Theory of
Blockchain

SWINBURNE UNIVERSITY OF TECHNOLOGY

Session 12:

Economics of Blockchain

Module 1 – Pricing Concepts

How are Cryptos Bought and Sold?

- Buying or selling means exchanging two currencies.
  Example
  - Buying BTC = Paying USD to get the seller transfer BTC to your account.
  - Selling ETH = Transferring ETH to someone's account and getting Euro in your account instead.

- Usually there's a mediator (exchange office, broker or market maker) who facilitates the buying/selling process.
  - You are free to do the exchange directly and by yourself (the financial system does not like that).

How is the Market Price Created?

This the price chart for exchanging ETH with USD

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Bid / Ask

The bid and ask prices are the best potential prices that buyers and sellers are willing to make a deal at.

$242.00 $243.00

Buyers   **Bid**   **Ask**   Sellers

$242.00   Spread=$1 $243.00

$241.50 $244.10

$241.20 $246.75

$240.00 $250.50

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$242.00 $243.00

$242.50

Volume

Each bid or ask is accompanied by a volume, which is the supply or demand amount.

In this case, the best buyer has to also make an agreement with the 2nd best seller to satisfy their buy demand. This pushes the market price up because the supply (at low prices) is lower than the purchase demand.

$242.00 $243.00

Buyers   Bid   Ask   **Sellers**

X 2.80   **$242.00** →   **$243.00**   X 1.2

X 1.0 $241.50   →   **$244.10**   X 100

                Effective price

X 100 $241.20 $246.75   X 0.4

                $243.40

X 0.1 $240.00 $250.50   X 2.0

How is the Market Price Created?
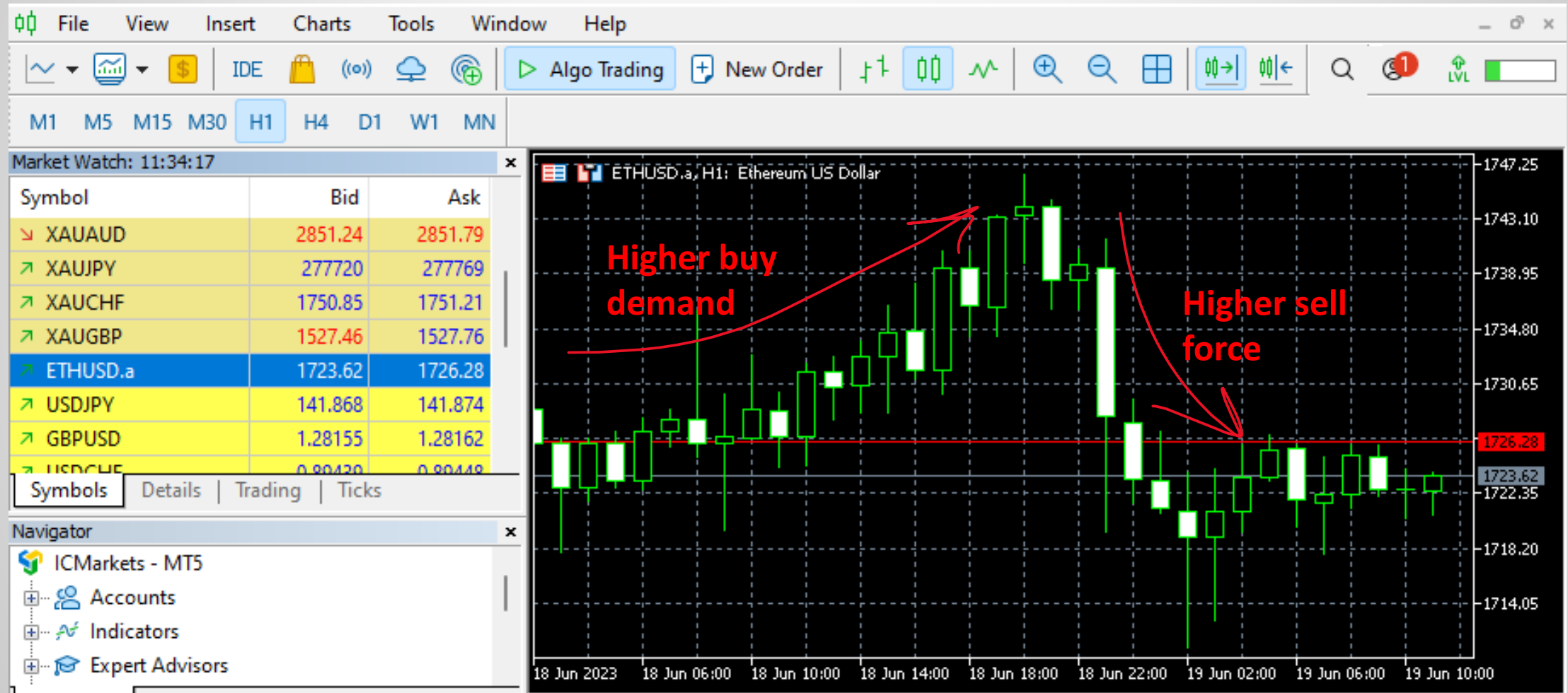
Supply Models in Cryptocurrencies

There are different models of crypto creation (original supply)

• Bitcoin

- 10 minutes between blocks
- 50 BTC per block
- 4 years between block reward halving (that might have come from expectations about the growth rate of Bitcoin usage)

The 4 years were rounded down to 210.000 blocks (probably just to have nicer numbers)

Every block introduces 50 new coins in the system. This quantity (50) halves every 210,000 blocks. So, getting the limit of coins it is possible to generate is quite easy : it's the sum of a geometric series.

$$\sum_{n=0}^{\infty} \frac{210000 \times 50}{2^n} = 210000 \times 50 \times \frac{1}{1 - \frac{1}{2}} = 21000000$$

Note that this is an upper bound. The actual quantity will probably be a bit lower due to rounding issues (BTC has a finite number of decimals; 8). There are also lost private keys which make the supply even less.

Supply Models in Cryptocurrencies

- **Ethereum**
  - Ethereum supply is not limited.
  - During the PoW time, miners earned 5 ETH (in 2015) and then 3 ETH (in 2017). TX commissions and uncle rewards used to be added to the block mining reward.
  - The inflation was high (due to continuous creation of ETH).
  - EIP-1559 suggested burning the basefee (part of the TX fee), but mainly to make TX fees predictable and not to control the inflation.
  - The migration to Ethereum 2.0 on Sep. 15, 2022 reduced the creation rate of ETH.
  - PoS Validators (miners) do not have to do the work as hard as in the PoW system. So the reward is less.
    - (Pre-Merge) PoW Mining rewards: ~13,000 ETH/day pre-merge
    - (Post-Merge) Only the ~1,600 ETH per day, dropping total new ETH issuance by ~90%

Supply Models in Cryptocurrencies

- **IOTA**
  - IOTA tokens are not mined or generated. The total supply of IOTA tokens was fixed at **2,779,530,283,277,761.**
  - This is the maximum supply of IOTA, and the tokens were distributed during the initial launch of the network.
    - Apart from the intentional burning of some tokens, this is the total number of IOTAs in circulation. No new IOTAs are mined or created.

www.blocknative.com

What Comes Next …

- We learned how market prices are created. We got familiar with the concept of bid and ask prices.

- We saw the different models of crypto creation/supply.

- We will talk about the effect of major events on cryptocurrencies and blockchains.

See you in the next video …