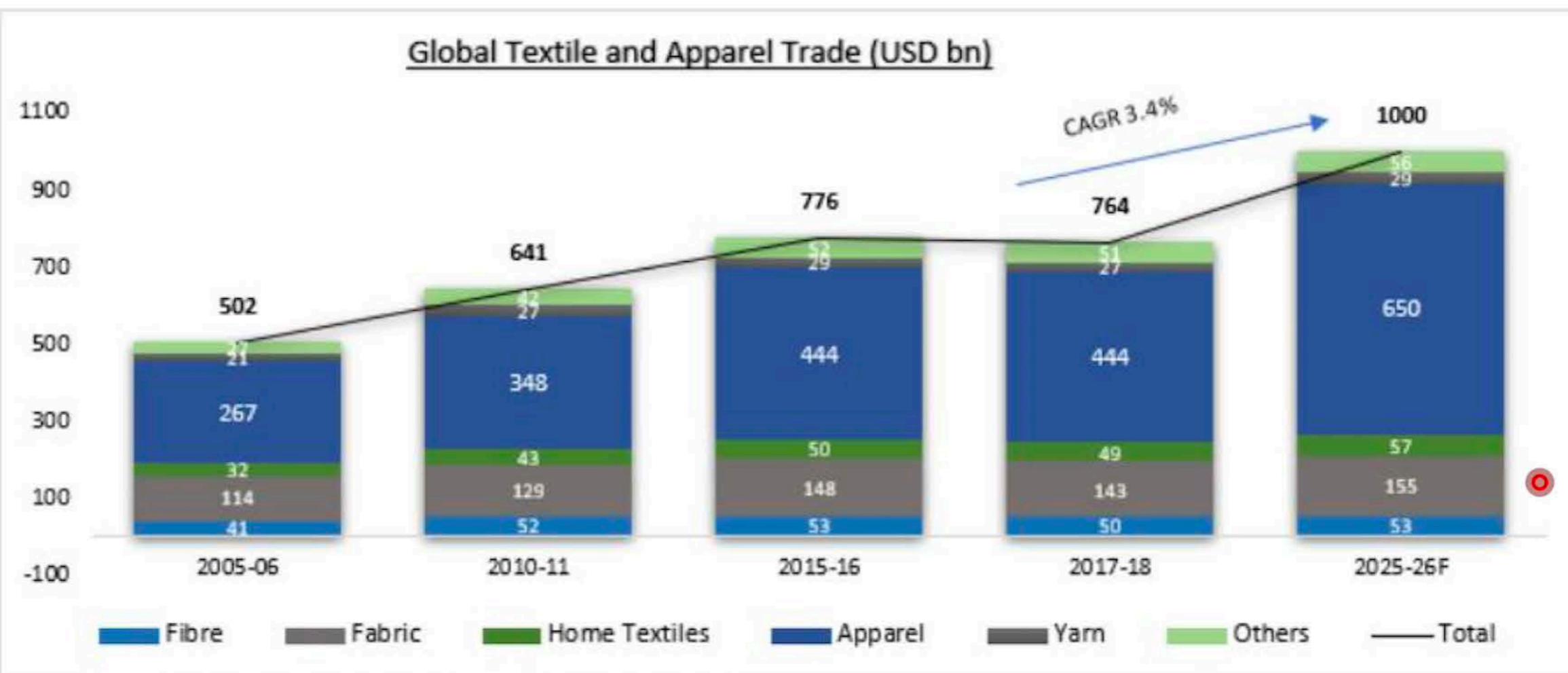


- Low risk ● Medium risk
- Sensitive risk ● High risk

Global Apparel Consumption – Country wise share



Source: UN Comtrade, Wazir Analysis, Televisory's Analysis



Source: UN Comtrade, Wazir Analysis, Televisory's Analysis

Leading Textile and Apparel Exporters (2019)

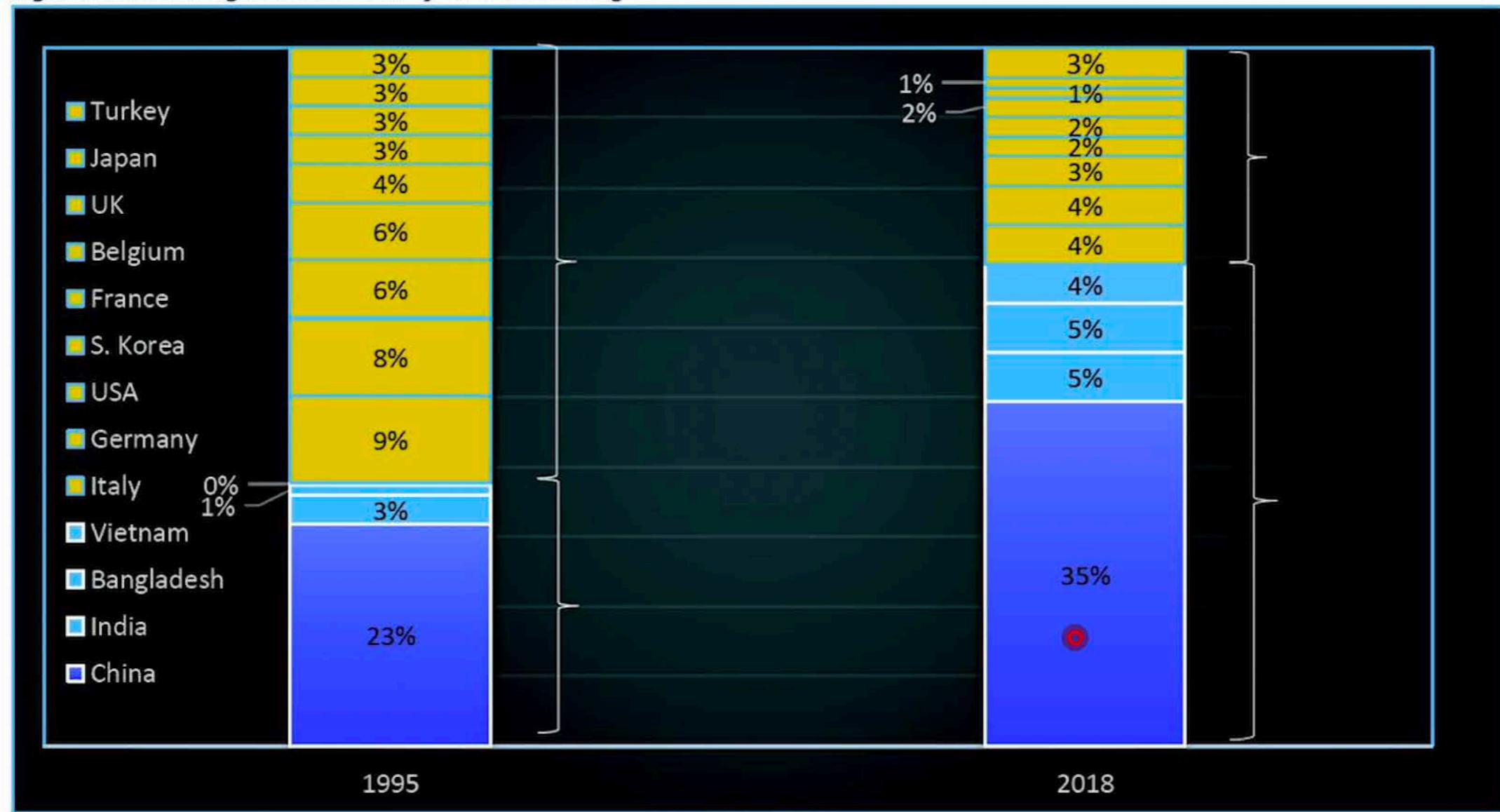
Value US\$ billion

Country	Exports			Share (%)
	Textile	Apparel	Total	
China	134.6	149.9	284.5	34
Vietnam	10.2	33.7	43.9	5
Bangladesh	1.8	40.9	42.7	5
Germany	15.5	23.8	39.3	5
India	20.2	16.2	36.4	4
Italy	12.8	23.6	36.4	4
Turkey	12.2	16.1	28.2	3
USA	21.7	5.2	26.9	3
Spain	5	14.3	19.3	2
France	5.6	12	17.6	2
ROW	117.2	146.3	263.5	31
Total	356.8	481.9	838.7	

Source: US Comtrade and Wazir Analysis

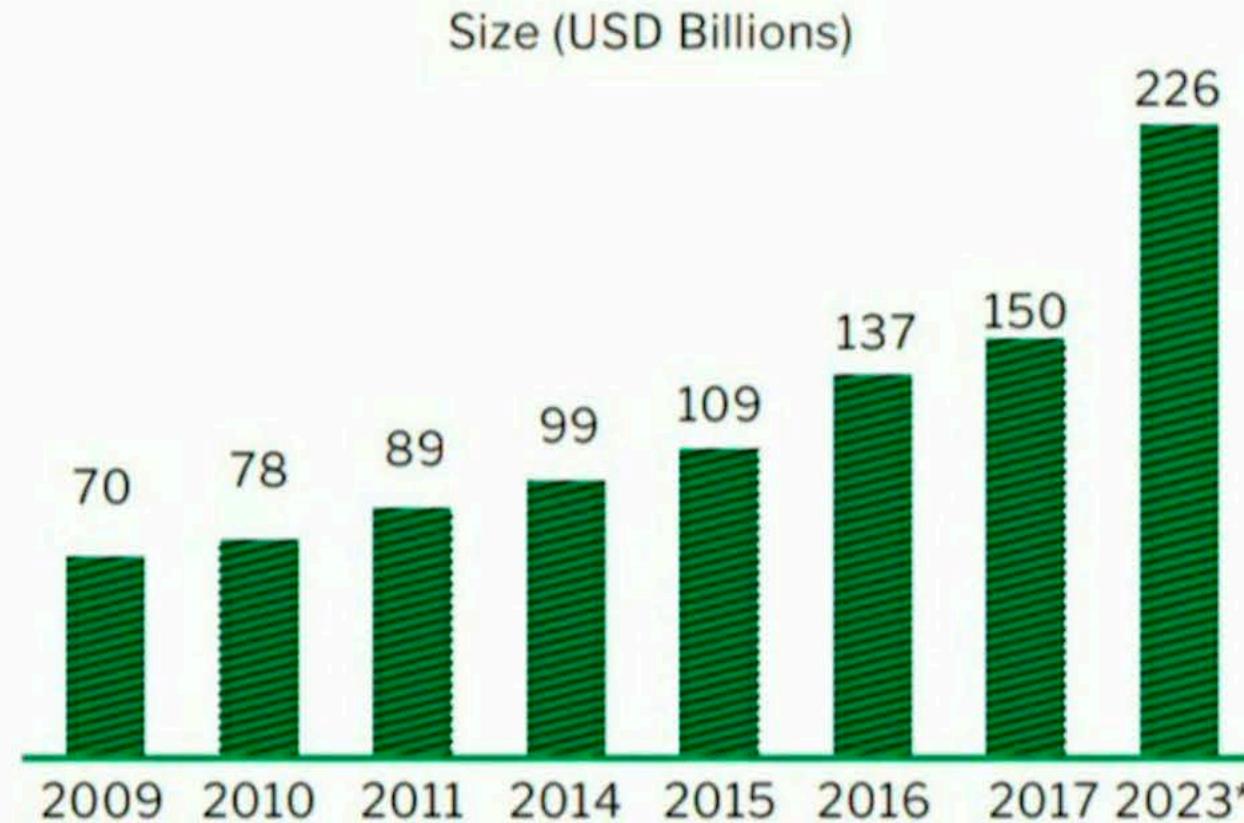
Figure 3: Increasing Consolidation of Global Sourcing

Figure 3: Increasing Consolidation of Global Sourcing



Source: Ficci, 2018

Textile and apparel industry in India



(Source: Ministry of Textiles)

* Estimated

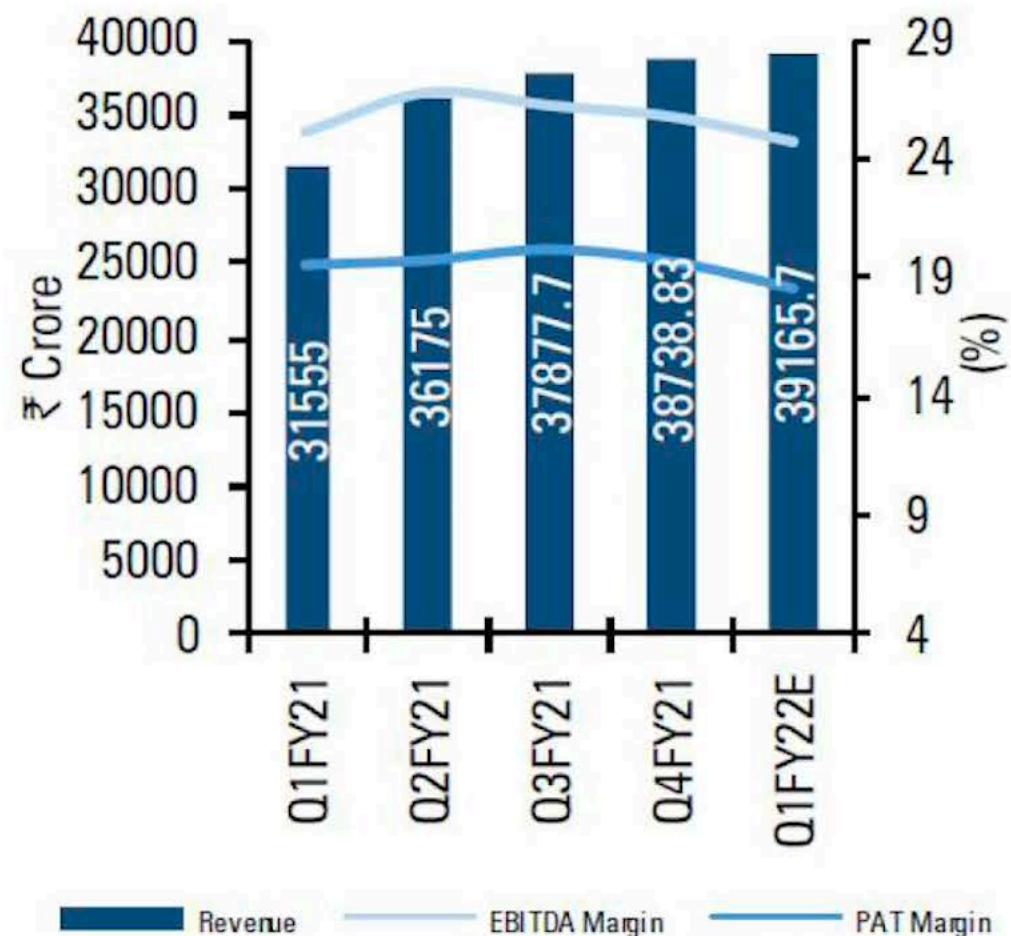
Table 8: Top 10 Traded Commodities in the World & India's Share (US\$ Bn.)

HS Code	Description	Global Exports	India's Exports	India's Share in Global Exports
610910	Cotton T-shirts	30.02	1.78	6%
620342	Mens Trousers of Cotton	26.97	0.20	1%
611030	Jerseys of MMF	25.58	0.07	0.2%
520100	Cotton Fibre	14.33	2.20	15%
610443	Dresses of MMF	13.00	0.66	5%
620520	Mens Shirts of Cotton	11.67	0.79	7%
621210	Brassieres	11.21	0.11	1%
540752	Dyed Woven Fabric of Polyester	8.23	0.12	2%
620640	Blouses & shirts of MMF	7.73	0.58	7%
620343	Mens Trousers of MMF	7.68	0.09	1%

Data Source: UN Comtrade



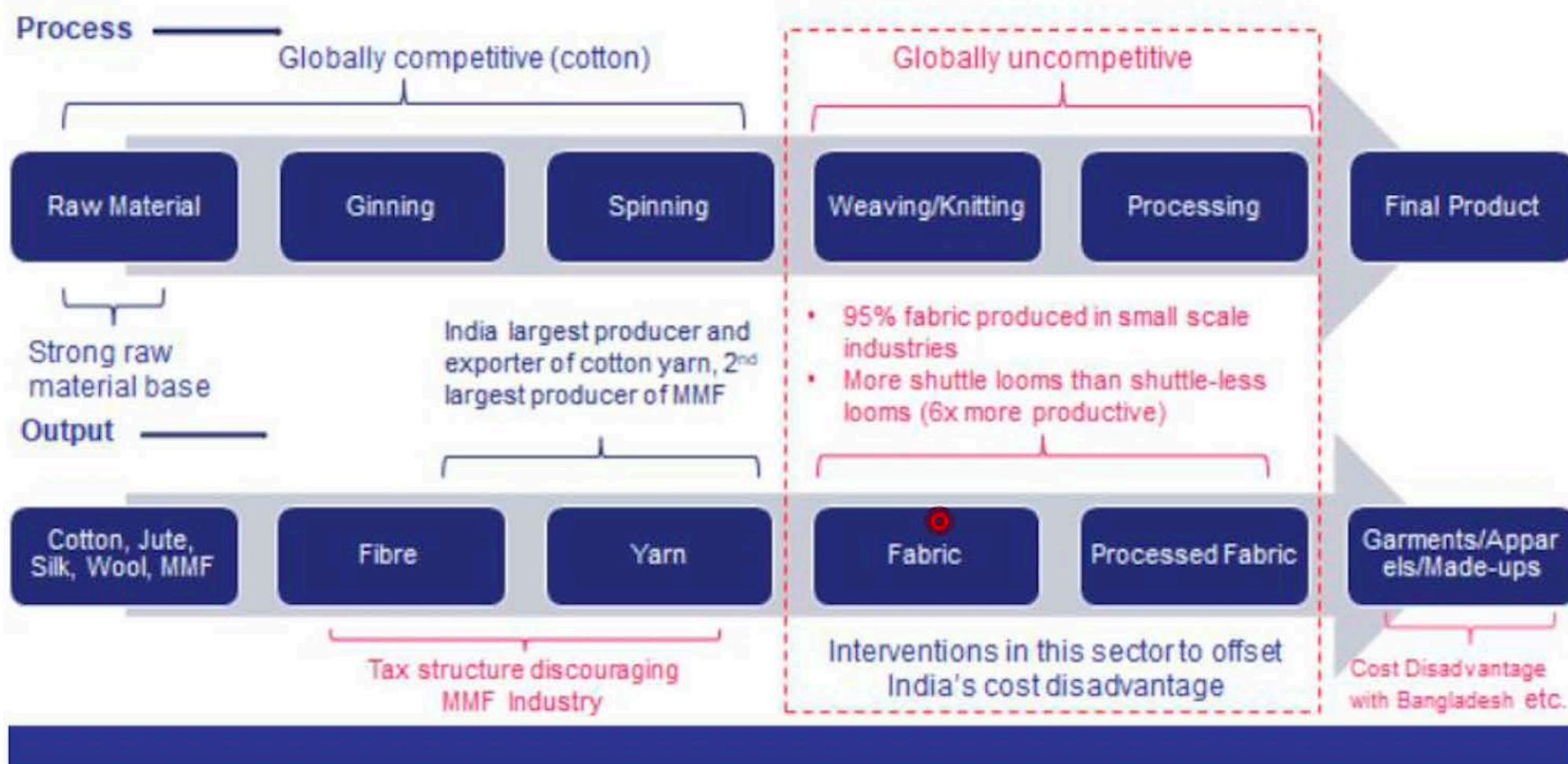
Topline & Profitability (Coverage Universe)



Operating margins FMCG Coverage (%)

Company	EBITDA margin %				
	Q1'21	Q2'21	Q3'21	Q4'21	Q1'22
Colgate	29.6	31.8	30.1	40.5	30.7
Dabur	21.0	22.6	21.0	18.9	19.9
HUL	25.0	25.1	24.1	24.4	23.3
ITC	27.9	33.9	35.0	31.6	31.4
Marico	24.2	19.6	19.4	15.9	18.2
Nestle	24.5	24.9	22.6	25.8	23.8
Tata Cons.	17.8	14.4	11.8	9.9	11.6
VST Ind.	40.4	37.6	34.8	35.3	37.1
Zydus Welln	22.8	7.9	13.0	24.0	23.5
FMCG Total	25.1	26.9	26.3	25.8	24.7

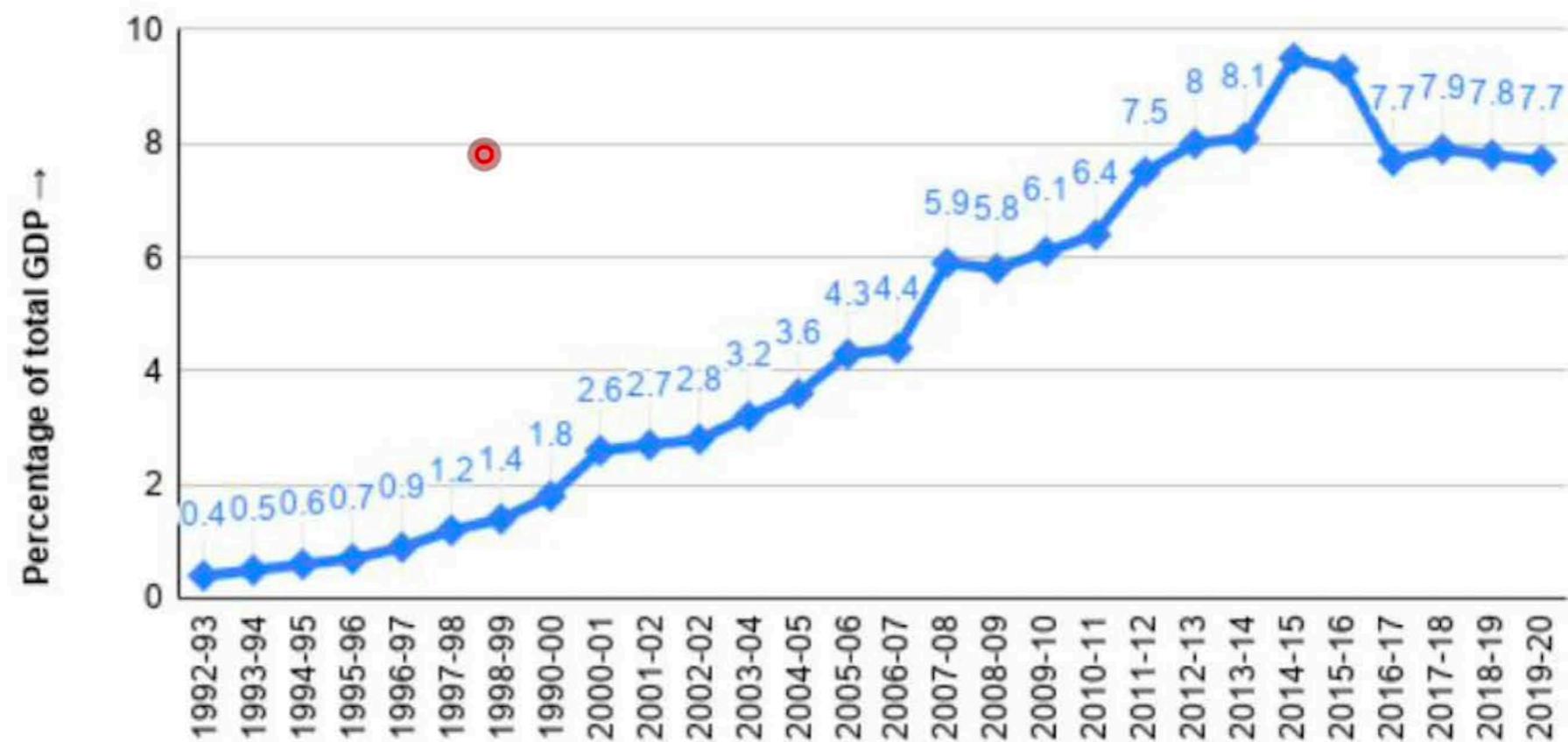
Uncompetitive Global Value Chain



Source: Niti Aayog

IT Industry

Graph 2. IT industry's share in GDP (in %)

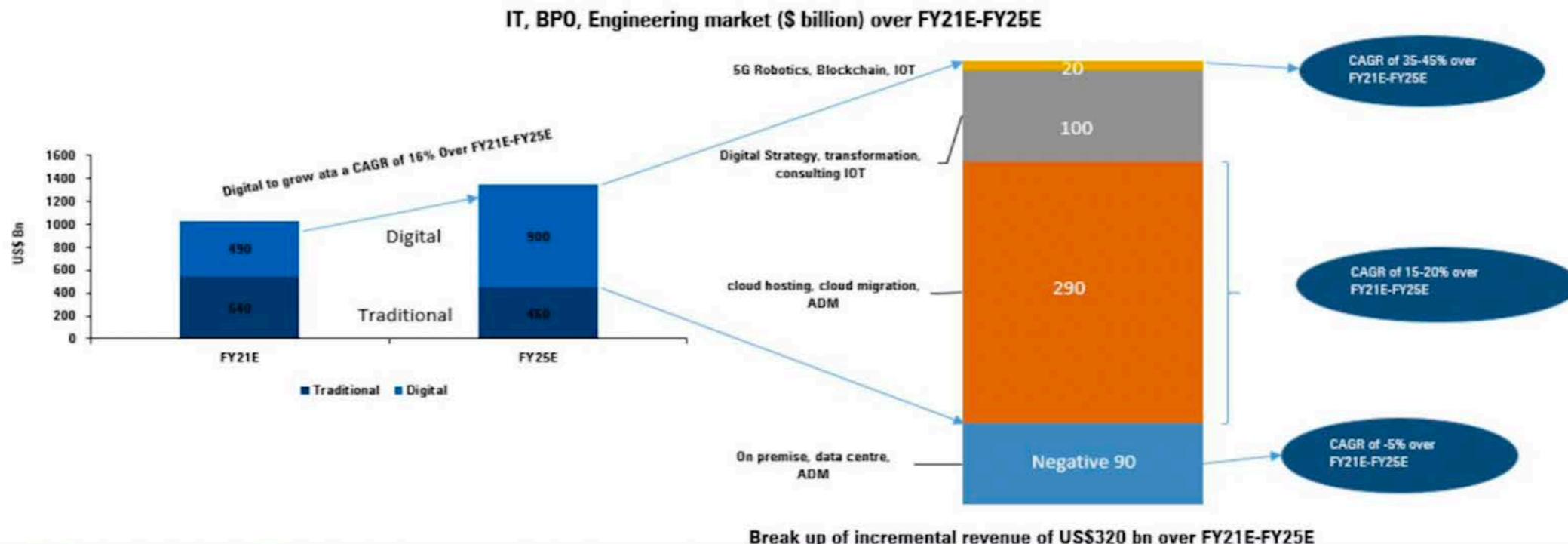


Data source: IBEF, Ministry of Commerce & Industry, Government of India

2019 Global Software Outsourcing Rates

Title of Full Time Employee (FTE)	United States	Latin America	Eastern Europe	Asia
Business Analyst	\$110 - \$205	\$45 - \$55	\$40 - \$63	\$30 - \$42
Architect	\$198 - \$292	\$60 - \$72	\$50 - \$77	\$35 - \$48
Project Manager	\$133 - \$233	\$55 - \$66	\$45 - \$70	\$35 - \$48
Jr. Developer	\$105 - \$111	\$35 - \$44	\$25 - \$42	\$18 - \$24
Mid-level Developer	\$132 - \$140	\$30 - \$52	\$35 - \$56	\$24 - \$35
Lead Developer	\$176 - \$187	\$50 - \$61	\$45 - \$70	\$30 - \$42
Sr. Developer	\$154 - \$163	\$45 - \$55	\$45 - \$70	\$30 - \$42
Junior QA	\$77 - \$81	\$30 - \$39	\$25 - \$42	\$15 - \$24
Mid-level QA	\$99 - \$105	\$35 - \$44	\$30 - \$49	\$20 - \$30
Senior QA	\$143 - \$169	\$40 - \$50	\$40 - \$63	\$25 - \$36
Graphic Designer	\$79 - \$163	\$40 - \$50	\$35 - \$56	\$25 - \$36

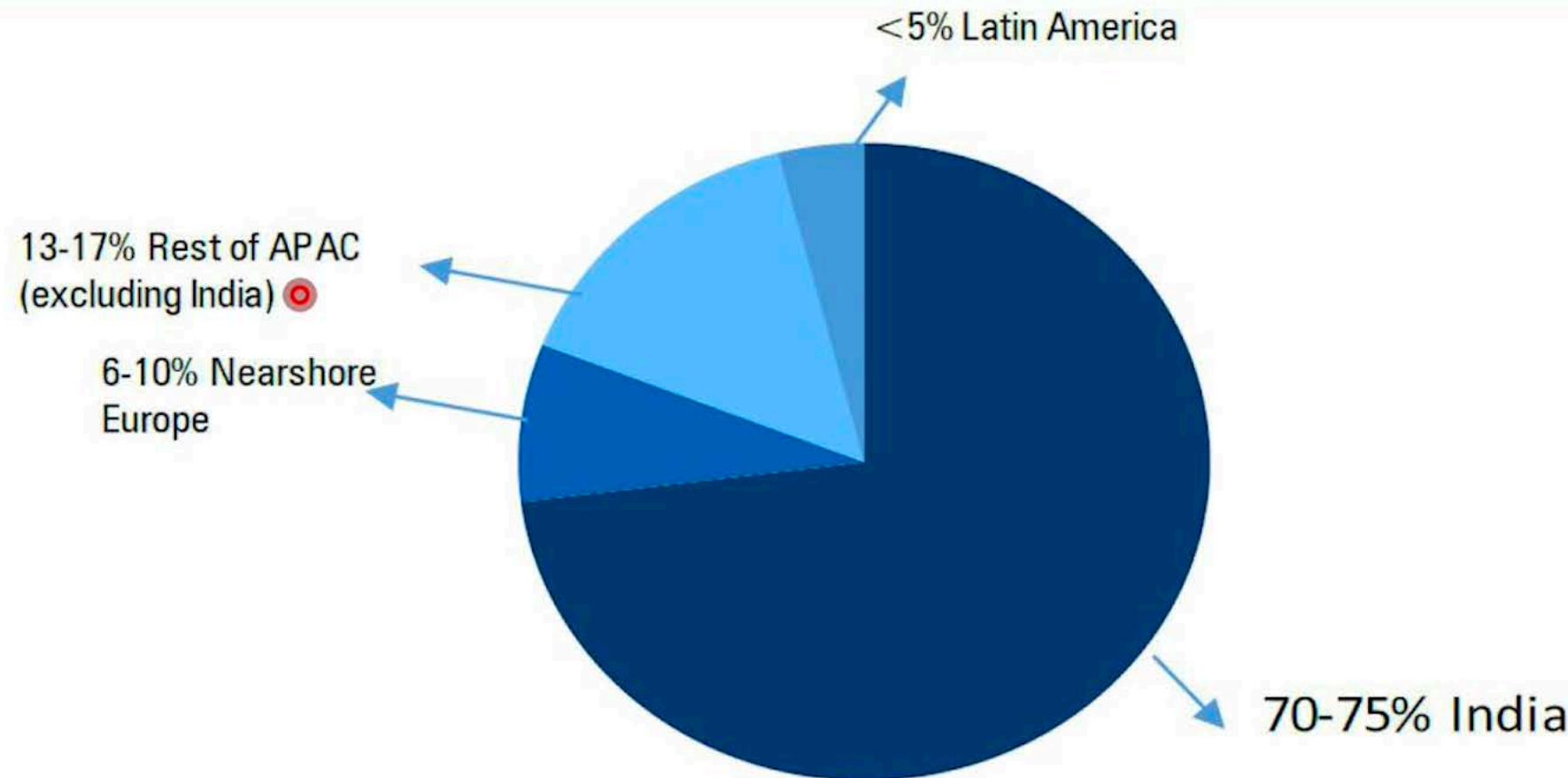
Exhibit 1: Digital technology to drive multi-year growth



Source: Wipro Analyst Meet, ICICI Direct Research;

Exhibit 2: India has high supply of digitally skilled employee (digital FTE as of FY18)

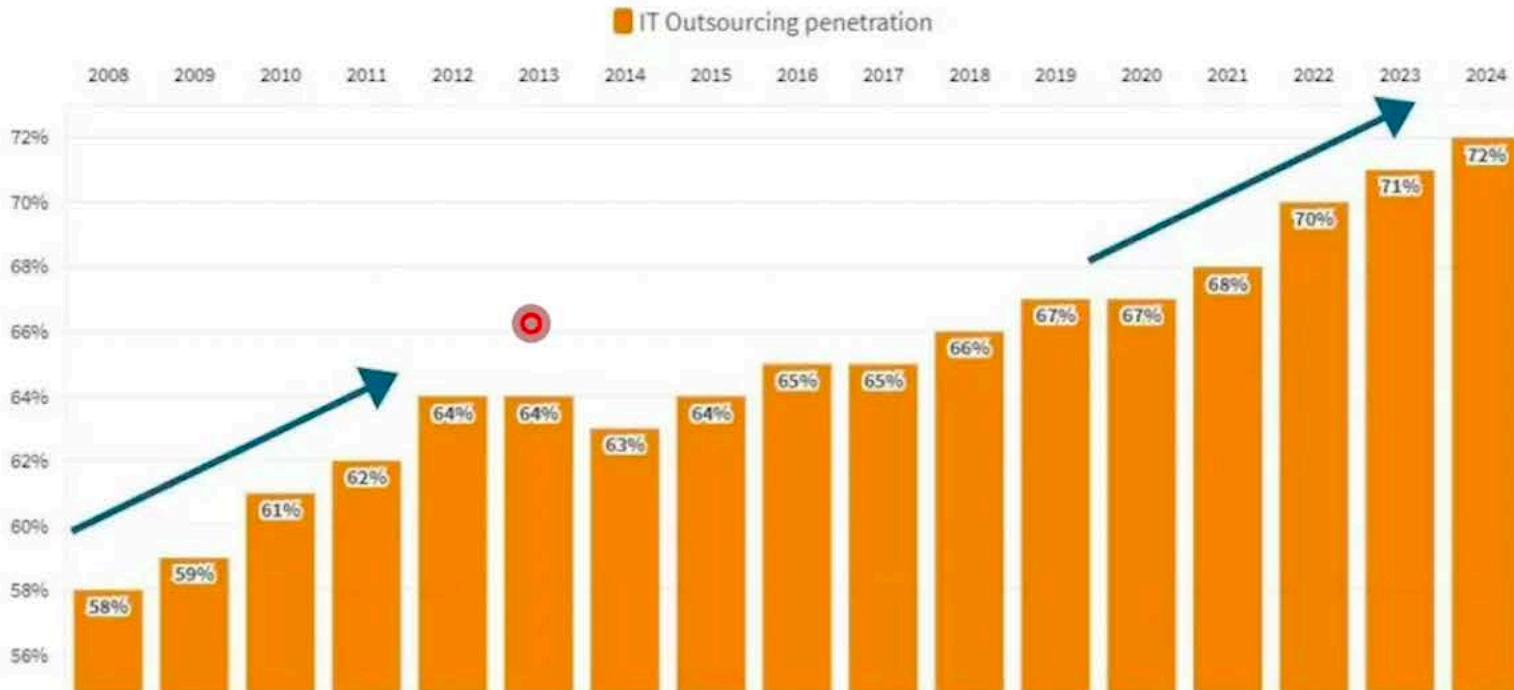
Exhibit 2: India has high supply of digitally skilled employee (digital FTE as of FY18)



Source: Nasscom, ICICI Direct Research

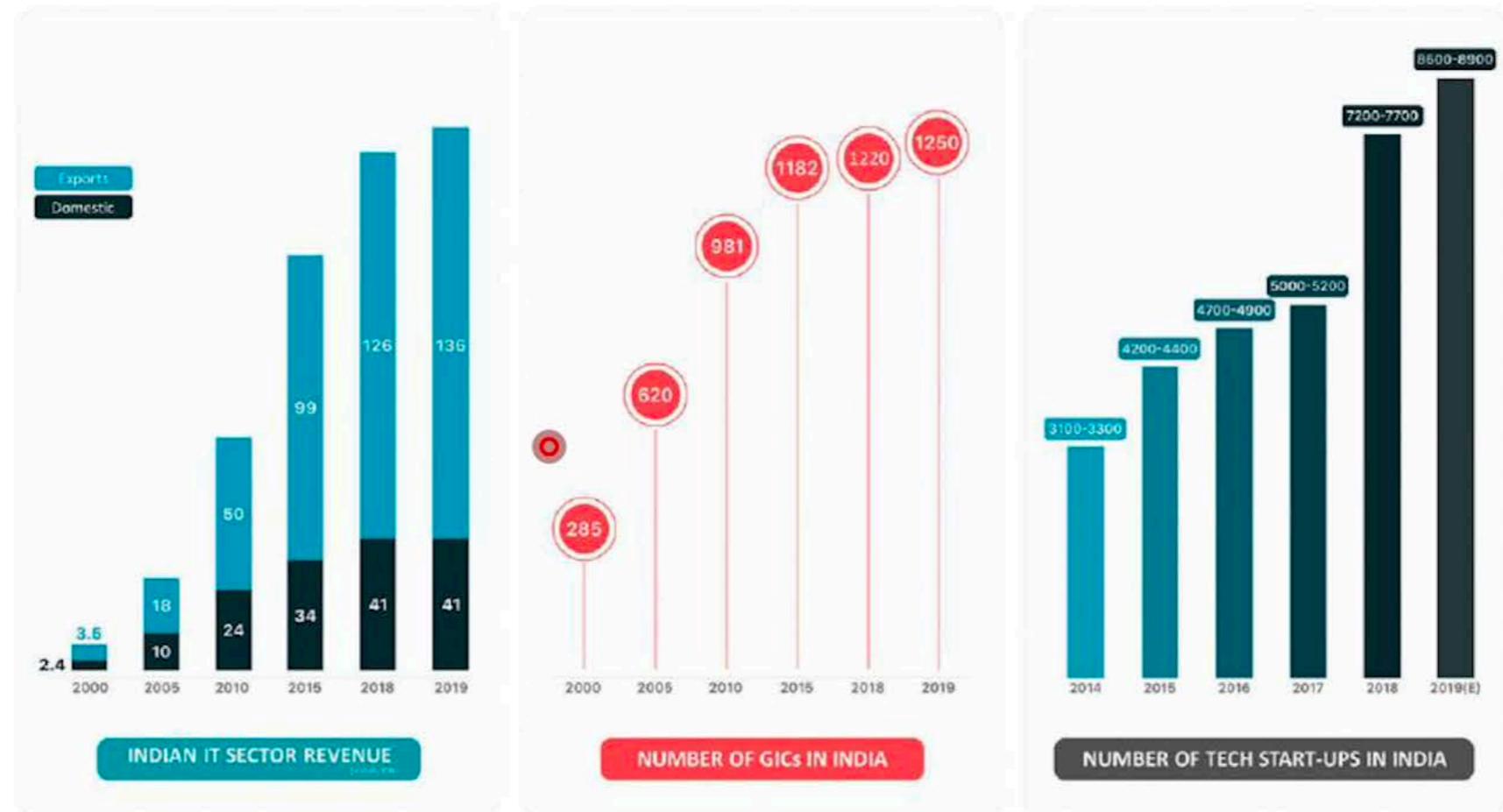
Outsourcing expected to pick up sharply post COVID

This will be the third wave of outsourcing after Y2K in 2000 and the 2008 GFC



Source: Gartner

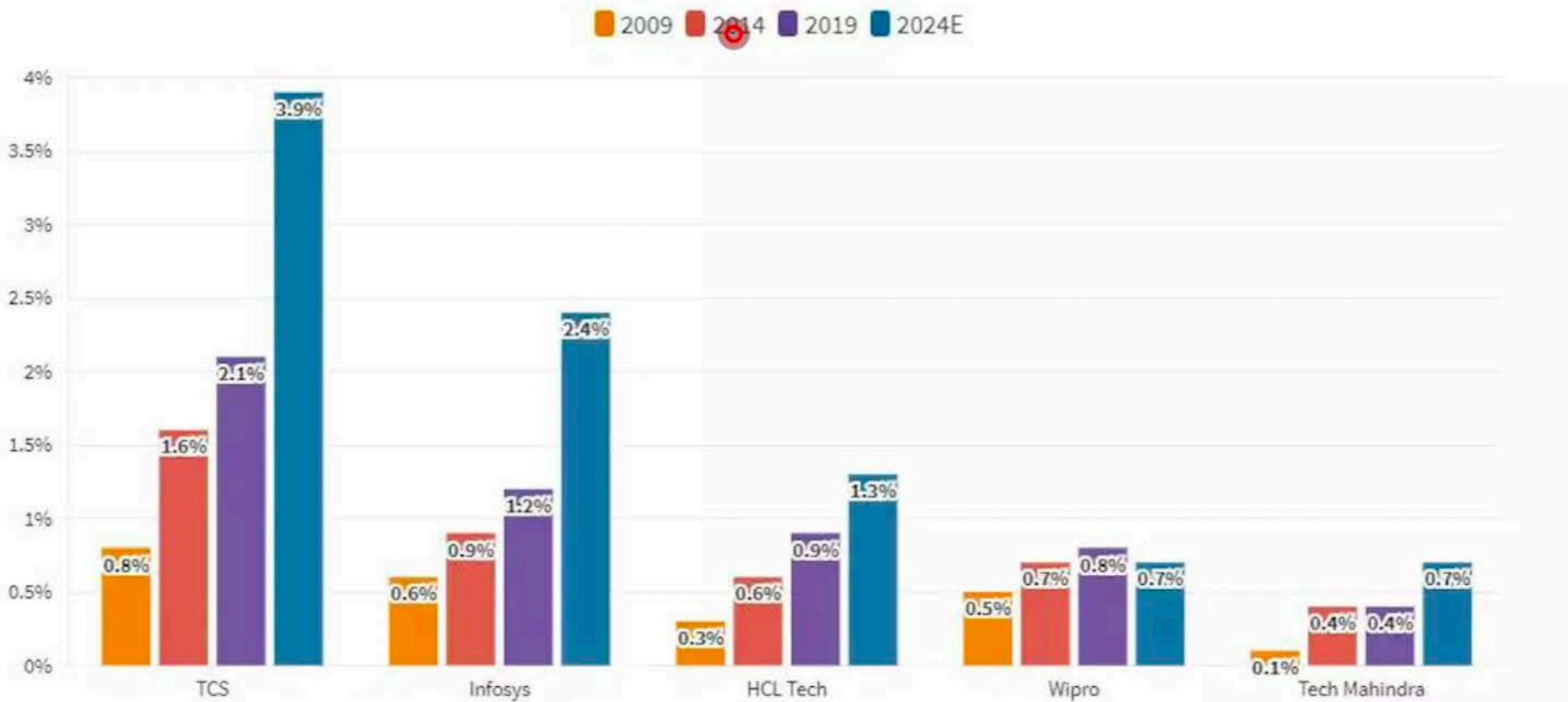
BI
Business Intelligence



Source: CACM 2019

Indian IT companies expected to gain market share by 2024

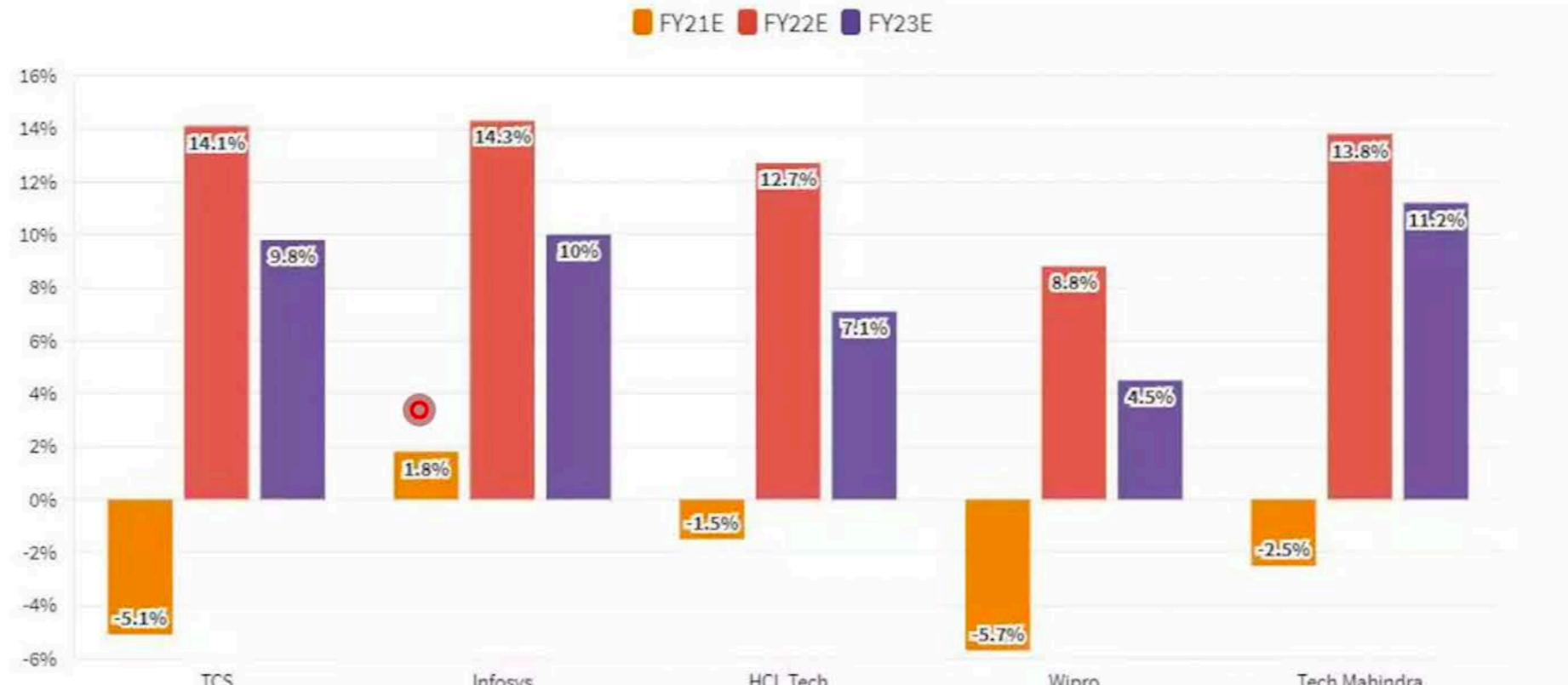
Wipro being the only exception



Source: Gartner, Company data, Goldman Sachs Global Investment Research

Double-digit revenue growth projected over the next three years

TCS and Infosys have the most to gain with growth crossing 14%



Source: Gartner, Company data, Goldman Sachs Global Investment Research



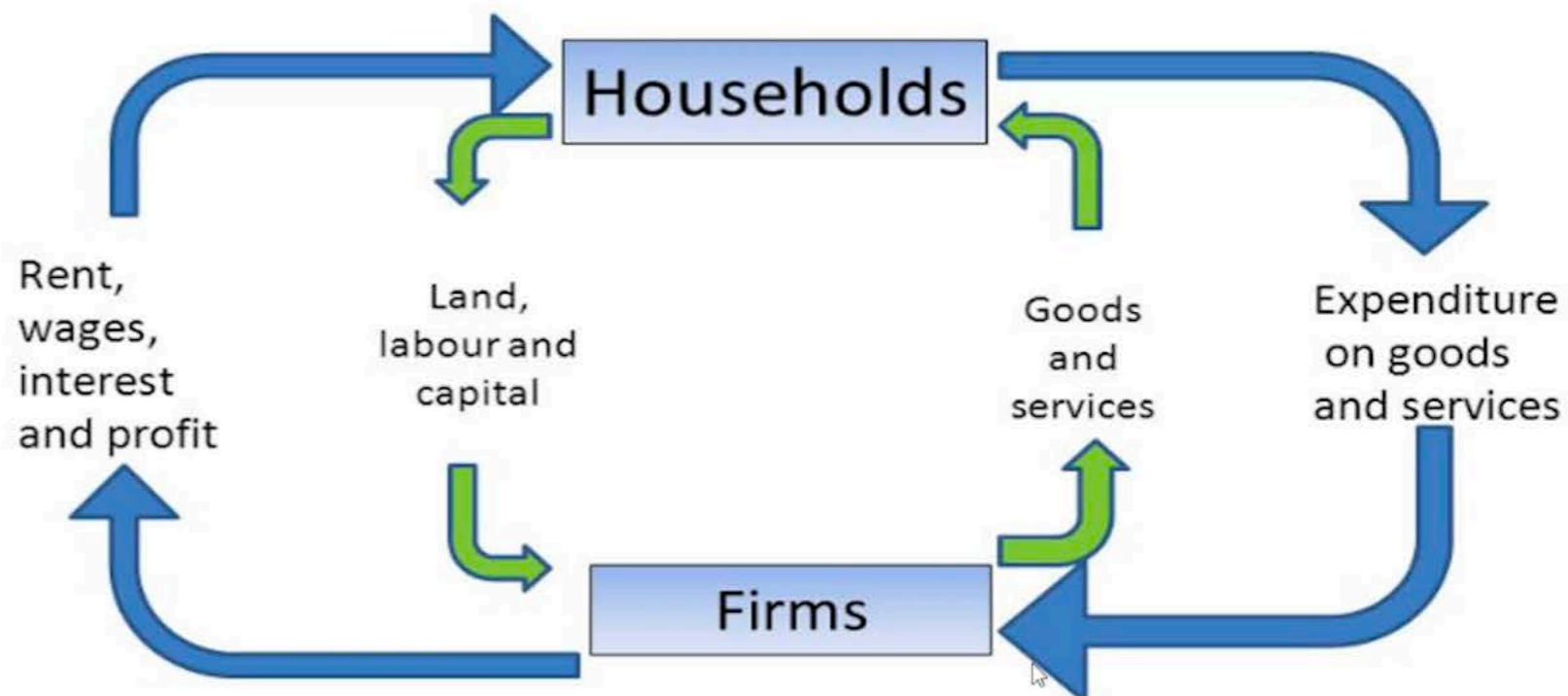
Summary

Weeks 1-4

Producers, consumers and exchange

- The unit of consumption is a household
- Households consume goods and services
- Firms produce the goods and services that households consume
- Households provide capital and labour to firms
- Money flows in the opposite direction to resource flow
- The objective is to optimise the flow of resources (and hence the flow of money)
- Price mechanism plays a role in the efficient allocation of resources

The circular flow of income



Consumption data

- Household consumption data patterns:
 - varies with income
 - varies with demographics - rural/urban, age, region, ...
 - varies with time - short term (seasonality) and long term
- Sources of household consumption data
 - primary surveys
 - National statistics: NSSO data - low frequency, universal and extensive
 - CMIE: consumer household pyramid survey - high frequency, targeted, longitudinal
 - Consulting agencies and analysts - occasional, different aspects captured, or different slices of the dataset



Utility

- Cardinal Utility: measures satisfaction of a consumer
 - total utility
 - marginal utility (measures incremental change in satisfaction level with a small increase in consumption)
 - Diminishing marginal utility
 - Consumer maximises utility by choosing goods given a fixed income and the prices of the goods
- Ordinal utility: satisfaction due to choice cannot be measured, but choices can be ranked
 - Indifference curves: on one curve all choices have the same rank
 - Pick the curve with the highest rank



Understanding Demand

- Quantity demanded: amount of goods that buyers are willing and able to purchase
- Demand schedule (table) and Demand curve (graph)
- Individual and aggregated demand (sum of individual demands)
- Demand varies with price - movement along the demand curve
- Other (non-price) factors move the demand curve to the right or the left
 - Income - **Normal** good: demand increases with higher income, **Inferior** good: demand decreases
 - Price of related goods
 - **Substitutes**: increase in price of one leads to increase in demand of the other
 - **Complements**: increase in price of one leads to decrease in demand of the other
 - Tastes
 - Expectations: income is going to rise in future, demand increases now
 - Number of buyers
- **Equilibrium price**: the price at which supply and demand are matched

Changes in demand and elasticity

- Elastic demand: Quantity demanded responds substantially to changes in price
 - Goods with close substitutes are more elastic
 - Luxury goods are elastic
- Inelastic demand: Quantity demanded responds only slightly to changes in price
 - Essential goods (necessities) are inelastic
- Cross price elasticity of demand:
 - substitutes (positive cross price elasticity)
 - complements (negative cross price elasticity)
- The above goods are all normal goods
- Negative income elasticity: Inferior goods

Cost of production

- Types of costs:
 - Accounting vs Economic profit: opportunity cost
 - Fixed vs Variable cost
 - Direct vs Indirect cost
 - Total, average and marginal cost
 - Sunk costs
- Average total cost calculation
- Cost curves and determination of production quantity
- Short term and long term cost curves

Production quantity decisions

- Production function relates inputs to outputs
 - Short run and long run production functions
- Marginal and average product
- Using the production function curves to determine returns to scale
 - Increasing, constant and diminishing returns to scale
- Capacity planning
- Competitive market: price cannot be controlled, quantity needs to be optimised

Pricing decisions

- Market skimming
- Value pricing
- Loss leader pricing
- Psychological pricing
- Price leadership (going rate)
- Tender pricing
- Price discrimination
- Penetration pricing
- Cost plus pricing

.

Firm data analysis

- Analysis of firm performance - key ratios obtained from financial statements
- Sources of data:
 - Profit and Loss statement
 - Balance sheet
 - Cash flow statement
 - Others ...
- Liquidity (ability to meet its obligation to debtors): current ratio, quick ratio
- Return to shareholders: EPS, P/E, EV/EBITDA
- Profitability: Gross margin, operating margin, net margin, ROCE
- Inventory (stock) turnover
- Debtor days

•

Analysis of four firms

- Ultratech
 - Capital intensive, low profit margin, low ROCE,
 - Material and energy costs
 - Ability to control price, volume is sensitive to a number of factors
 - High debt to equity, high interest costs, using cash to retire debt
- Page Industries
 - Higher ROCE due to low capital assets, Low debt, good cash flow
 - Raw material and employment costs
- Nestle
 - Differentiation is key. Low debt, very high ROCE, dividend paying
 - Revenue highly dependent on consumption patterns
- TCS
 - Employment cost is the only main cost, high profit margin, high ROCE

Industry data analysis

- Methods of classification:
 - Labour, material, ownership etc
- NIC codes for industries
- Sources of data:
 - ASI (Annual survey of industries) uses factory data: infrequent
 - Index of Industrial Production (IIP) is available monthly
 - Purchasing Managers Index (PMI) is a sentiment based survey
- Market structure:
 - concentration ratio and Herfindahl index
 - perfect competition, monopolistic competition, oligopoly, monopoly
- Porter's five forces
 - rivalry
 - bargaining power of suppliers and customers
 - threat of new entrants and substitutes

Analysis of four industries

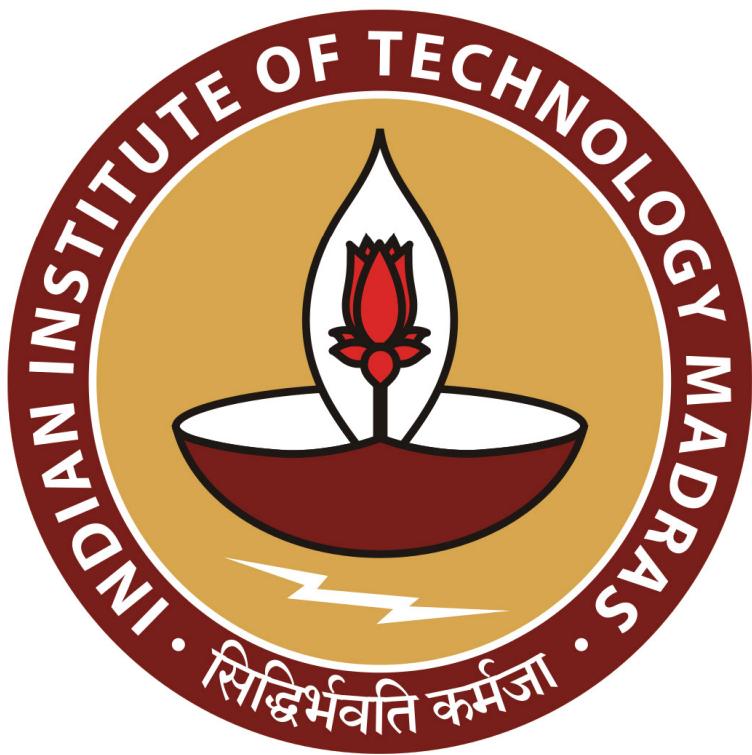
- Cement industry
 - per capita consumption is low in east and central regions
 - ROCE will increase with volumes
 - Ultratech has 21% marketshare and 33% share of incremental capacity
- FMCG industry
 - Per capita consumption of India very low compared to other countries
 - Several segments: different companies are leaders in their main segments
 - raw material costs on the increase leading to margin compression
- Textile industry
 - mix of domestic and exports: both have high potential
 - not competitive in finished products, competitive in cotton products and yarn
- IT industry
 - cost advantage and digital transformation are the main drivers of growth
 - Indian companies are still at a low share of market and have potential to grow

Assignment

Prepare report on the sales and profit trends of a company
(and its competitive position)

Each student will be assigned a company for the purpose of this assignment





IIT Madras

ONLINE DEGREE



fab Mart

We are a global e-commerce company – and have recently entered India

**Focused on South Indian market, for time being –
Rest of India coming soon**



We have best brands to offer to customers at best price

Committed to offer best in class service to our customer – before and after purchase

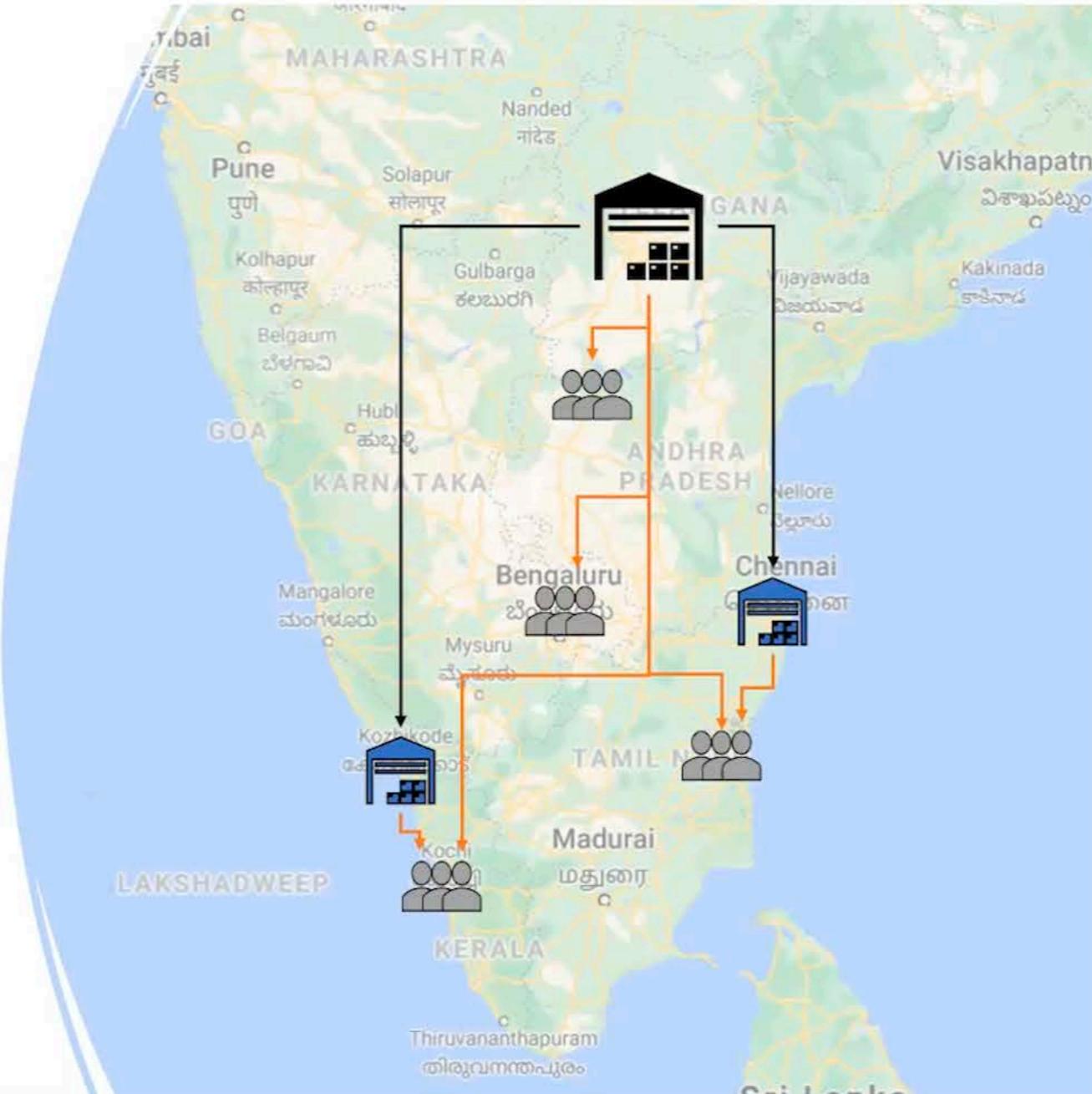
Product Range



BU	Brand	Type
Mobiles	RealU	Aspirational Entry Brand
Mobiles	YouM	Economy Brand
Mobiles	Sumsang	Aspirational Brand
Mobiles	Orange	Premium Brand
FMCG	Babaji	Local Product - new entry
		Local Product - Established
FMCG	Vedic	quality
FMCG	Gear	MNC Product
Lifestyle	Jeera	International Men's clothing
Lifestyle	Viva	International Women's clothing

Distribution Network

- Hyderabad (H) Mother DC serves Child DC in Cochin (C) and Chennai (M)
- Customers from Chennai / Cochin can get orders delivered from Hyderabad – if their respective locations do not have sufficient stock





Mr. Shah – CFO



Mr. Shastri – Head
Planning

Responsible to ensure optimal inventory is brought by Mr. Shastri, and overall growth in revenue of the company

Answerable to board to deliver revenue growth and efficient operations

Responsible for buying and distribution of FCs across mother and child DCs, and to ensure all SKUs are available to customer, and yet don't have too much of bad inventory



Mr. Moorthy – MD
&CEO

Management Team

Data available

- Since Fab Mart has recently entered the Indian market, the company has just 3 Business units, viz. –
 - FMCG
 - Life style
 - Mobiles
- Also, the company has just 15 days data available for analysis



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	BU	SKU	Brand	Model	Avg Price										
2	Mobiles	M01	RealU	RU-10	12000										
3	Mobiles	M02	RealU	RU-9 Plus	10000										
4	Mobiles	M03	YouM	YM-99	16000										
5	Mobiles	M04	YouM	YM-99 Plus	20000										
6	Mobiles	M05	YouM	YM-98	8000										
7	Mobiles	M06	RealU	RU-9	8000										
8	Mobiles	M07	Sumsang	S-20	49000										
9	Mobiles	M08	Sumsang	S-21	54000										
10	Mobiles	M09	Orange	O-10	55000										
11	Mobiles	M10	Orange	O-11	60000										
12	FMCG	F01	Babaji	Babaji Oil	300										
13	FMCG	F02	Vedic	Vedic Crean	200										
14	FMCG	F03	Vedic	Vedic Sham	290										
15	FMCG	F04	Babaji	Babaji Shar	365										
16	FMCG	F05	Babaji	Babaji Creati	190										
17	FMCG	F06	Vedic	Vedic Oil	350										
18	FMCG	F07	Gear	Gear Oil	400										
19	FMCG	F08	Gear	Gear Cream	300										
20	FMCG	F09	Gear	Gear Shamp	460										
21	FMCG	F10	Gear	Gear BB Cre	999										
22	Lifestyle	L01	Jeera	M- T Shirts	350										



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
18	FMCG	F07	Gear	Gear Oil	400										
19	FMCG	F08	Gear	Gear Cream	300										
20	FMCG	F09	Gear	Gear Shamp	460										
21	FMCG	F10	Gear	Gear BB Cre	999										
22	Lifestyle	L01	Jeera	M- T Shirts	350										
23	Lifestyle	L02	Jeera	M- Inners	400										
24	Lifestyle	L03	Viva	W-Casuals	800										
25	Lifestyle	L04	Viva	W-Inners	1200										
26	Lifestyle	L05	Jeera	M-Jeans	1999										
27	Lifestyle	L06	Jeera	M-Casuals	1200										
28	Lifestyle	L07	Viva	W-Western	2500										
29	Lifestyle	L08	Viva	W-Lounge	1500										
30	Lifestyle	L09	Jeera	M-Formals	1800										
31	Lifestyle	L10	Jeera	M-Shoes	3000										
32															
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A2 01/04/2021

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Date	SKU	City	Sale											
2	01/04/21	M01	H	26											
3	01/04/21	M02	H	13											
4	01/04/21	M03	H	9											
5	01/04/21	M04	H	6											
6	01/04/21	M05	H	8											
7	01/04/21	M06	H	3											
8	01/04/21	M07	H	3											
9	01/04/21	M08	H	2											
10	01/04/21	M09	H	0											
11	01/04/21	M10	H	0											
12	01/04/21	F01	H	31											
13	01/04/21	F02	H	10											
14	01/04/21	F03	H	10											
15	01/04/21	F04	H	7											
16	01/04/21	F05	H	5											
17	01/04/21	F06	H	5											
18	01/04/21	F07	H	3											
19	01/04/21	F08	H	2											
20	01/04/21	F09	H	0											
21	01/04/21	F10	H	2											
22	01/04/21	L01	H	26											

raw_data

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B3 fx 10

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	STK TRNS	C													
2	SKU	01-Apr	02-Apr	03-Apr	04-Apr	05-Apr	06-Apr	07-Apr	08-Apr	09-Apr	10-Apr	11-Apr	12-Apr	13-Apr	14-A
3	F01	10	21	15	17	13	19	15	12	16	15	13	8	13	:
4	F02	5	7	6	9	7	8	7	6	7	9	5	9	6	:
5	F03	8	6	7	5	5	7	4	5	5	6	4	7	6	:
6	F04	6	6	6	4	6	4	6	4	3	5	4	4	4	:
7	F05	3	5	4	4	3	2	4	4	5	5	4	4	4	:
8	F06	3	4	3	3	2	4	2	3	3	3	2	2	3	:
9	F07	2	2	3	2	2	2	2	2	2	3	2	3	3	:
10	F08	2	1	1	1	2	1	2	2	2	2	2	2	2	:
11	F09	1	2	2	2	1	1	2	2	1	2	2	2	2	:
12	F10	2	2	2	2	2	2	1	1	1	2	3	2	2	:
13	L01	9	7	11	6	12	6	12	10	10	10	5	10	10	:
14	L02	6	4	5	4	5	5	6	4	5	4	5	3	6	:
15	L03	3	3	4	3	3	4	4	3	5	4	4	3	3	:
16	L04	4	4	4	4	4	3	2	3	3	2	3	2	3	:
17	L05	3	4	4	4	3	4	5	3	3	3	4	4	4	:
18	L06	3	3	3	3	2	4	2	3	3	3	3	3	2	:
19	L07	4	4	3	2	3	3	4	3	3	3	3	4	4	:
20	L08	2	2	2	2	2	2	1	1	1	2	2	1	1	:
21	L09	2	1	2	2	1	1	1	2	2	1	2	2	2	:
22	L10	1	1	1	1	1	1	1	1	1	1	1	1	1	:

SKU Master Sales Data OPN STK Stock Transfer +

Ready 175%

Planning Head wants to know:

1. Which are high volume SKUs?
2. Which SKUs provide highest revenue?
3. Where should I place the high volume & high revenue SKUs in the DC?
4. Which are the SKUs I am planning to order today?



CFO wants to know:

1. What is the inventory holding?
2. Are there stockouts?
3. Why we are not getting stocks on M01?



CEO wants to know:

1. What is the availability for customers from forward DCs?
2. What is the growth at BU level?
3. How do we plan the service levels for important SKUs?



Data available

- Since Fab Mart has recently entered the Indian market, the company has just 3 Business units, viz. –
 - FMCG
 - Life style
 - Mobiles
- Also, the company has just 15 days data available for analysis



Planning Head wants to know:

1. Which are high volume SKUs?
2. Which SKUs provide highest revenue?
3. Where should I place the high volume & high revenue SKUs in the DC?
4. Which are the SKUs I am planning to order today?



Fab Mart

CFO wants to know:

1. What is the inventory holding?
2. Are there stockouts?
3. Why we are not getting stocks on M01?



Fab Mart

CEO wants to know:

1. What is the availability for customers from forward DCs?
2. What is the growth at BU level?
3. How do we plan the service levels for important SKUs?



Home Insert Draw Page Layout Formulas Data Review View

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E3 Sum of Revenue

A B C D E F G H I J K L

14

15

16 Row Labels Sum of Revenue Row Labels Sum of Revenue

17 F01 ₹2,74,200 F01 ₹2,74,200

18 F02 ₹85,800 F02 ₹85,800

19 F03 ₹96,280 F03 ₹96,280

20 F04 ₹1,00,010 F04 ₹1,00,010

21 F05 ₹35,150 F05 ₹35,150

22 F06 ₹39,200 F06 ₹39,200

23 F07 ₹44,800 F07 ₹44,800

24 F08 ₹11,400 F08 ₹11,400

25 F09 ₹17,020 F09 ₹17,020

26 F10 ₹50,949 F10 ₹50,949

27 L01 ₹3,13,600 L01 ₹3,13,600

28 L02 ₹1,82,800 L02 ₹1,82,800

29 L03 ₹2,66,400 L03 ₹2,66,400

30 L04 ₹3,07,200 L04 ₹3,07,200

31 L05 ₹3,89,805 L05 ₹3,89,805

32 L06 ₹1,32,000 L06 ₹1,32,000

33 L07 ₹2,62,500 L07 ₹2,62,500

34 L08 ₹58,500 L08 ₹58,500

35 L09 ₹54,000 L09 ₹54,000

SKU Master Sheet10 Sales Data OPN STK Stock Transfer +

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Microsoft Excel - Distribution_MilindClassWork

Search Sheet

Home Insert Draw Page Layout Formulas Data Review View

Paste Auto-sum

Sort & Filter

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B I U Merge & Centre % .00 .00

Format as Table Cell Styles Insert Delete Format

Clear Sort & Filter Find & Select

F4 X ✓ fx

A B C D E F G H I J K L

1

2

3 Row Labels Sum of Revenue Row Labels Sum of Revenue Cumulative Revenue

4 F01 ₹2,74,200 M01 ₹1,09,08,000

5 F02 ₹85,800 M07 ₹57,33,000

6 F03 ₹96,280 M03 ₹54,72,000

7 F04 ₹1,00,010 M04 ₹54,40,000

8 F05 ₹35,150 M02 ₹46,40,000

9 F06 ₹39,200 M09 ₹22,00,000

10 F07 ₹44,800 M10 ₹18,00,000

11 F08 ₹11,400 M05 ₹15,36,000

12 F09 ₹17,020 M08 ₹15,12,000

13 F10 ₹50,949 M06 ₹9,52,000

14 L01 ₹3,13,600 L05 ₹3,89,805

15 L02 ₹1,82,800 L01 ₹3,13,600

16 L03 ₹2,66,400 L04 ₹3,07,200

17 L04 ₹3,07,200 F01 ₹2,74,200

18 L05 ₹3,89,805 L03 ₹2,66,400

19 L06 ₹1,32,000 L07 ₹2,62,500

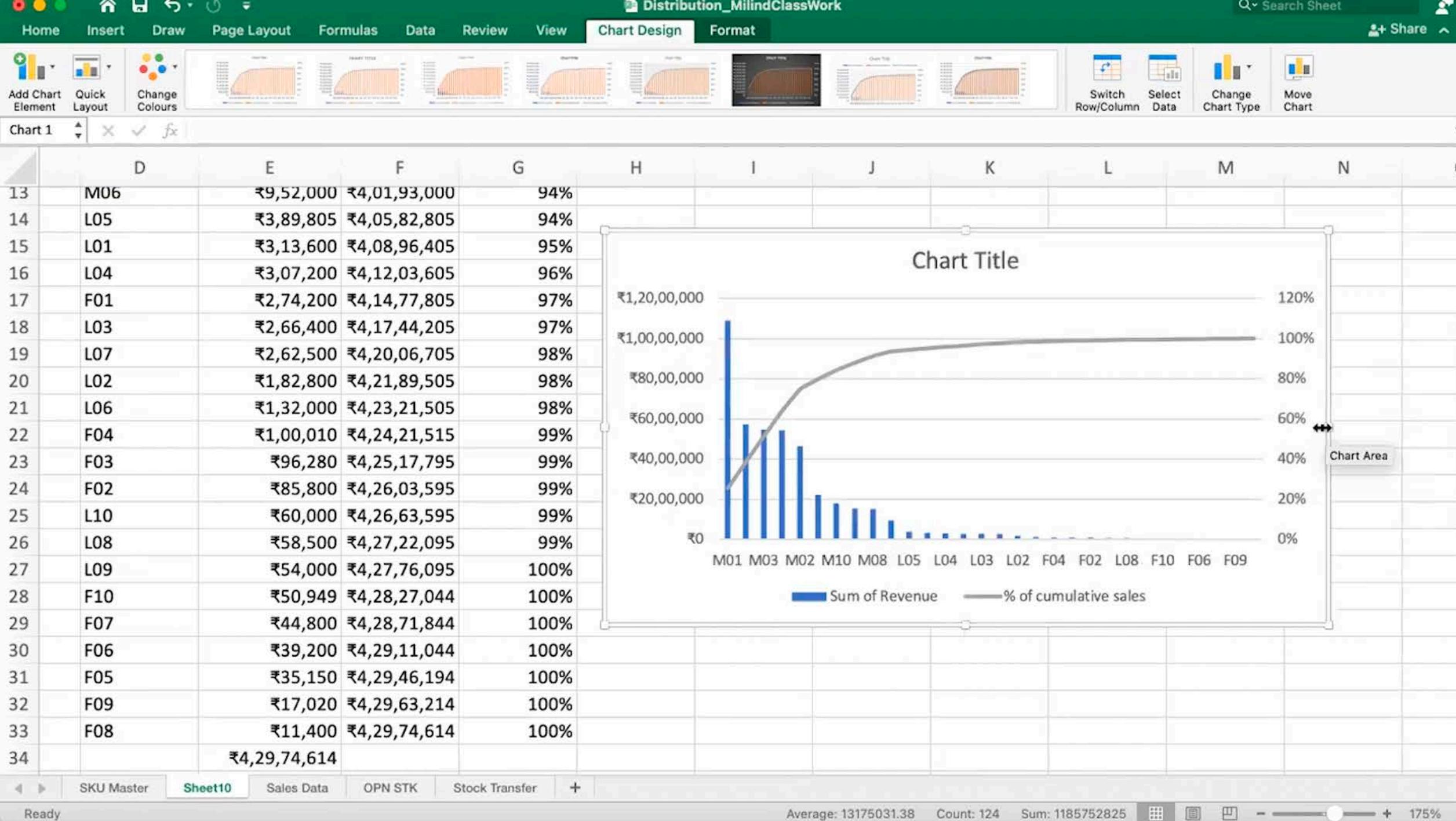
20 L07 ₹2,62,500 L02 ₹1,82,800

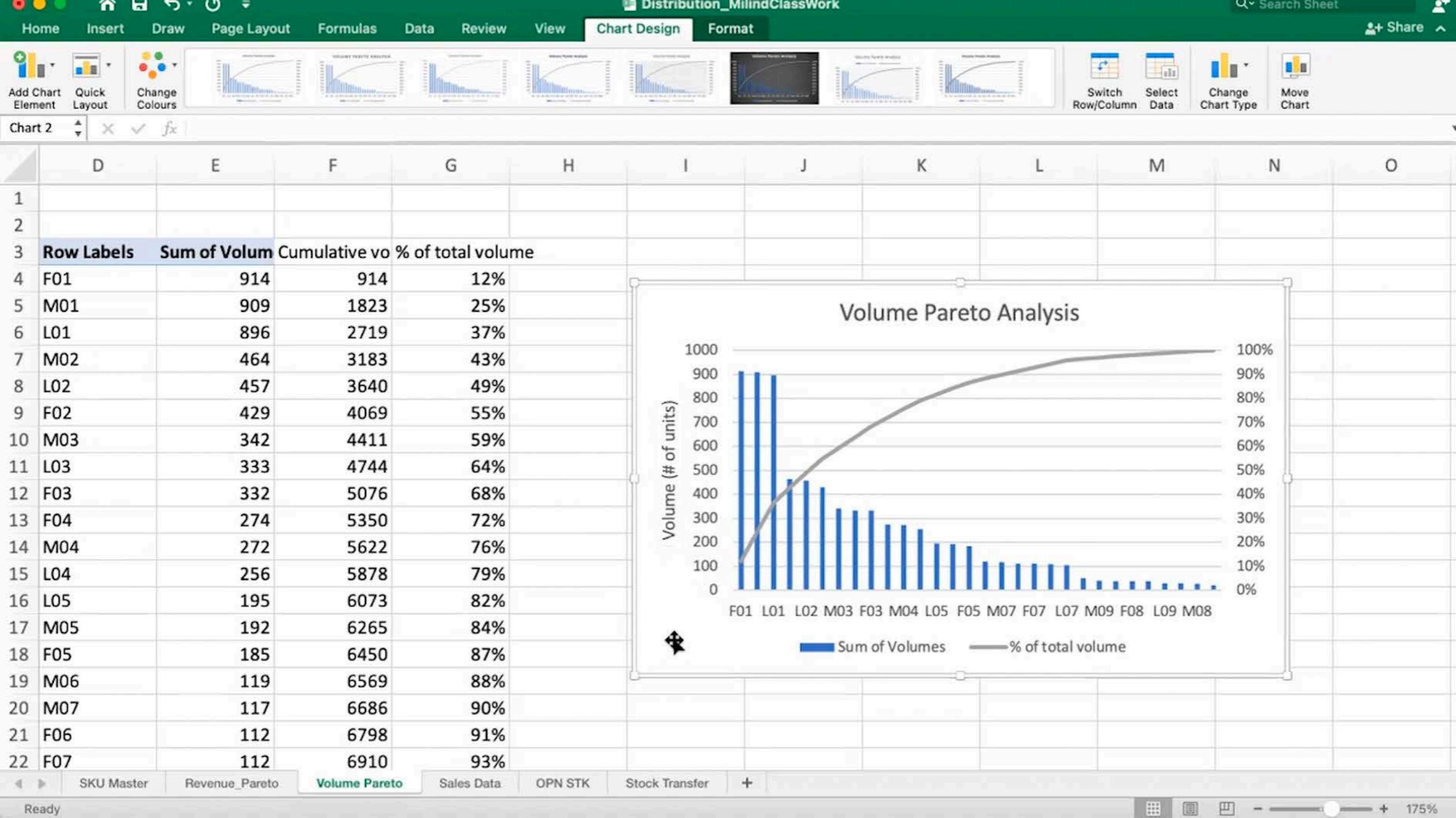
21 L08 ₹58,500 L06 ₹1,32,000

22 L09 ₹54,000 F04 ₹1,00,010

SKU Master Sheet10 Sales Data OPN STK Stock Transfer +

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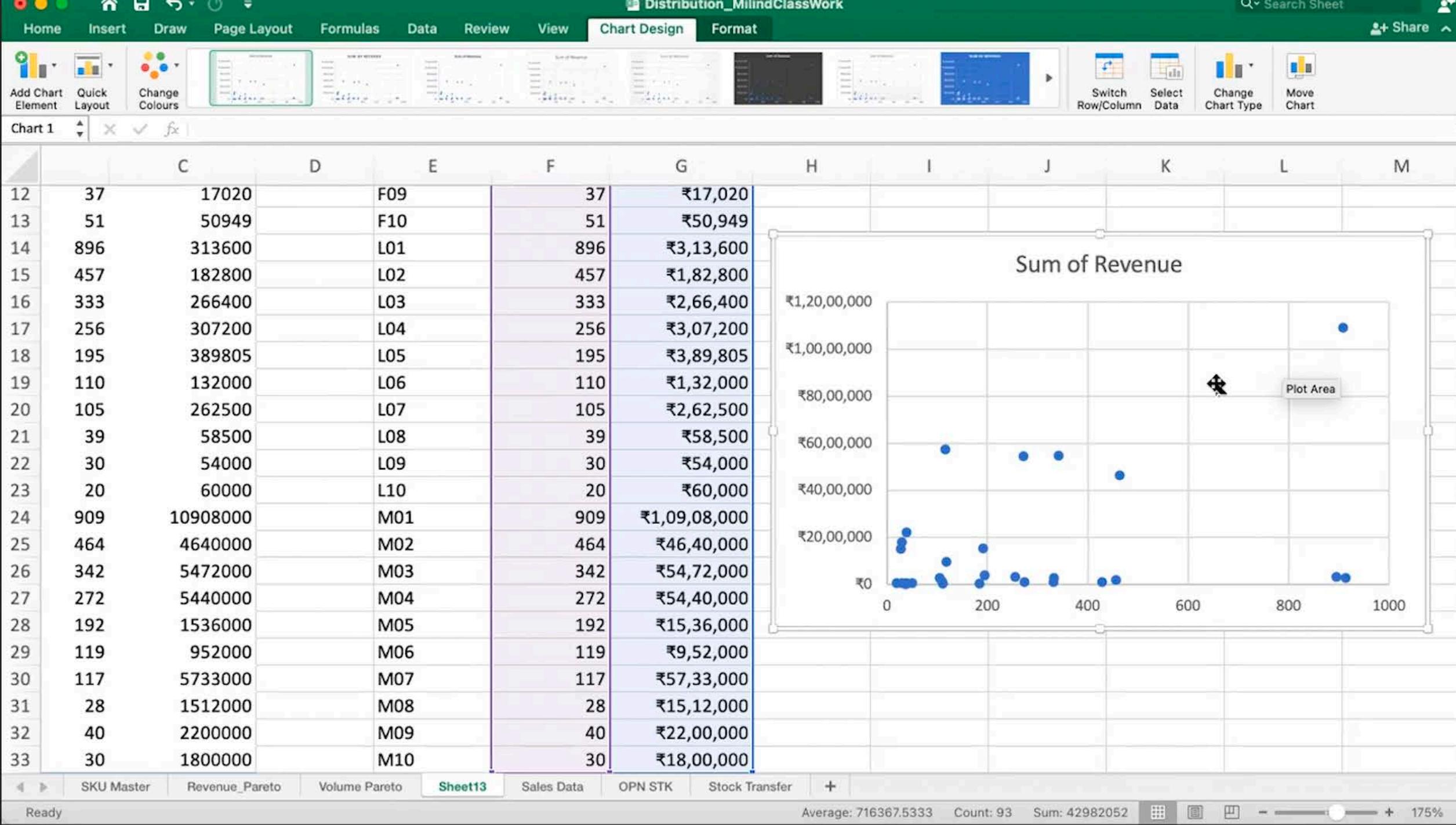
Pivot Table Recommended Pivot Tables Table Pictures Shapes Icons Get Add-ins My Add-ins Recommended Charts Maps Pivot Chart Sparklines Timeline Link New Comment Text Box Header & Footer Equation Symbol

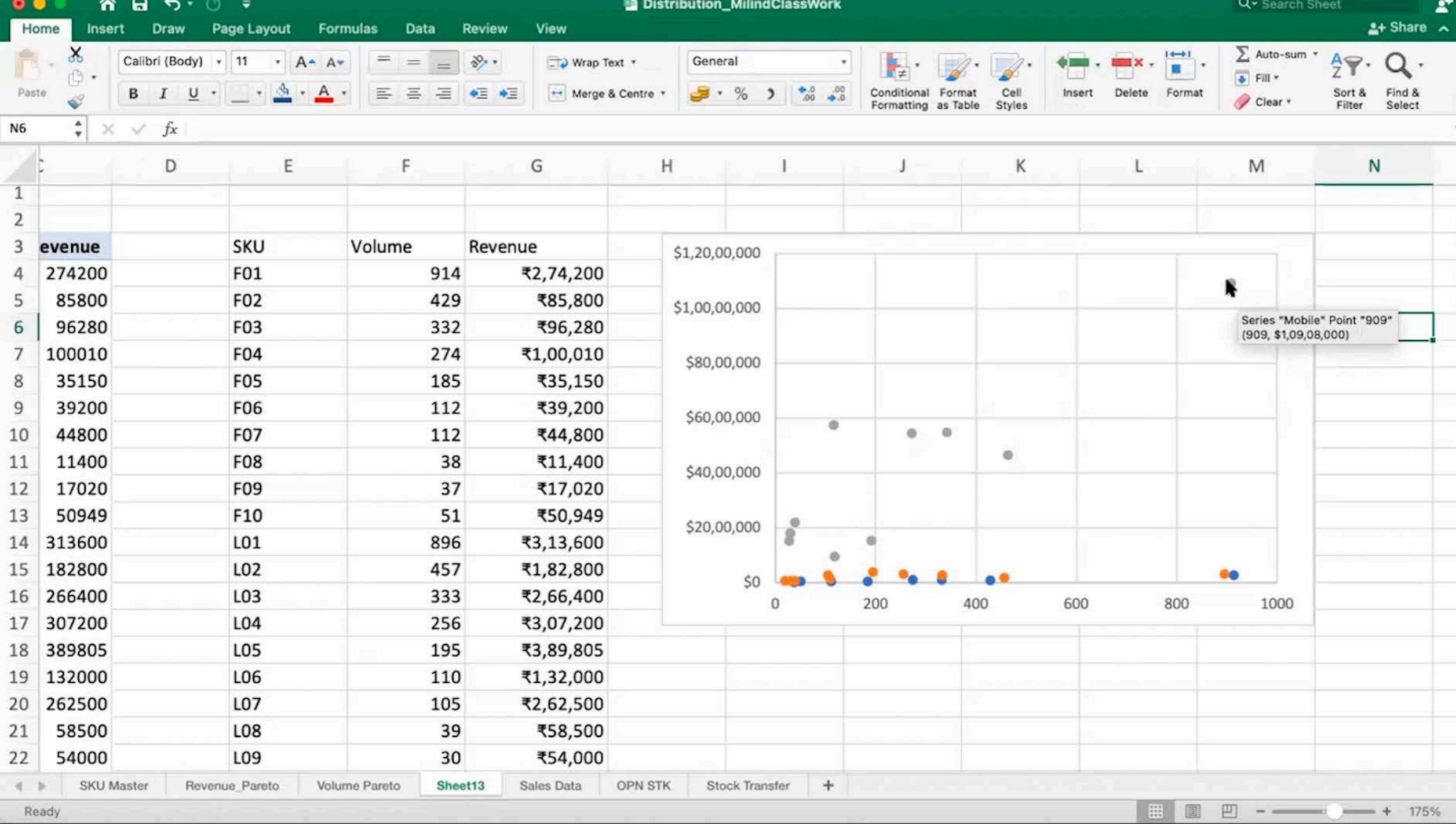
E3 SKU

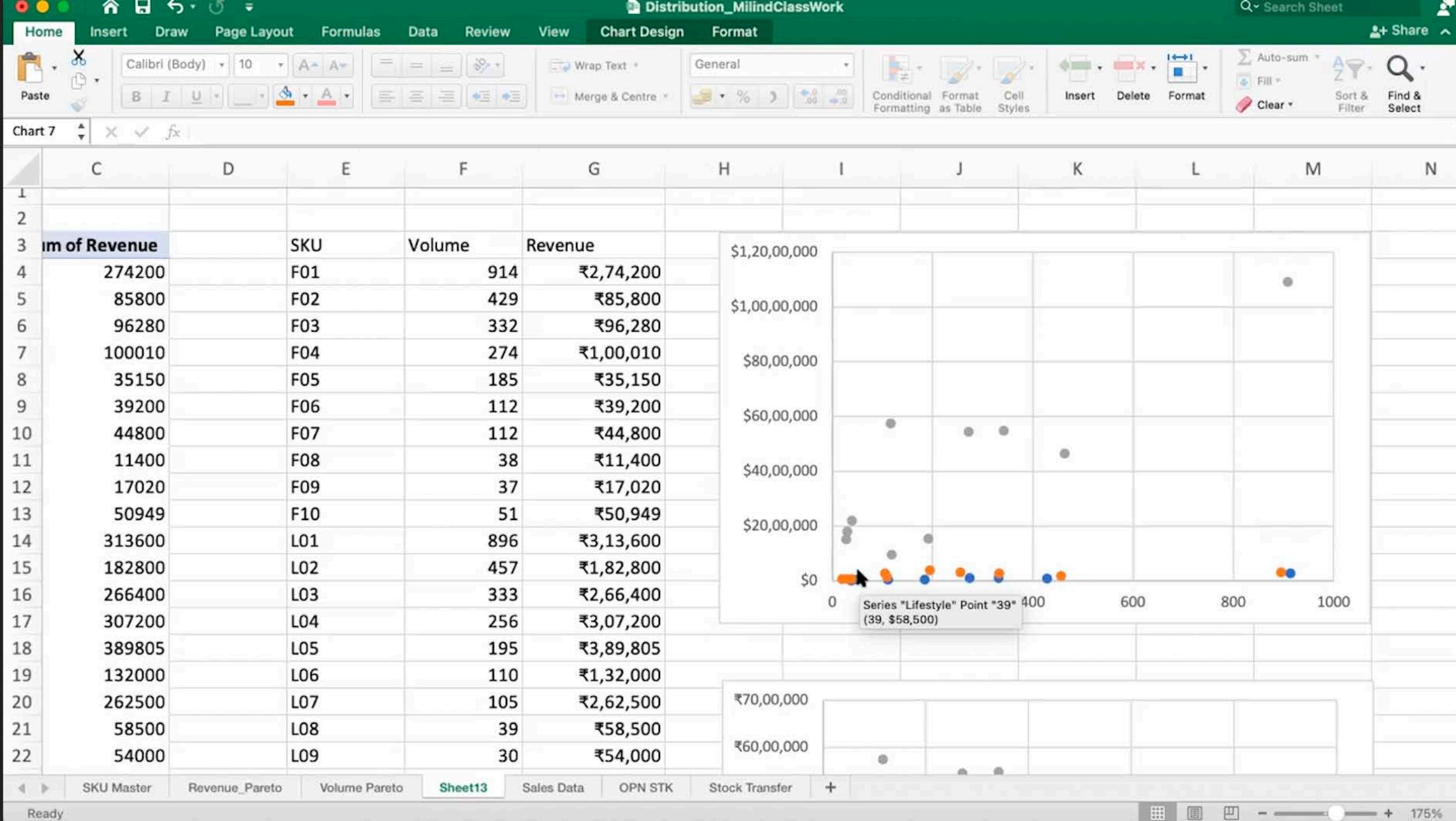
	A	B	C	D	E	F	G	H	I	J	K
13	F10	51	50949		F10	51	₹50,949				
14	L01	896	313600		L01	896	₹3,13,600				
15	L02	457	182800		L02	457	₹1,82,800				
16	L03	333	266400		L03	333	₹2,66,400				
17	L04	256	307200		L04	256	₹3,07,200				
18	L05	195	389805		L05	195	₹3,89,805				
19	L06	110	132000		L06	110	₹1,32,000				
20	L07	105	262500		L07	105	₹2,62,500				
21	L08	39	58500		L08	39	₹58,500				
22	L09	30	54000		L09	30	₹54,000				
23	L10	20	60000		L10	20	₹60,000				
24	M01	909	10908000		M01	909	₹1,09,08,000				
25	M02	464	4640000		M02	464	₹46,40,000				
26	M03	342	5472000		M03	342	₹54,72,000				
27	M04	272	5440000		M04	272	₹54,40,000				
28	M05	192	1536000		M05	192	₹15,36,000				
29	M06	119	952000		M06	119	₹9,52,000				
30	M07	117	5733000		M07	117	₹57,33,000				
31	M08	28	1512000		M08	28	₹15,12,000				
32	M09	40	2200000		M09	40	₹22,00,000				
33	M10	30	1800000		M10	30	₹18,00,000				
34	Grand Total	7438	42974614								

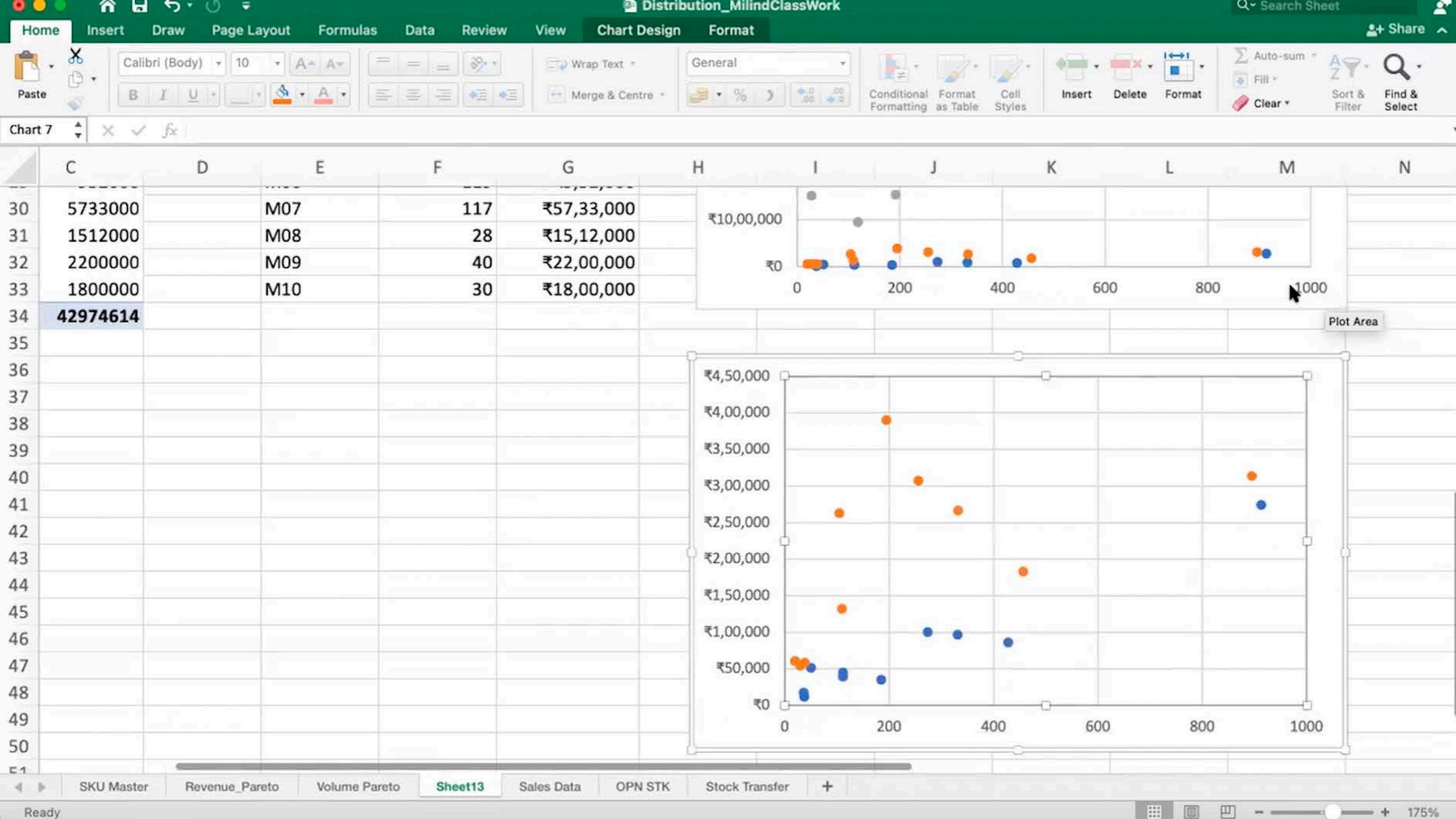
SKU Master Revenue_Pareto Volume Pareto Sheet13 Sales Data OPN STK Stock Transfer + Average: 716367.5333 Count: 93 Sum: 42982052

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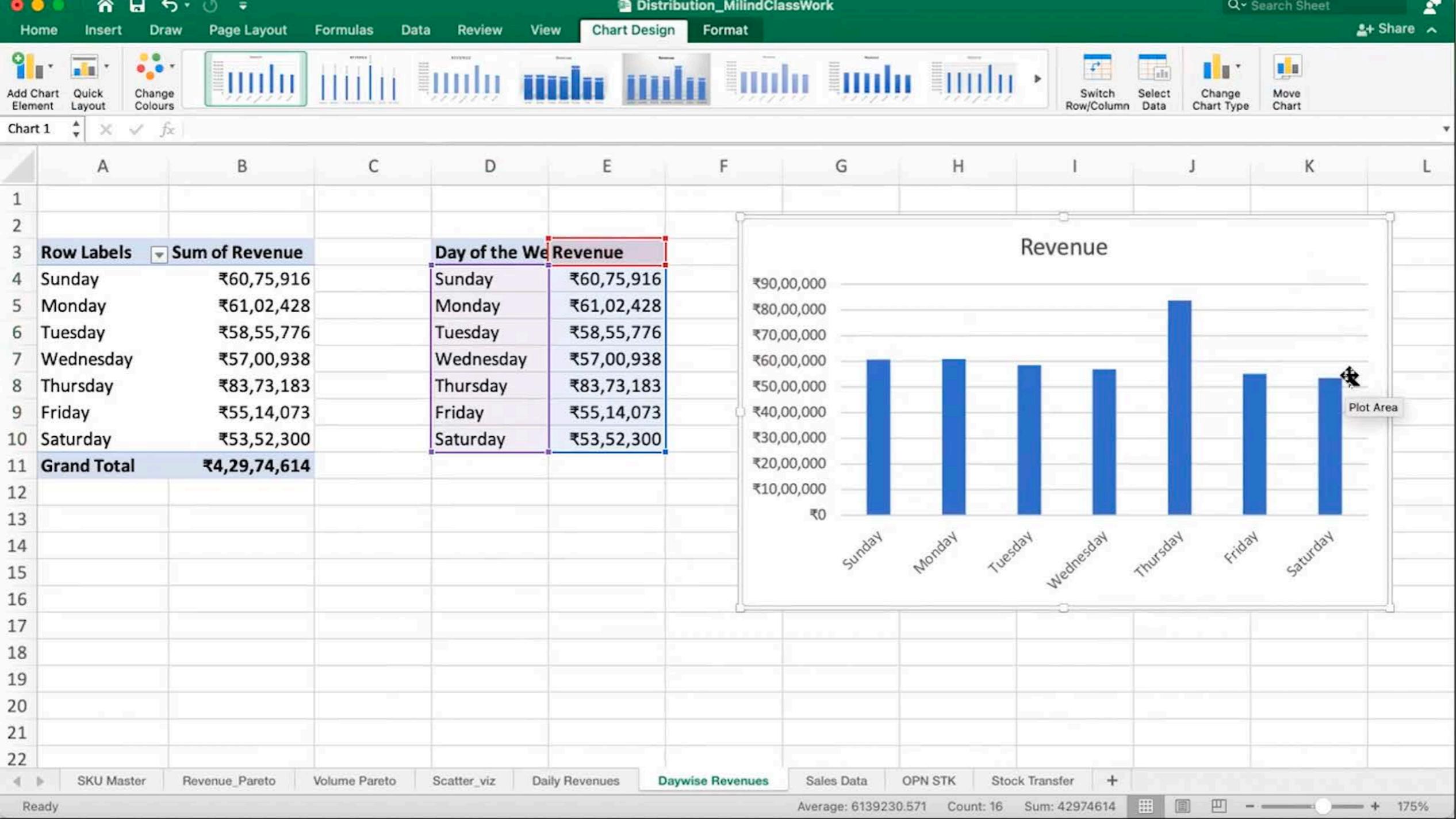
Pivot Table Recommended Pivot Tables Table Pictures Shapes Icons Get Add-ins My Add-ins Recommended Charts Maps Pivot Chart Sparklines Slicer Timeline Link New Comment Text Box Header & Footer A π Ω Equa Sym

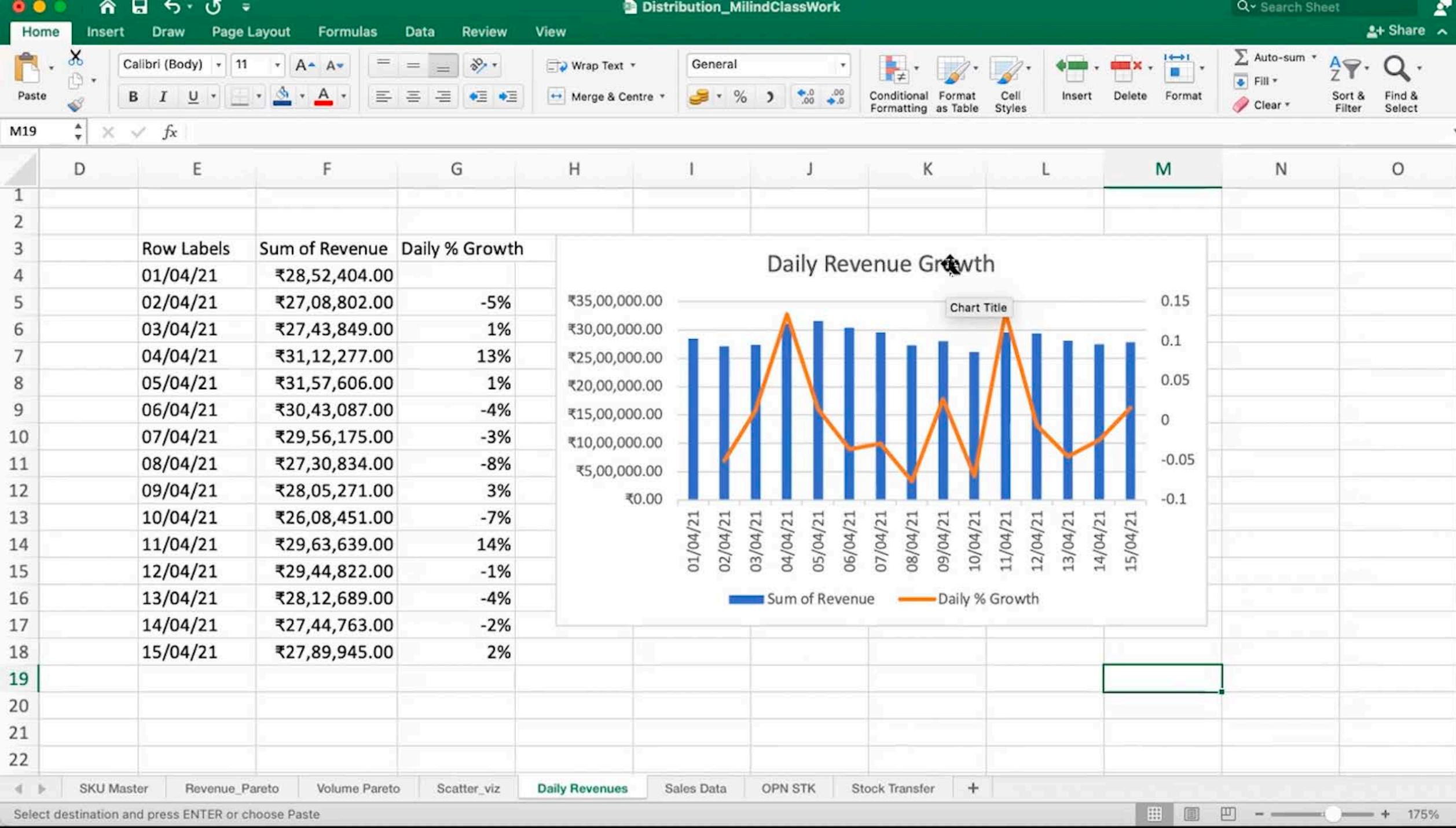
A1 × ✓ fx Date

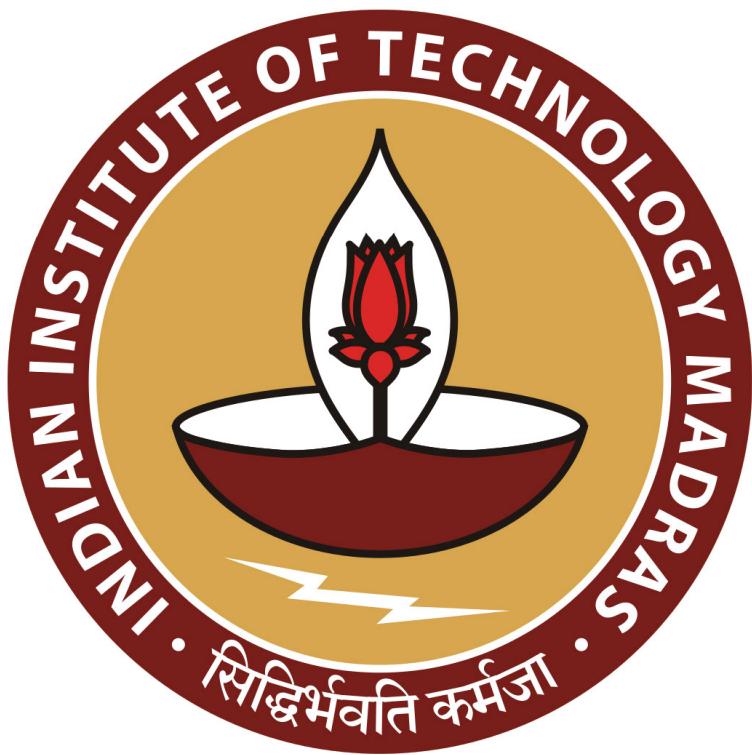
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Date	SKU	City	Volumes	Price	Revenue								
2	01/04/21	M01	H	26	12000	₹3,12,000								
3	01/04/21	M02	H	13	10000	₹1,30,000								
4	01/04/21	M03	H	9	16000	₹1,44,000								
5	01/04/21	M04	H	6	20000	₹1,20,000								
6	01/04/21	M05	H	8	8000	₹64,000								
7	01/04/21	M06	H	3	8000	₹24,000								
8	01/04/21	M07	H	3	49000	₹1,47,000								
9	01/04/21	M08	H	2	54000	₹1,08,000								
10	01/04/21	M09	H	0	55000	₹0								
11	01/04/21	M10	H	0	60000	₹0								
12	01/04/21	F01	H	31	300	₹9,300								
13	01/04/21	F02	H	10	200	₹2,000								
14	01/04/21	F03	H	10	290	₹2,900								
15	01/04/21	F04	H	7	365	₹2,555								
16	01/04/21	F05	H	5	190	₹950								
17	01/04/21	F06	H	5	350	₹1,750								
18	01/04/21	F07	H	3	400	₹1,200								
19	01/04/21	F08	H	2	300	₹600								
20	01/04/21	F09	H	0	460	₹0								
21	01/04/21	F10	H	2	999	₹1,998								
22	01/04/21	L01	H	26	350	₹9,100								

SKU Master Revenue_Pareto Volume Pareto Scatter_viz Sales Data OPN STK Stock Transfer + Average: 12/03/59 Count: 8106

Ready







IIT Madras

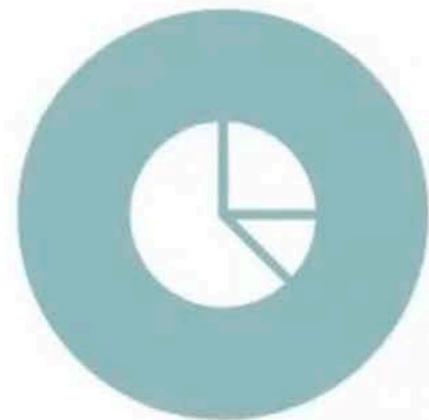
ONLINE DEGREE

LEARNING OBJECTIVE OF THIS COURSE

At the end of this course you will learn:

- ❖ Sales and Revenue Analysis
- ❖ Production Planning and Analysis
- ❖ Profitability Analysis
- ❖ Raw Materials Requirement Analysis
- ❖ Human Resource Requirement Analysis

ACE GEARS LIMITED – BUSINESS PROFILE



MANUFACTURE & SUPPLY OF
AUTOMOBILE GEAR ASSEMBLIES TO
OEMS AND TIER-1 COMPANIES



HAS CUSTOMERS IN ALL FOUR
REGIONS OF INDIA



HAS NUMEROUS PRODUCTS BUT
ONLY 10 PRODUCTS ARE
CONSIDERED FOR THIS CASE STUDY

ACE GEARS COMPANY

- ❖ ACE Gears Manufactures Gear Assemblies and supplies them to OEMs (OEM-Original Equipment Manufacturer) and Tier-1 suppliers across India.
- ❖ At present, it produces 10 Gear Assemblies

Gear Type	Number of Assemblies
BS4 Engines Only	2
BS4 and BS6 Engines	6
BS6 Engines only	2

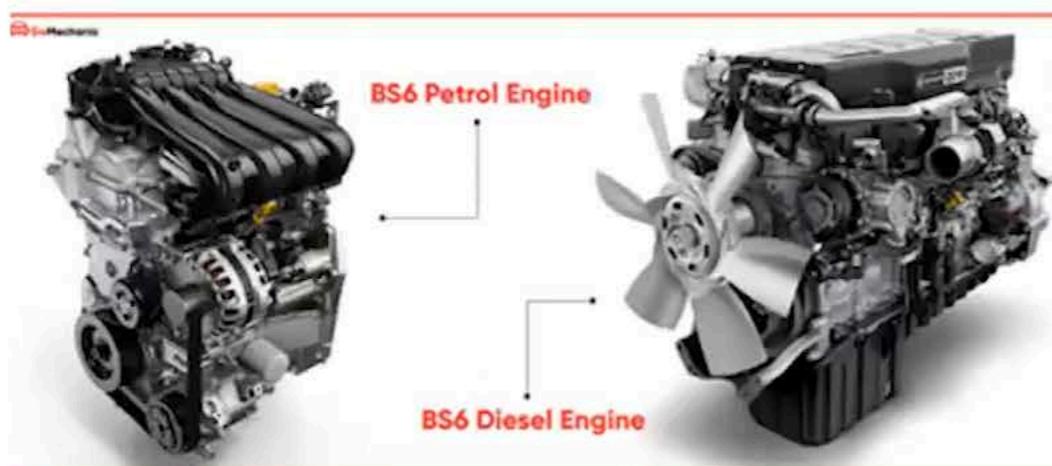
THE TEAM

Designation	Employee	Responsibilities
Sales Manager	Archana	Sales planning, Forecasting
Production Scheduler	Swarup	Production Scheduling
Shop-floor Manager	Francis	Inventory Management (Raw materials, Work-in-Progress, Finished Goods)
Purchase Manager	Razia	Raw Material Procurement
Finance Manager	Chandru	Profitability, Revenue, and other accounts related works
Human Resource Manager	Ashish	Workforce Planning

THE BACKGROUND

- ❖ Govt. of India has directed all automobile companies to migrate from BS4 engine to BS6 Engines
 - Pressure on OEMs and Suppliers to shift from BS4 to BS6
- ❖ ACE Gears decides to discontinue gear assemblies for BS4 engines from April 1, 2020 according the Govt. norms
- ❖ Simultaneously, manufacturing of gear assemblies for BS6 engines starts from April 1, 2020
- ❖ CoVID pandemic has had impact on the automobile sector as a whole in 2020

Illustrations on BS-4/6 engines/Gears

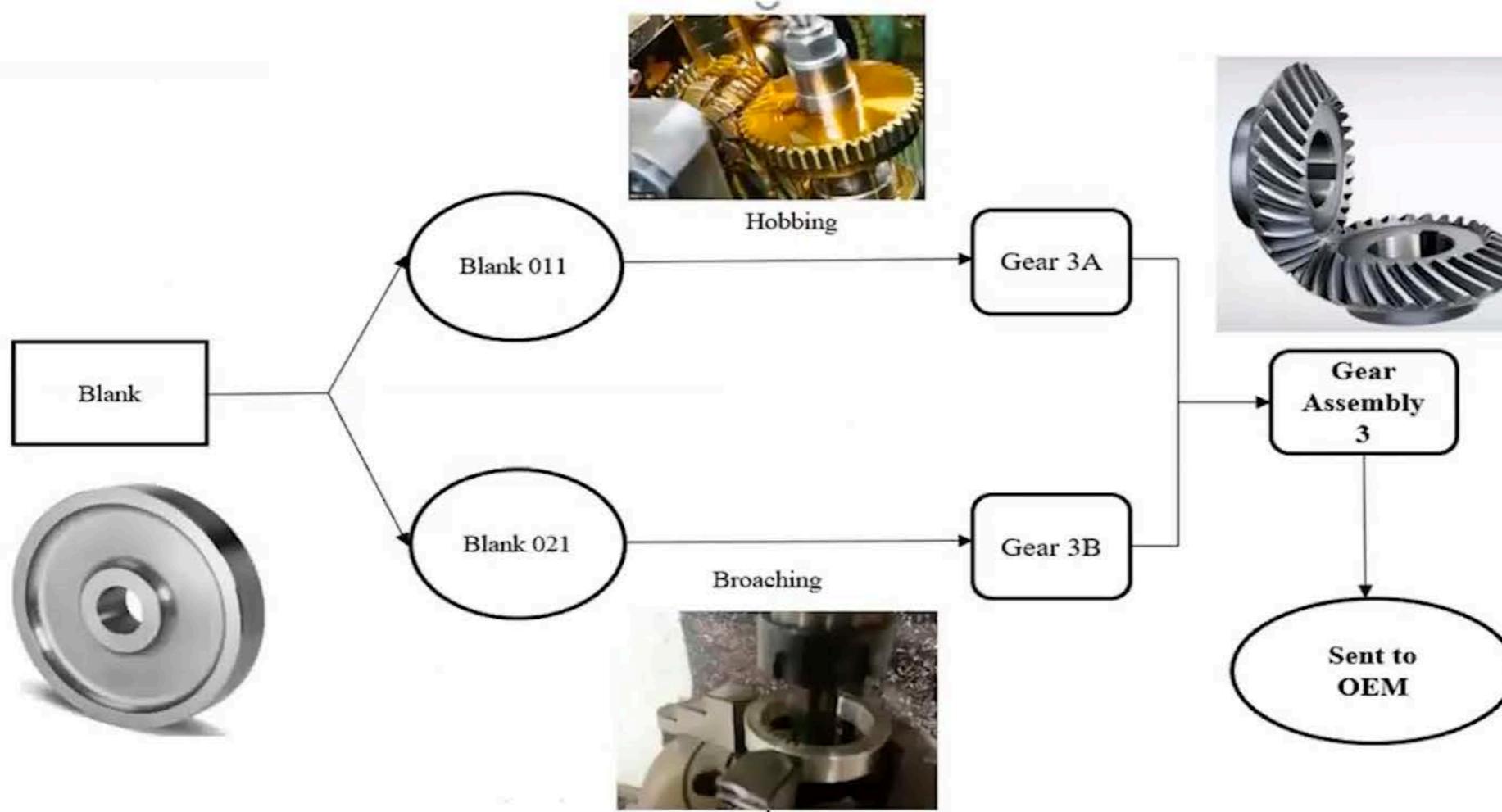


How BS6 Petrol and Diesel engines work to reduce emissions?

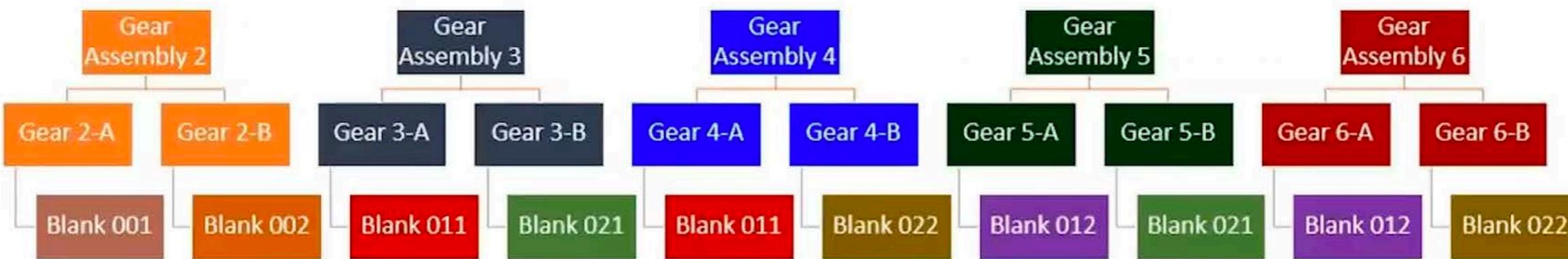
Emission Targets				
Engine Type	Mass of Exhaust Gas	BS4 Limit	BS6 Limit	Percentage Decrease
Petrol	CO (in mg/km)	1000	1000	Nil
	HC (in mg/km)	100	100	Nil
	Nox (in mg/km)	80	60	25
	PM (in mg/km)		4.5	
Diesel	CO (in mg/km)	500	500	Nil
	HC + NOx (in mg/km)	300	170	43
	Nox (in mg/km)	250	80	68
	PM (in mg/km)	25	4.5	82

Source: Autocar India

ACE Gears - Manufacturing Process



PRODUCT STRUCTURE (BILL OF MATERIALS)



ERP SYSTEMS

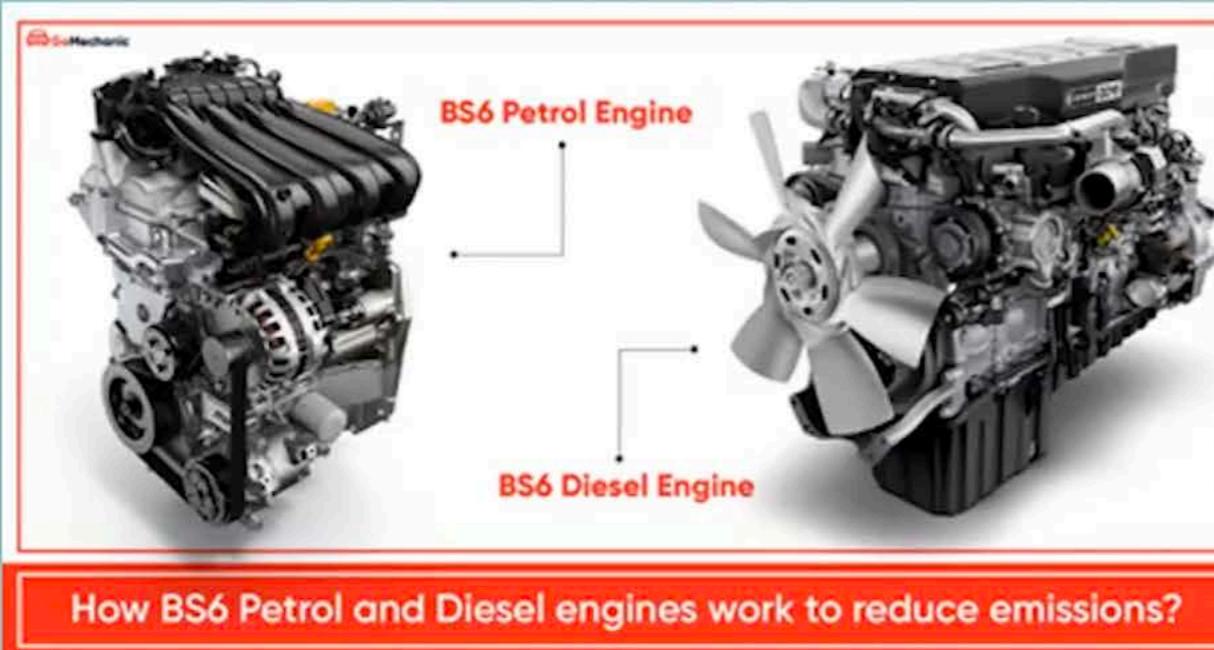
- Integrates the various planning and execution functions of a company
- Data flows seamlessly between departments, avoiding need for repeated data entry and avoiding errors
- Based on common master data elements such as customer, product, supplier, material data maintained commonly at company level



THE BACKGROUND

- ❖ Govt. of India has directed all automobile companies to migrate from BS4 engine to BS6 Engines
 - Pressure on OEMs and Suppliers to shift from BS4 to BS6
- ❖ ACE Gears decides to discontinue gear assemblies for BS4 engines from April 1, 2020 according the Govt. norms
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Illustrations on BS-4/6 engines/Gears



Emission Targets				
Engine Type	Mass of Exhaust Gas	BS4 Limit	BS6 Limit	Percentage Decrease
Petrol	CO (in mg/km)	1000	1000	Nil
	HC (in mg/km)	100	100	Nil
	Nox (in mg/km)	80	60	25
	PM (in mg/km)		4.5	
Diesel	CO (in mg/km)	500	500	Nil
	HC + NOx (in mg/km)	300	170	43
	Nox (in mg/km)	250	80	68
	PM (in mg/km)	25	4.5	82

Source: Autocar India

PLANNING PROCESS

- Production Planning happens through a hierarchical process, with increasing level of detail
- As we go down the flow, the planning intervals get shorter and the plan units get more granular
- Strategic Business Plans are generally Annual, S&OP and MPS are generally month-wise, MRP may be weekly and Detailed Production Schedule is shift-wise

Strategic Business Plan

Sales & Operations Plan (S&OP)

Master Production Schedule (MPS)

Material Requirement Plan (MRP)

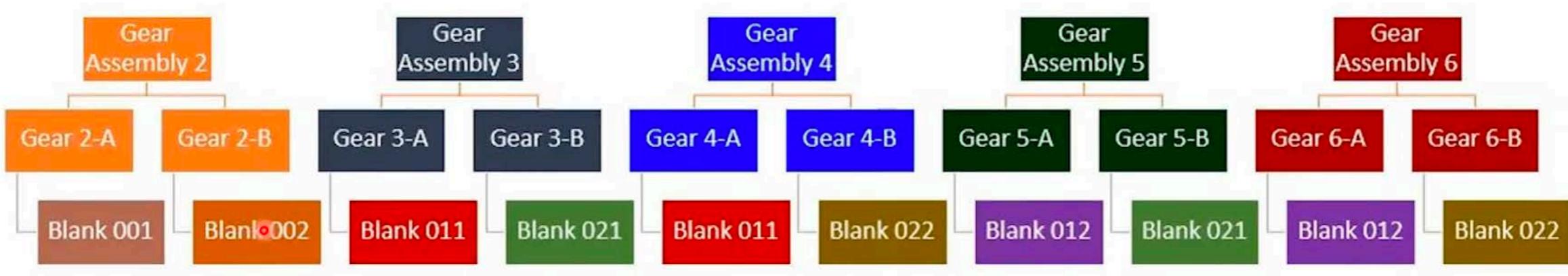
Capacity Requirement Plan

Detailed Production Scheduling

Production Activity Control

Purchasing Plan

PRODUCT STRUCTURE (BILL OF MATERIALS)



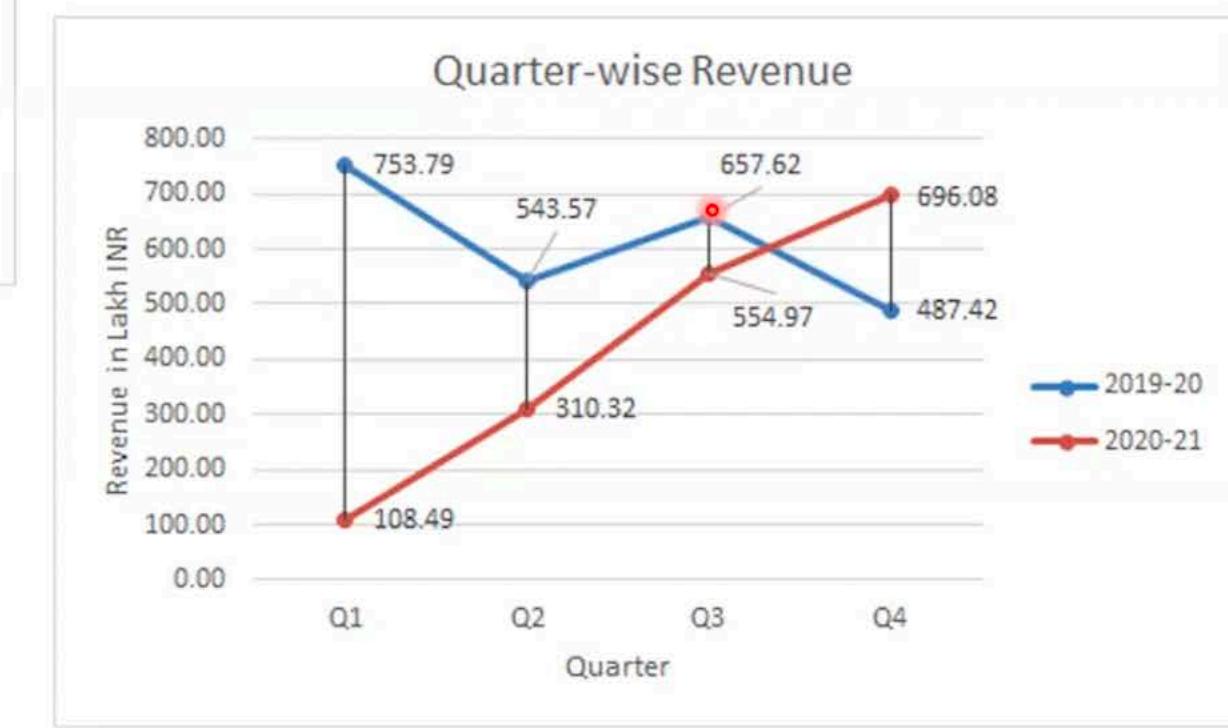
Monthly/ Quarterly/Annual Revenue - Two Years

Month	2019-20	2020-21	% Change	2019-21
Apr	231.30	0	-100.00%	231.30
May	266.95	16.85	-93.69%	283.80
Jun	255.53	91.64	-64.14%	347.17
Jul	175.00	133.14	-23.92%	308.14
Aug	191.49	90.49	-52.74%	281.98
Sep	177.08	86.67	-51.05%	263.77
Oct	227.38	175.41	-22.86%	402.79
Nov	248.46	181.43	-26.98%	429.90
Dec	181.77	198.13	9.00%	379.91
Jan	190.72	199.92	4.82%	390.64
Feb	192.82	245.98	27.57%	438.80
Mar	103.88	250.19	140.85%	354.07
Total	2,442.39	1,669.86	-31.63%	4,112.26

Quarter	2019-20	2020-21	% Change	Grand Total
Q1	753.79	108.49	-85.61%	862.27
Q2	543.57	310.32	-42.91%	853.89
Q3	657.62	554.97	-15.61%	1212.59
Q4	487.42	696.08	42.81%	1183.50
Grand Total	2,442.40	1,669.86	-31.63%	4,112.26

All Revenue Figures are in INR Lakhs

Monthly/ Quarterly/Annual Revenue -Graphs

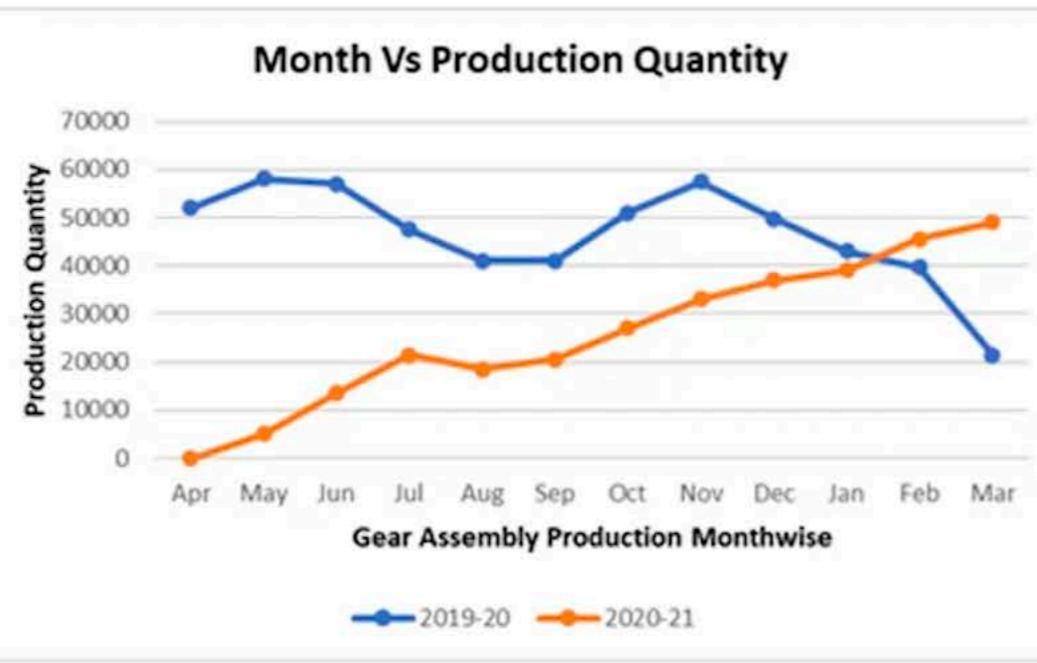


Gear Assembly Based on Production and Sales Quantity - Two Years

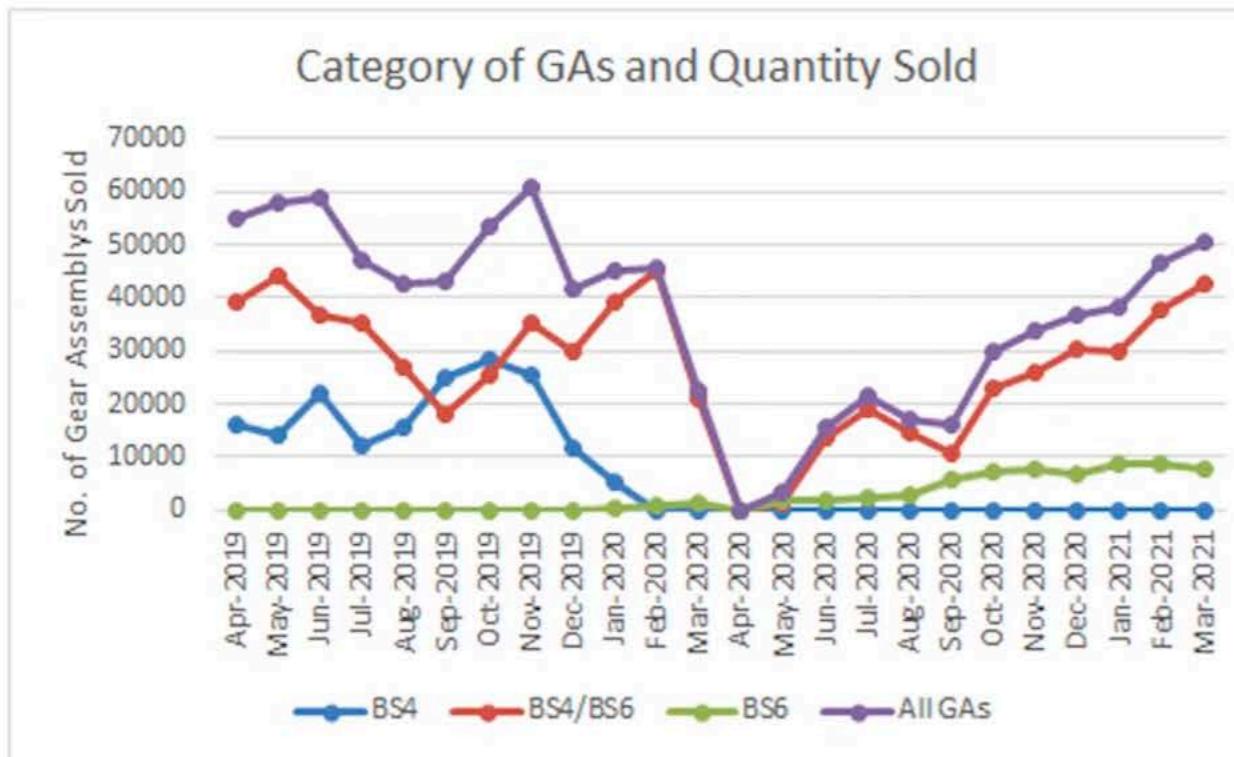
Production Quantity			
Month	2019-20	2020-21	Grand Total
Apr	52,000	0	52,000
May	58,000	5,000	63,000
Jun	57,000	13,500	70,500
Jul	47,500	21,500	69,000
Aug	41,000	18,500	59,500
Sep	41,000	20,500	61,500
Oct	51,000	27,000	78,000
Nov	57,500	33,000	90,500
Dec	49,750	37,000	86,750
Jan	42,950	39,000	81,950
Feb	39,750	45,500	85,250
Mar	21,500	49,000	70,500

Sales Quantity			
Month	2019-20	2020-21	Grand Total
Apr	54,932	0	54,932
May	58,121	3,189	61,310
Jun	58,676	15,617	74,293
Jul	47,291	21,534	68,825
Aug	42,426	17,195	59,621
Sep	43,247	16,244	59,491
Oct	53,658	29,903	83,561
Nov	60,671	33,558	94,229
Dec	41,502	36,899	78,401
Jan	44,959	38,344	83,303
Feb	45,795	46,638	92,433
Mar	22,555	50,618	73,173

Month Wise Production and Sales Quantity -Graphs



What does Archana learn from this Graph?



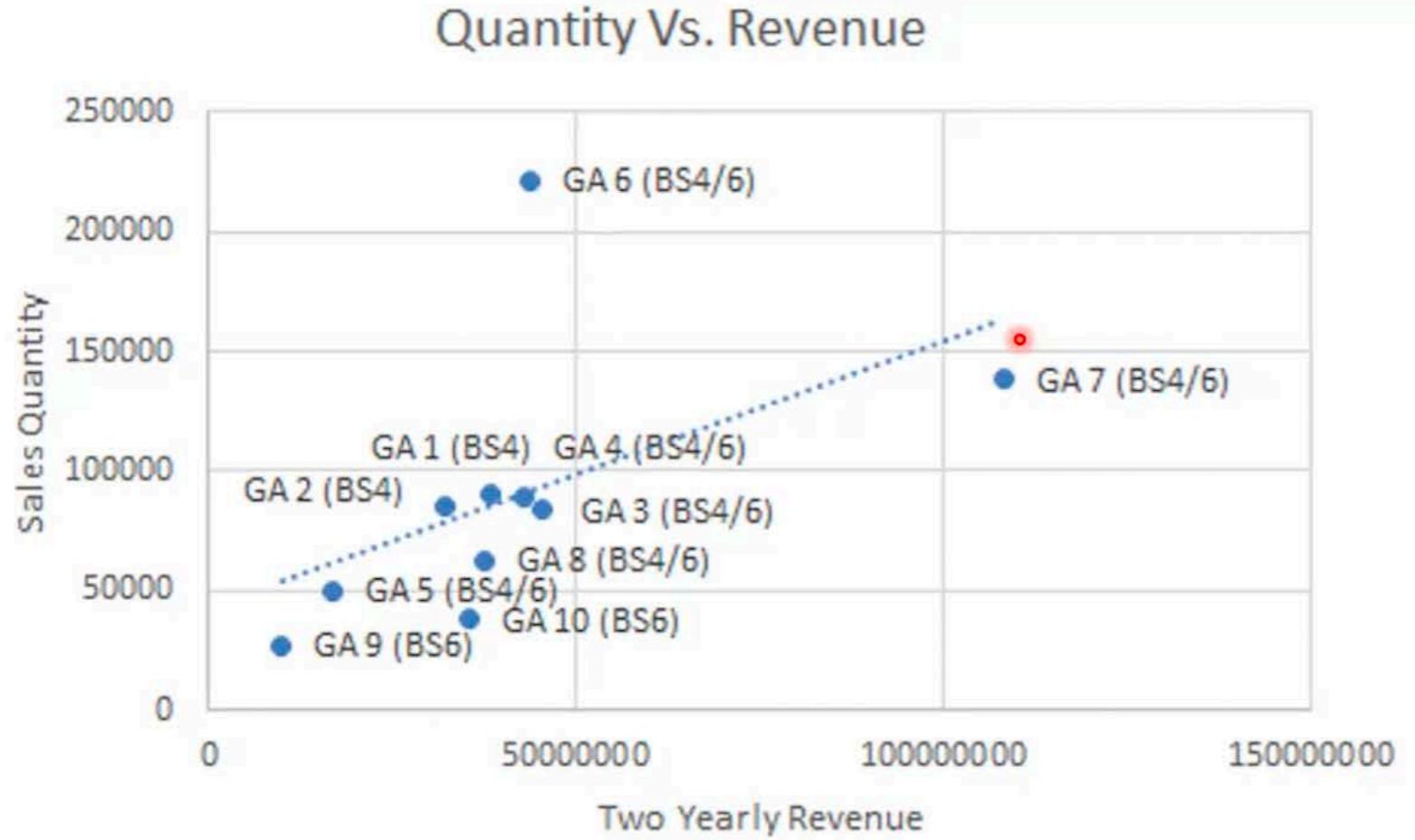
In which months of the FY 2019-20 did the sale of BS4 category gears surpassed other categories?

- Why is there a decline in sales of BS4 after Nov-19? Why is there a sales of BS6 even before the Govt. mandated time?

When did the difference between BS6 and BS4/BS6 categories least in terms of quantity produced?

During the period Apr-2019 to Dec-2019, when did the difference between BS4 and BS4/BS6 categories most in terms of quantity produced?

GEAR ASSEMBLY SALES QUANTITY VS. REVENUE



What can be inferred from this graph?

What goes into making GAs and why are some GAs cheaper than others?

GA6 - High Volume Product

GA7 - High Revenue Product

One Year Scatter Plot Amplify Cluster

ARCHANA'S CURIOSITY ANSWERED

1. Revenue Receipts of Each Region

Region	Oct-19	Nov-19	Dec-19	Total Revenue
North	62,76,200	6231575	45,57,600	1,70,65,375
East	71,08,150	7176550	34,40,800	1,77,25,500
West	26,90,550	4474400	35,37,500	1,07,02,450
South	66,62,990	7003840	66,41,510	2,03,08,340
Total	2,27,37,890	2,48,86,365	1,81,77,410	6,58,01,665

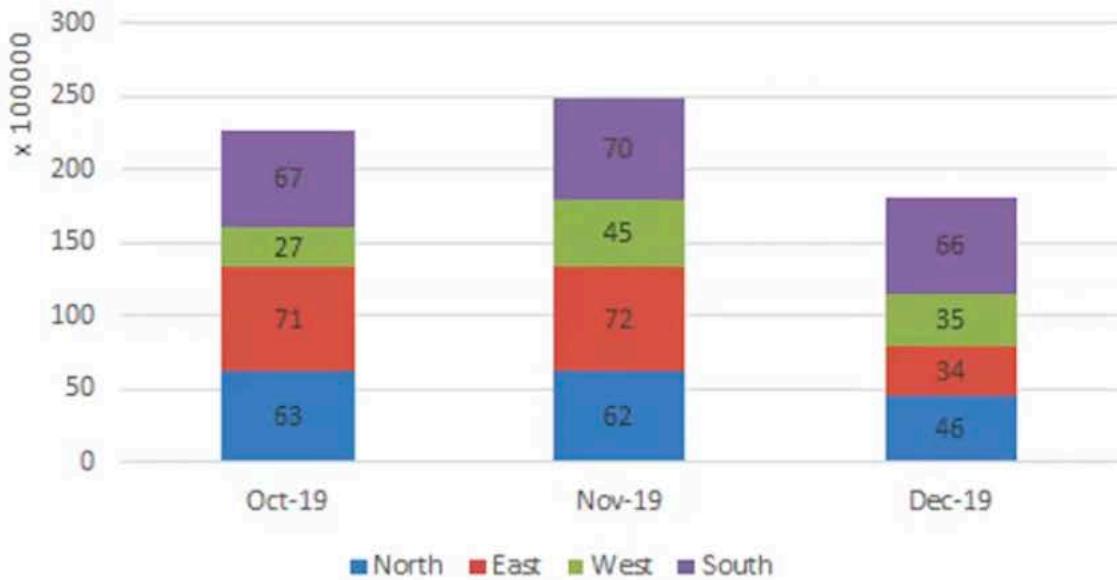
2. No. of Agents Needed and their Salary

Region	Oct-19 Volumes	Nov-19 Volumes	Dec-19 Volumes	Max	No. of Agents	Agent Salary/ Month
North	16,230	16,645	11,815	16,645	4	80,000
East	17,135	17,695	8,295	17,695	4	80,000
West	5,985	9,640	7,485	9,640	2	40,000
South	14,308	16,691	13,907	16,691	4	80,000
Total	53,658	60,671	41,502	60,671	14	2,80,000

How do you calculate, how much revenue did each agent manage in a region on an average.

REGION WISE REVENUE DISTRIBUTION

Region wise Revenue Distribution in INR Lakhs



Regionwise % Revenue

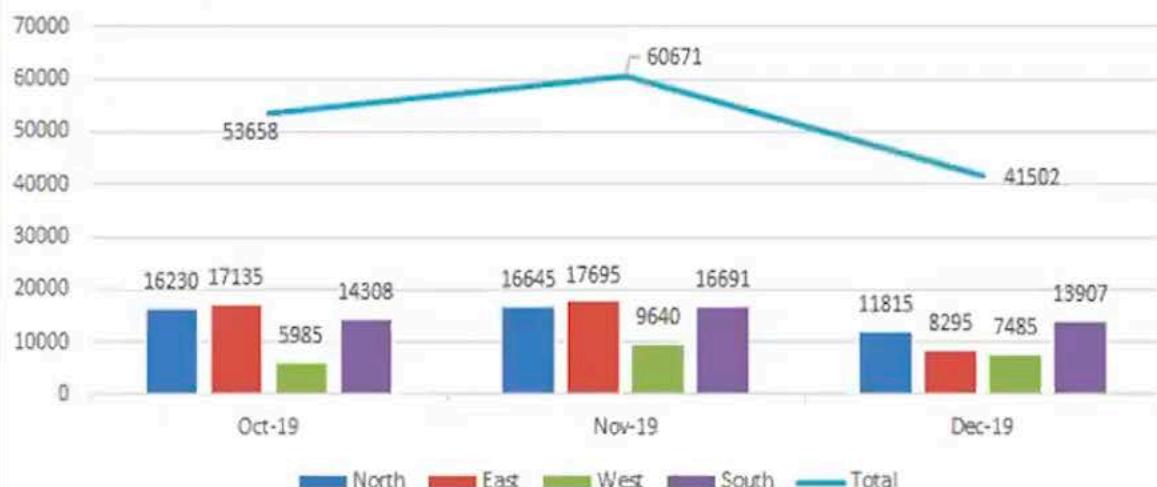


What can you infer the above graphs?

Why do you think there is a sudden dip in revenue in Dec in East and North region?

MONTH-WISE REGIONAL SALES QUANTITY AND REVENUE DISTN.

Regionwise GA Sales Details



Regionwise Revenue Distribution

