

# MARKETS WITH INTERMEDIARIES

SCENARIO: IN MANY KINDS OF MARKETS, INDIVIDUAL BUYERS AND SELLERS DO NOT INTERACT DIRECTLY WITH EACH OTHER, BUT TRADE THROUGH INTERMEDIARIES

EXAMPLES:

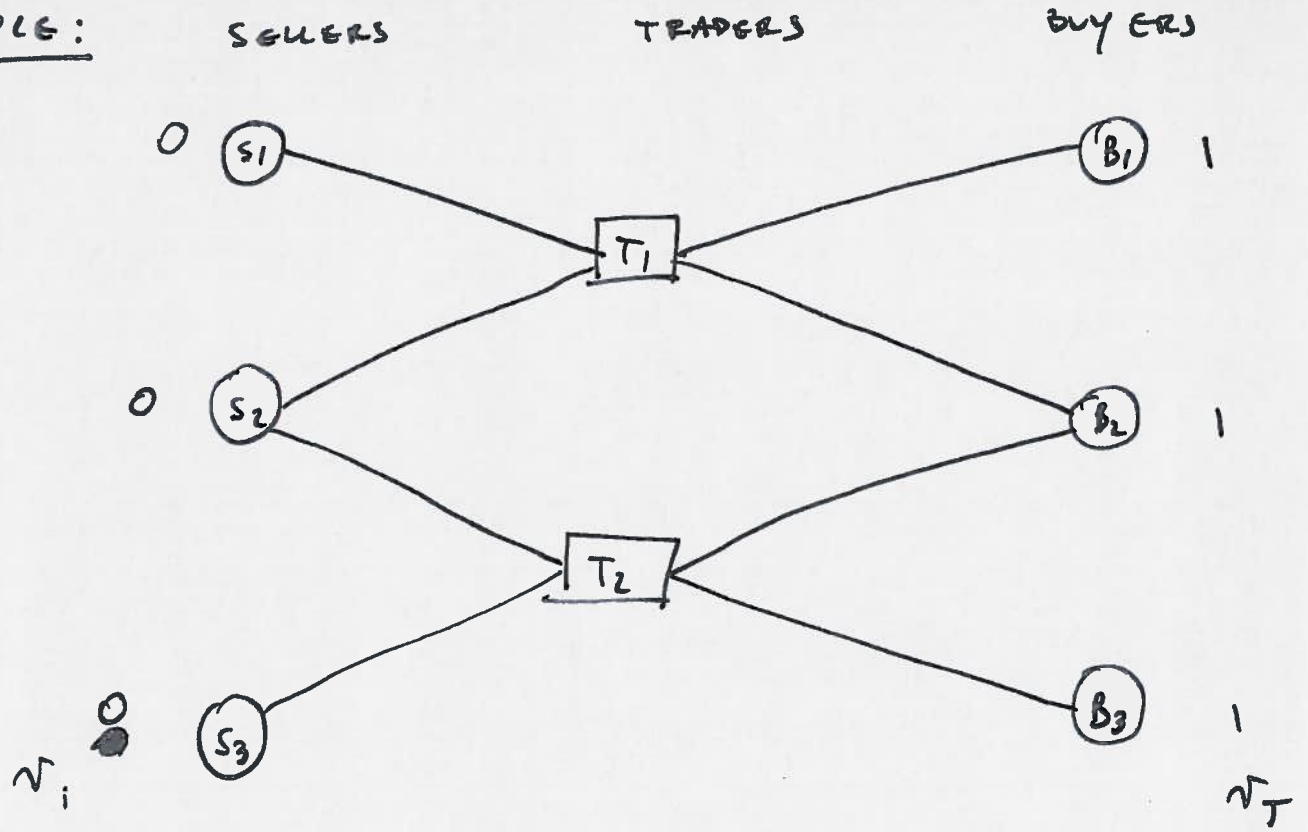
- STOCK EXCHANGE
- DISPLAY ADVERTISEMENT MARKET

MODEL:

- WE ASSUME A SINGLE <sup>TYPE OF</sup> GOOD THAT COMES IN INDIVISIBLE UNITS
- ~~NO~~ EACH SELLER  $i$  INITIALLY HOLDS ONE UNIT OF THE GOOD WHICH HE VALUES AT  $v_i$ ;  
 $\Rightarrow$  HE IS WILLING TO SELL IT AT ANY PRICE  $\geq v_i$ ;
- EACH BUYER  $T$  VALUES A COPY OF THE GOOD AT  $v_T$   
 $\Rightarrow$  HE IS WILLING TO BUY IT AT ANY PRICE  $\leq v_T$
- NO BUYER WANTS MORE THAN ONE COPY OF THE GOOD, SO ADDITIONAL COPIES ARE VALUED AT 0
- ALL THE VALUATIONS ARE KNOWN BY ALL THE PLAYERS
- TRADE TAKES PLACE ON A NETWORK THAT REPRESENTS WHO CAN TRADE WITH WHOM

NETWORK: IT IS COMPOSED OF BUYERS AND SELLERS AS IN MATCHING MARKETS, BUT TRADERS ARE PRESENT

EXAMPLE:



SIMPLIFICATIONS:

- WE ASSUME FOR SIMPLICITY THAT THE VALUATIONS OF THE BUYERS DO NOT DEPEND ON THE SELLERS
- THE NETWORK IS FIXED

GAME MODEL:

- 1) TRADERS SET PRICES
- 2) SELLERS AND BUYERS REACT TO THESE PRICES

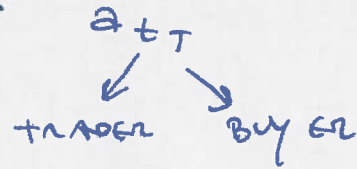
MORE PRECISELY:

- TRADERS OFFER A BID PRICE TO EACH CONNECTED SELLER  $b_{ti}$

$\downarrow$        $\downarrow$   
 TRADER      SELLER

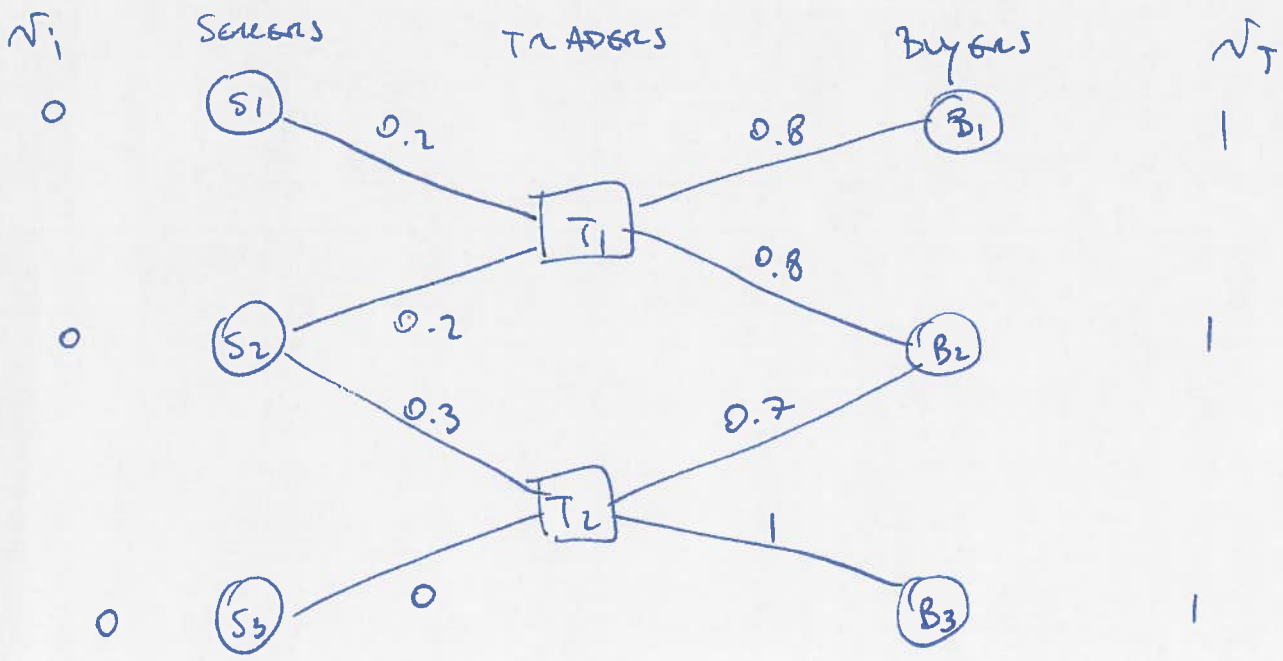
IT IS THE PRICE PAID BY THE TRADER TO HAVE A COPY OF THE GOOD

- TRADERS OFFER AN ASK PRICE TO EACH CONNECTED BUYER.



IT IS THE PRICE THAT THE BUYER PAYS TO HAVE A COPY OF THE GOOD

EXAMPLE:

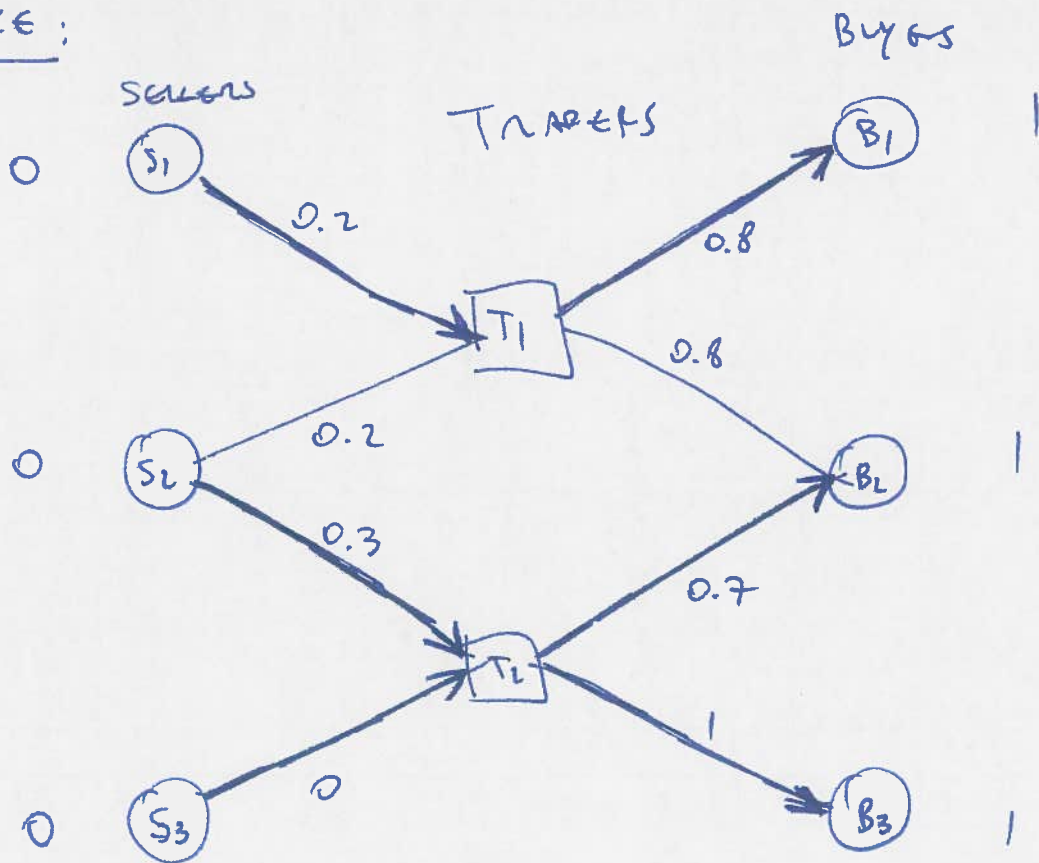


- ONCE THE TRADERS ANNOUNCED PRICES, EACH SELLER AND BUYER CHOOSES AT MOST ONE TRADER TO DEAL WITH

- \* EACH SELLER SELECTS THE TRADER TO WHOM SELLS ITS COPY
- \* EACH BUYER SELECTS THE TRADER FROM WHOM BUYS A COPY

- THIS DETERMINES THE FLOW OF GOODS OVER THE NETWORK

## EXAMPLE :



## COMMENTS :

- OVER EACH EDGE, ONLY ONE COPY MOVES (OR ZERO COPY) GIVEN THAT EACH BUYER AND EACH SELLER IS INTERESTED IN A SINGLE COPY
- MULTIPLE COPIES CAN PASS THROUGH A SINGLE TRADER
- A TRADER CAN SELL A NUMBER OF GOODS EQUAL TO THE NUMBER OF GOODS IT BUYS
- USUALLY PENALTIES ARE INTRODUCED TO AVOID THE CASE IN WHICH A BUYER SELECTS A TRADER THAT HAS NO COPIES FOR SUCH BUYER

## PROBLEM:

- GIVEN THE TRADERS' PRICES, WHAT IS THE FLOW OF GOODS?
- WHAT ARE THE OPTIMAL PRICES FOR THE TRADERS?

## OBSERVATION:

THE GAME IS IN TWO STAGES:

- SETTING THE PRICES [TRADERS]
- SELECTING THE TRADER [BUYER AND SELLER]

NASH EQUILIBRIUM IS NOT APPROPRIATE

⇒ STACKELBERG EQUILIBRIUM

## PROPERTY:

IN THE SECOND STAGE EACH BUYER AND SELLER SELECT THE TRADER SUCH THAT:

- [BUYER] THE TRADER WITH THE LOWEST PRICE
- [SELLER] THE TRADER WITH THE HIGHEST PRICE

## OBSERVATION:

WHEN A BUYER OR A SELLER CAN SELECT AMONG MULTIPLE TRADERS WITH THE SAME OPTIMAL PRICE, HOW TO BREAK THE TIES IS IMPORTANT TO GET AN EQUILIBRIUM

## PROPERTY:

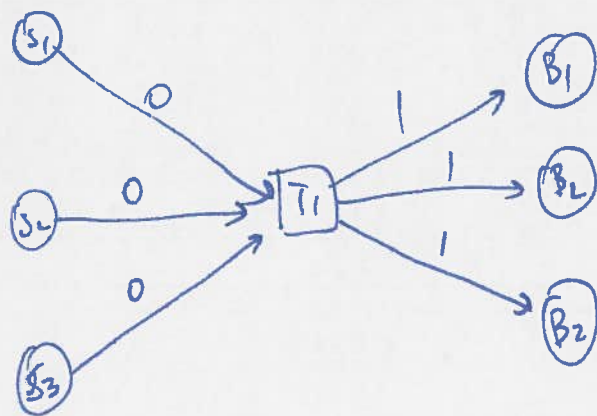
TWO BASIC CASES:

- MONOPOLY: EACH BUYER AND SELLER CAN TRADE WITH ONLY ONE TRADER
- PERFECT COMPETITION: EACH BUYER AND SELLER CAN TRADE WITH ALL THE TRADERS

# MONOPOLY:



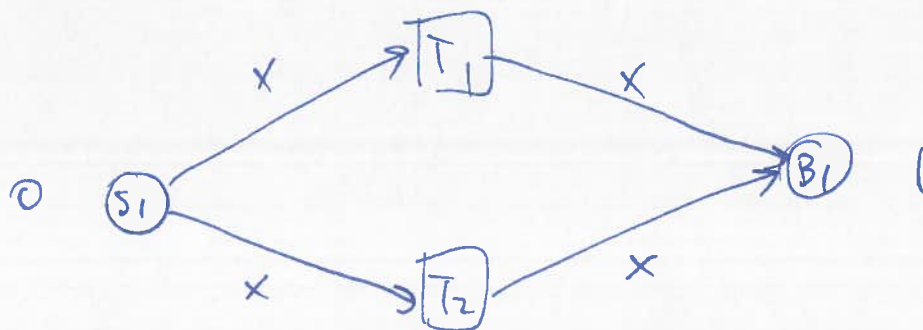
THERE COULD BE MULTIPLE SELLERS ~~AND BUYERS~~  
AND BUYERS



- THE BID PRICES ARE ALL EQUAL TO 0
- THE ASK PRICES ARE ALL EQUAL TO 1
- \* WE ARE REPLICATING THAT EACH SELLER PREFERENCES TO SELL EVEN IF HE IS INDIFFERENT BETWEEN SELLING AND NOT SELLING
- \* THE SAME FOR THE BUYERS

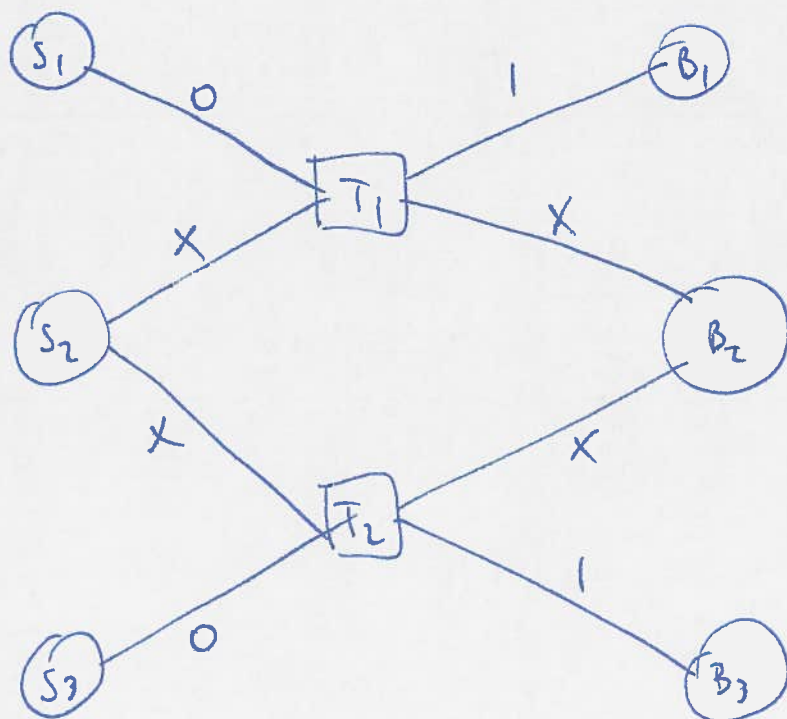
IN MONOPOLY, THE GAIN OF THE TRADERS IS MAXIMUM

# PERFECT COMPETITION:



① IN A PERFECT COMPETITION, EACH ~~TRADER~~ TRADER IS PERFORMING A TRADE RECEIVES A UTILITY OF ZERO

Hybrid cases:



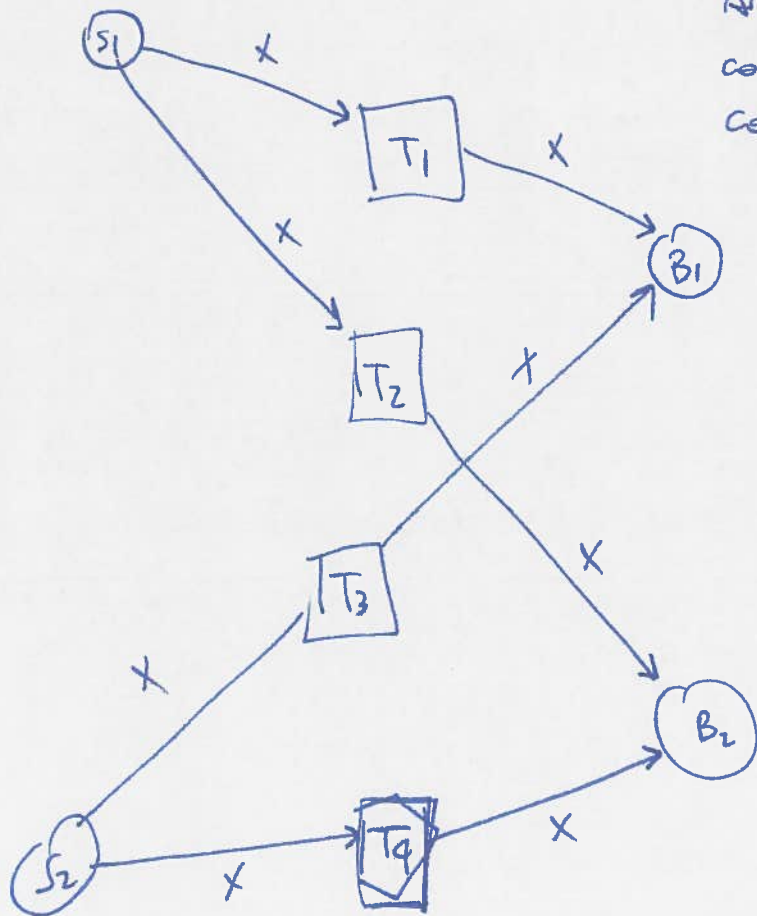
THIS CASE CONTAINS BOTH PERFECT COMPETITION NETWORKS AND MONOPOLY NETWORKS

⇒ TRADERS GAIN ONLY IF THEY ARE MONOPOLIST FOR SOME BUYER OR SELLER

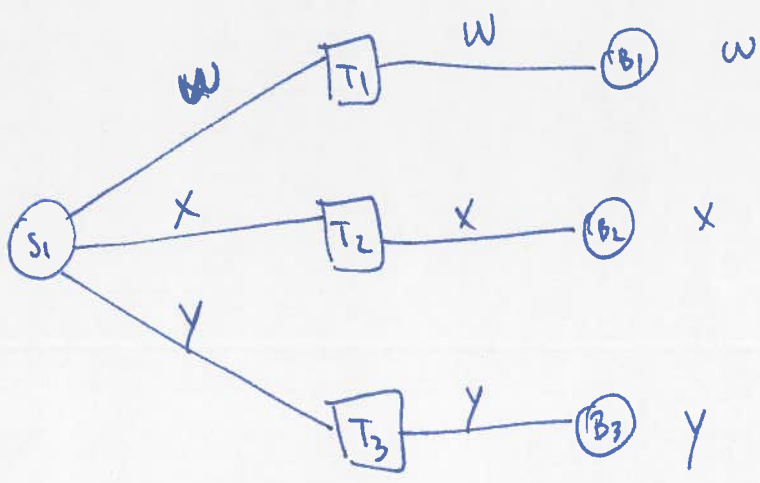
⇒ BUYERS/SELLERS GAIN ONLY IF THEY ARE CONNECTED TO MULTIPLE TRADERS

IMPLICIT PERFECT COMPETITION:

THE TRADERS CONNECTED TO THE SAME SELLERS/BUYERS ARE NOT DIRECTLY IN COMPETITION, BUT THE COMPETITION IS IMPLICIT



CONNECTION WITH THE VICKREY AUCTION:

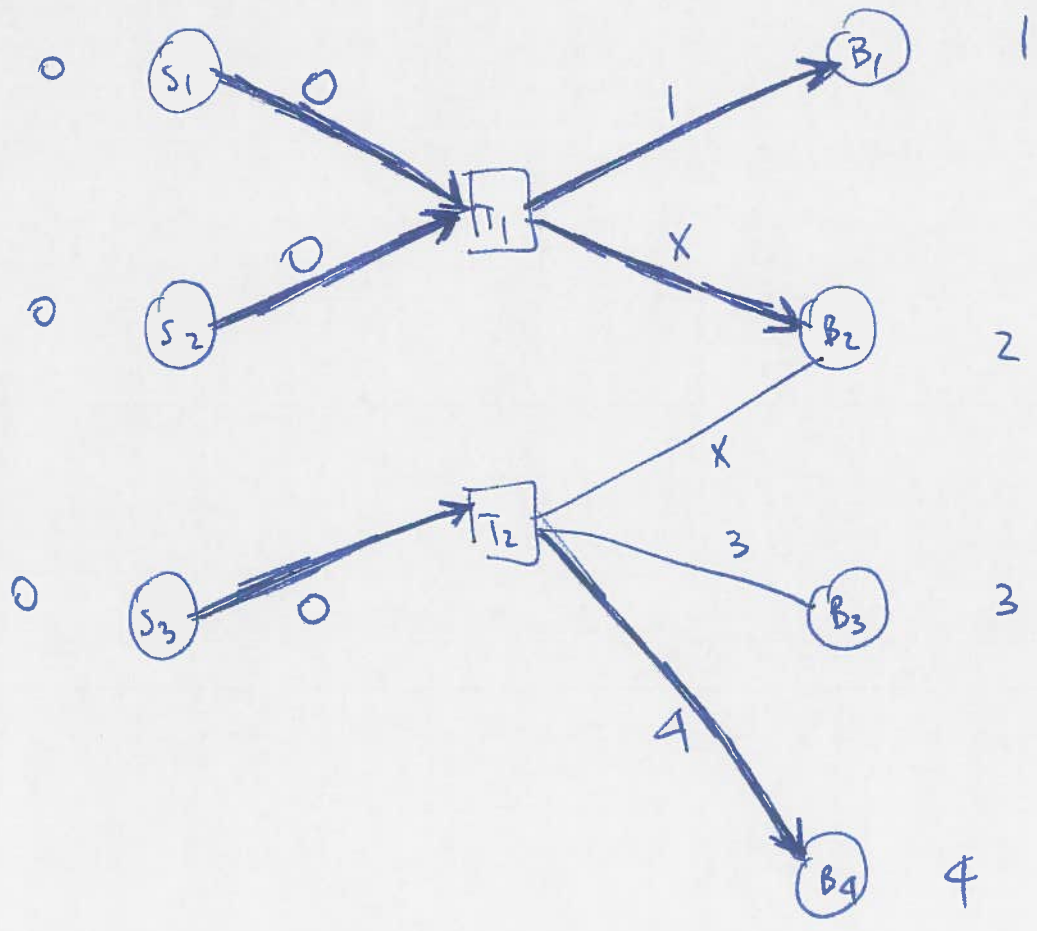


WITH A SINGLE SELLER, IT IMPLEMENTS EXACTLY THE VCG AUCTION

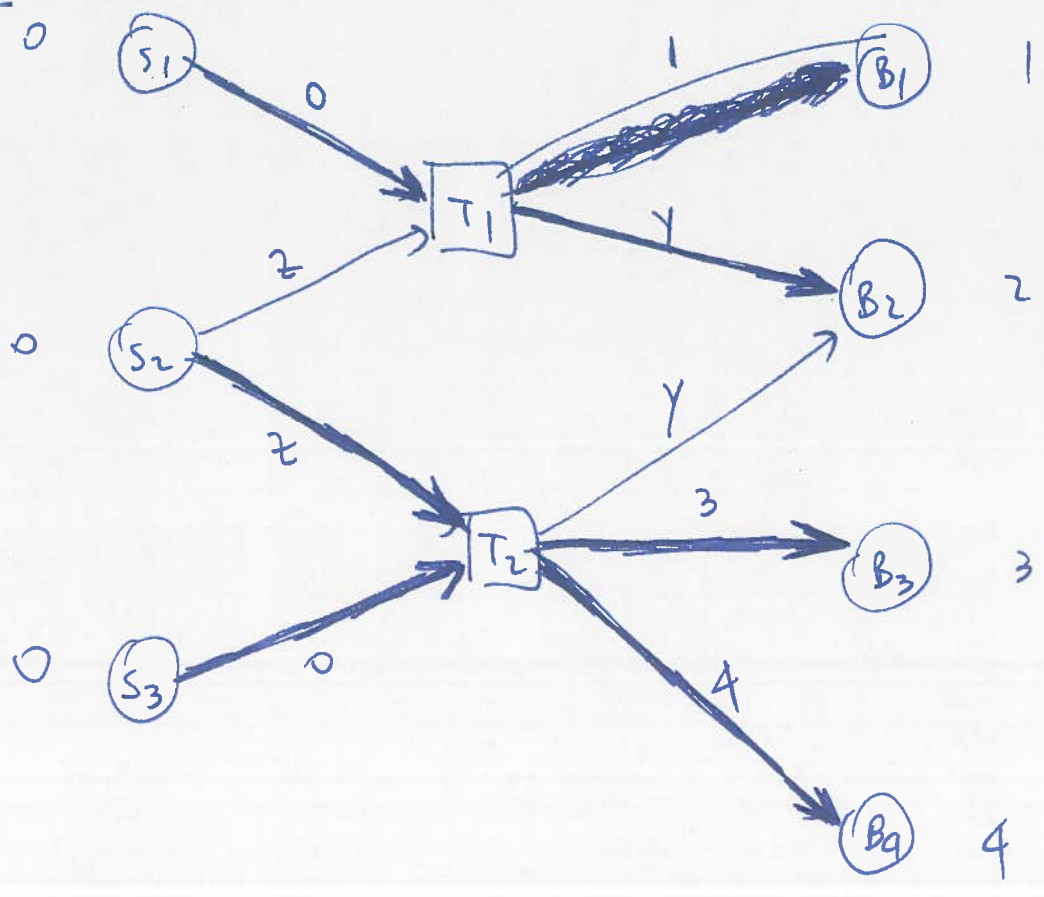


EXAMPLE :

For every  $x \in [0, 2]$



EXAMPLE :



$z \in [1, 3]$   
 $\gamma \in [1, 2]$

PROPERTY:

THE SOCIAL ~~WELFARE~~ WELFARE IS GIVEN BY (FOR EACH Good):

$$\underbrace{b_{ti} - v_i}_{\text{SENDER}} + \underbrace{a_{tj} - b_{tj}}_{\text{TRADER}} + \underbrace{v_j - a_{tj}}_{\text{BUYER}} = \underbrace{v_j - v_i}_{\text{DIFFERENCE BETWEEN THE VALUES OF BUYER AND SENDER}}$$

SO THE SOCIAL WELFARE DEPENDS ONLY ON THE DIFFERENCE OF VALUES OVER THE GOOD MOVING OVER THE NETWORK