Supply Use Table Analysis

Mini Project – Mathematics for Analytics

Submitted by:
Abhishek Vyas
M2021anlt001

Index:

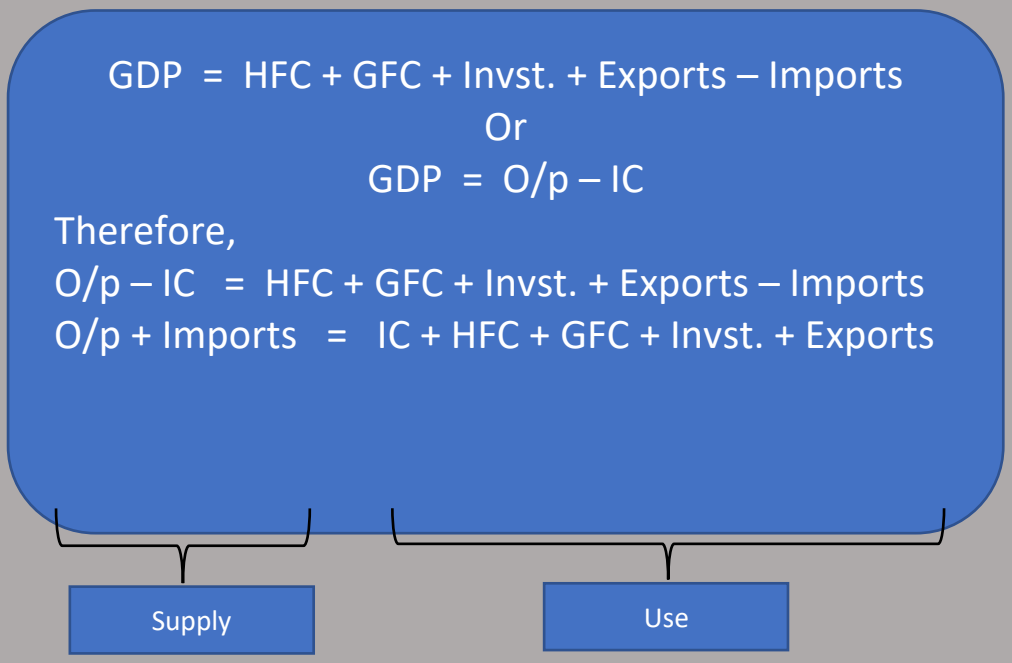
1. Introduction

Supply and Use forms one of the most basic concepts in economics and is quite interesting when you observe how different industries are interconnected with each other. What is supplied by one industry, then how another industry consumes it, and much more. Eg Educational industry & Garments industry: when children go to school they require uniforms and garments, and these garments are provided by the garment industry. One might not be able to find correlation between different industries easily, but it becomes much easier with the supply-use table. India is one of the largest economies in the world and has developed at good pace in the last decades, to ensure this growth in the future it is vital that we have better understanding of the supple and use of the country across different industries.

2. About the Supply Use table

SUT is a detailed information system that is composed of a supply matrix and a use matrix. The supply matrix tells us about the products that are available across industries and use matrix shows us how the products are used.

The relation between the supply and use in the economy can also be linked to the GDP of that economy. Below is the equation:



HFC -> Household Final Consumption
GFC -> Government Final Consumption
Invst. -> Investment
o/p -> Output
IC -> Intermediate Consumption

➔ Below are the snapshot of Supply and Use tables and how the matrices play a part here.

- Supply table

Supply Table

	Industry 1	...	Industry n	Import	Taxes less subsidies on products	Trade and transport margins	Total supply at purchasers' prices
Product 1 Product 2 ... Product m	Domestic Output matrix at basic prices				Valuation Matrix		
Output/ Total at basic prices							

- Use table

Use Table

	Industry 1	...	Industry n	Final consumption expenditure	Gross capital formation	Exports	Total uses at Purchasers' prices
Product 1	Intermediate Use Matrix			Final use Matrix			
Product 2							
...							. .
Product m							
Total Intermediate Inputs							
GVA	Value Added Vector						
Compensation of Employees							
Net Operating surplus							
CFC							
Taxes less subsidies on production							
Total Input /Output							

3. Uses of Supply Use Table

- SUT can be used for measuring or getting an estimate of the GDP. GDP can be estimated by 3 different methods using SUT; Income, production and expenditure approaches.
- Helps in expressing macroeconomic trends at a microeconomic level.
- Shows how the products available in a country are employed.
- Could be used to predict or estimate the demand or use from the economy.
- Can be used to perform Sectoral, Industrial analysis.
- In many scenarios used to benchmark national accounts, used by media-houses to display some estimates.

4. Sectoral Analysis

In Sectoral analysis for the ease of understanding and for cross sector analysis we have divided the supply and use tables into 3 parts Primary, Tertiary & Secondary sector. Different Supply and Use tables can be formed separately to check. We can also identify supply and use matrices with aggregated values of the 3 sectors. Below is the example, it can be identified if supply is more than needed, and if it is more than how much more it is.

We saw that for construction industry the supply and use were the highest. Whereas lowest supply and lowest Use was seen for Repair and installation of machinery and equipments industry.

5. R Code

```
### Supply Use Table assignment in R

#Checking the structure of the data tables

Use <-
as.matrix(read_xlsx("C:\\Users\\dell\\Desktop\\sut.xlsx", sheet
= 2))
View(Use)
is.matrix(Use)

Use <- Use[-c(143:145),]  ## to remove the bottom 3 rows
str(Use)
supply <-
as.matrix(read_xlsx("C:\\Users\\dell\\Desktop\\sut.xlsx", sheet
= 1))
View(supply)
str(supply)
is.matrix(supply)


#going through the data
head(Use)
class(Use)
summary(Use)

head(supply)
class(supply)
summary(supply)

# Remove scientific notation (e values).
options(scipen = 999)

#Converting NA values to 0
Use[is.na(Use)]<-0


#Which industry has the most supply & Use
View(max(as.numeric(supply[142,3:68]))  )
max(as.numeric(Use[142,3:68]))

#Which industry has the least supply & Use
min(as.numeric(supply[142,3:68]))
min(as.numeric(Use[142,3:68]))



supply1 <-
as.matrix(read_xlsx("C:\\Users\\dell\\Desktop\\table sut.xlsx",
sheet = 1))

summary(supply1)


## Supply & Use for Primary sector products across all
PRIMARY, TERTIARY AND SECONDARY industries:

PPS <- supply[1:40, 3:12]
PPS <- as.numeric(PPS)
PPS <- sum(PPS)

PPU <- Use[1:40, 3:12]
PPU <- as.numeric(PPU)
PPU <- sum(PPU)

PSS <- supply[1:40, 13:41]
PSS <- as.numeric(PSS)
PSS <- sum(PSS)

PSU <- Use[1:40,13:41]
PSU <- as.numeric(PSU)
PSU <- sum(PSU)


PTS <- supply[1:40, 42:68]
PTS <- as.numeric(PTS)
PTS <- sum(PTS)

PTU <- Use[1:40,42:68]
PTU <- as.numeric(PTU)
PTU <- sum(PTU)



## Supply & Use for Secondary sector products across all
PRIMARY, TERTIARY AND SECONDARY industries:



SPS <- supply[41:112, 3:12]
SPS <- as.numeric(SPS)
SPS <- sum(SPS)

SPU <- Use[41:112, 3:12]
SPU <- as.numeric(SPU)
SPU <- sum(SPU)

SSS <- supply[41:112, 13:41]
SSS <- as.numeric(SSS)
SSS <- sum(SSS)

SSU <- Use[41:112,13:41]
SSU <- as.numeric(SSU)
SSU <- sum(SSU)


STS <- supply[41:112, 42:68]
STS <- as.numeric(STS)
STS <- sum(STS)
View(supply)
STU <- Use[41:112,42:68]
STU <- as.numeric(STU)
STU <- sum(STU)

## Supply & Use for Tertiary sector products across all
PRIMARY, TERTIARY AND SECONDARY industries:


TPS <- supply[113:140, 3:12]
TPS <- as.numeric(TPS)
TPS <- sum(TPS)

TPU <- Use[113:140, 3:12]
TPU <- as.numeric(TPU)
TPU <- sum(TPU)

TSS <- supply[113:140, 13:41]
TSS <- as.numeric(TSS)
TSS <- sum(TSS)

TSU <- Use[113:140,13:41]
TSU <- as.numeric(TSU)
TSU <- sum(TSU)

TTS <- supply[113:140, 42:68]
TTS <- as.numeric(TTS)
```

```
TTS <- sum(TTS)

TTU <- Use[113:140,42:68]
TTU <- as.numeric(TTU)
TTU <- sum(TTU)


## Reduced matrix for Supply
Supply_matrix <-
matrix(c(PPS,PSS,PTS,SPS,SSS,STS,TPS,TSS,TTS),byrow = T, ncol
= 3)
rownames(Supply_matrix) <- c("PRIMARY", "SECONDARY",
"TERTIARY")
colnames(Supply_matrix) <- c("PRIMARY", "SECONDARY",
"TERTIARY")
Supply_matrix


##Reduced matrix for Use
Use_matrix <-
matrix(c(PPU,PSU,PTU,SPU,SSU,STU,TPU,TSU,TTU),byrow = T,
ncol = 3)
rownames(Use_matrix) <- c("PRIMARY", "SECONDARY",
"TERTIARY")
colnames(Use_matrix) <- c("PRIMARY", "SECONDARY",
"TERTIARY")
Use_matrix
```

```
## For which sectors is the Use more than supply
Use_matrix > Supply_matrix

## By how much is the use more than supply
Use_matrix - Supply_matrix
```

```
## According to supply use equation below:
##   "" [Output + Import] = [ Intermediate consumption +
household consumption + Govt. consumtion + Investment +
Exports  ] ""
```

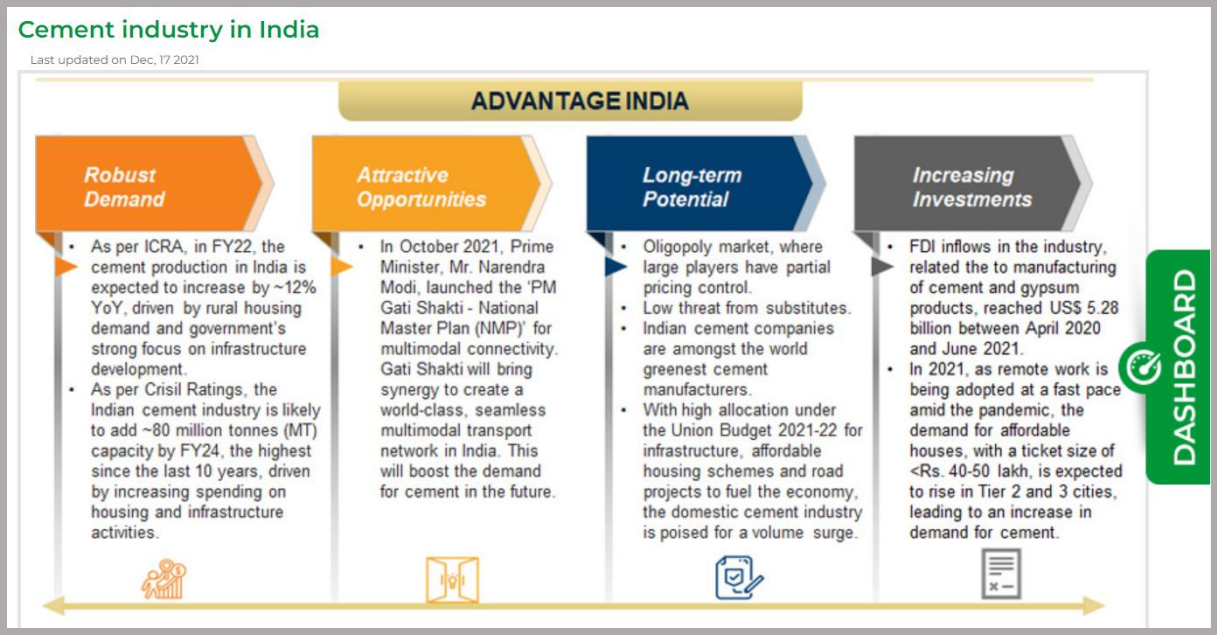
```
# or  OP at Producer Price + Import = Total Use

Use[142,77]  ## Total Use
supply[142,77]  ##OP at Producer Price + Import

as.numeric(Use[142,77]) - as.numeric(supply[142,77]) ## The
result is 0
```

6. Policy Implication

After a thorough analysis is done for each industry we get to know what all are the products through which a particular industry can be affected. We can take example of cement and construction, there is a close relation between them and effective policies can be made using the information available to us from the SUT. Because, we know how much cement is needed by the construction industry and how much is supplied.
If we have enough data in hand the supply and use can also be predicted beforehand to get a rough estimate and to avoid any surprises. Based on which government can put a cap on the increase/decrease of the imports/exports of the cement.



As we can see above, the screenshot was taken from ibef.org. Where the site is talking about opportunities, long term potentials etc of the cement and construction industry.