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1. Terminologies

1.1. **Measures of Market Size and Activity.** There are at least four different measures that you will see mentioned in the press and on financial websites. The different measures count the number of transactions that occur daily (trading volume), the number of positions that exist at the end of a day (open interest), and the value (market value) and size (notional value) of these positions. Here are more detailed definitions:

Trading volume: This measure counts the number of financial claims that change hands daily or annually. Trading volume is the number commonly emphasized in press coverage, but it is a somewhat arbitrary measure because it is possible to redefine the meaning of a financial claim. For example, on a stock exchange, trading volume refers to the number of shares traded. On an options exchange, trading volume refers to the number of options traded, but each option on an individual stock covers 100 shares of stock.

Open interest: Open interest measures the total number of contracts for which counterparties have a future obligation to perform. Each contract will have two counterparties. Open interest measures contracts, not counterparties. Open interest is an important statistic in derivatives markets.

Market value: The market value (or "market cap") of the listed financial claims on an exchange is the sum of the market value of the claims that could be traded, without regard to whether they have traded. A firm with 1 million shares and a share price of $50 has a market value of $50 million. Some derivative claims can have a zero market value; for such claims, this measure tells us nothing about activity at an exchange.

Notional value: Notional value measures the scale of a position, usually with reference to some underlying asset. Suppose the price of a stock is $100 and that you have a derivative contract giving you the right to buy 100 shares at a future date. We would then say that the notional value of one such contract is 100 shares, or $10,000. The concept of notional value is especially important in derivatives markets. Derivatives exchanges frequently report the notional value of contracts traded during a period of time.

1.2. **Question Solving.**

Question (1.14)**.** *Consider the widget exchange. Suppose that each widget contract has a market value of $0 and a notional value of $100. There are three traders, A, B, and C. Over one day, the following trades occur:*
A long, B short, 5 contracts.
A long, C short, 15 contract.

B long, C short, 10 contracts.
C long, A short, 20 contracts.

a. *What is each trader's net position in the contract at the end of the day?*
(Calculate long positions minus short positions.)
b. *What are trading volume, open interest, and the notional values of trading volume and open interest?*
(Calculate open interest as the sum of the net long positions, from your previous answer.)
c. *How would your answers have been different if there were an additional trade:*
C long, B short, 5 contracts?
d. *How would you expect the measures in part (b) to be different if each contract had a notional value of $20?*

Solution.
a. For trader A, the long positions will be $5+15+0+0=20$ contracts and the short positions will be $0+0+0+20=20$ contracts. So for trader A, the net position in the contract at the end of the day will be $20-20=0$, which equals having no contract.

For trader B, the long positions will be $0+0+10+0=10$ contracts and the short positions will be $5+0+0+0=5$ contracts. So for trader B, the net position in the contract at the end of the day will be $10-5=5$, which equals longing 5 contracts.

For trader C, the long positions will be $0+0+0+20=20$ contracts and the short positions will be $0+15+10+0=25$ contracts. So for trader C, the net position in the contract at the end of the day will be $20-25=-5$, which equals shorting 5 contracts.

b. The trading volume will be $5+15+10+20=50$, so there are 50 contracts in total traded today.
The open interest will be $0+5=5$ or $(0+5+5)/2=5$.

The notional values of trading volume will be $5\times\$100+15\times\$100+10\times\$100+20\times\$100=50\times\$50=\$5,000$.
The notional values of open interest will be $5\times\$100=\$500$.

c. If there were an additional trade: C long, B short, 5 contracts?

Then for trader A, the long positions will be $5+15+0+0+0=20$ contracts and the short positions will be $0+0+0+20+0=20$ contracts. So for trader A, the net position in the contract at the end of the day will be $20-20=0$, which equals having no contract.

For trader B, the long positions will be $0+0+10+0+0=10$ contracts and the short positions will be $5+0+0+0+5=10$ contracts. So for trader B, the net position in the contract at the end of the day will be $10-10=0$, which equals having no contract.

For trader C, the long positions will be $0+0+0+20+5=25$ contracts and the short positions will be $0+15+10+0+0=25$ contracts. So for trader C, the net position in the contract at the end of the day will be $25-25=0$, which equals having no contract.

Then the trading volume will be $5+15+10+20+5=55$, so there are 55 contracts in total traded today.
The open interest will be $0+0+0=0$.

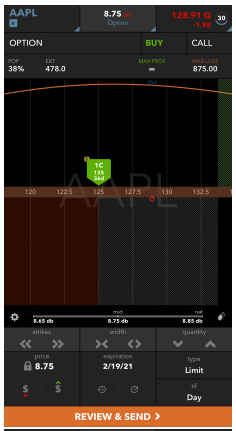
The notional values of trading volume will be $5\times\$100+15\times\$100+10\times\$100+20\times\$100+5\times\$100 = 55 \times \$100 = \$5,500$
The notional values of open interest will be $0 \times \$100 = \$0$.

d. The trading volume and open interest will not change. However, the notional values of trading volume will be $5 \times \$20 + 15 \times \$20 + 10 \times \$20 + 20 \times \$20 = \$1,000$ and the notional values of open interest will be $5 \times \$20 = \$100$

□

1.3. **Notional Value and Market Value.**

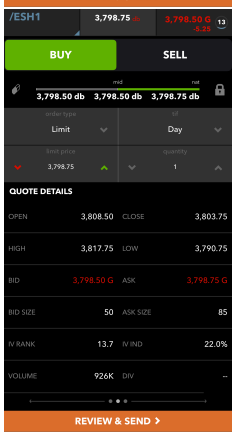
Example (Apple Option)**.** *The figure on the right is an Apple call option, this call option has a strike price at* $125*, expires on February 19, and the bid/ask price is 8.65/8.85.*



The notional value of this call option will be $100 \times \$125 = \$12,500$*. If we fill this order at* $\$8.75db$*, then the market value of this call option will be* $100 \times \$8.75 = \$875$*. Note that we multiply 100 because for stock option, each contract controls 100 underlying shares.*

Remark. *Options will have many abstract terms, for example, θ Theta, IV, IV Rank, δ Delta, PoP, etc.*

Example (E-mini SP500 Future)**.** *The figure on the right is an E-mini SP500 future, this future has a strike price at* $3,798.50*, expires on March 19, and the bid/ask price is 3,798.50/3,798.75.*



If we fill this order at $\$3,798.50db$*, then the notional value of this call future will be* $50 \times \$3,798.50 = \$189,925$*. If we fill this order at* $\$3,798.50db$*, then the market value of this call option will be* $\$3,798.50$*. Note that we multiply the notional value by 50 because one E-mini SP500 Index futures contract leverages 50 units of the index.*

Remark. *The"E" in E-mini stands for electronic. Many traders favor the SP500 E-Mini ES over the SP not only for its smaller investment size but also for its liquidity. Like its name, the E-Mini ES trades electronically, which can be more efficient than the open outcry pit trading for the SP.*

References

[1] Wikipedia, *Open outcry*.
https://en.wikipedia.org/wiki/Open_outcry.