

## FUNDAMENTAL ANALYSIS

- Fundamental analysts assess commodity price implications by evaluating supply and demand variables. These include:
  - Seasonal use patterns
  - Seasonal supply patterns
  - Price of compliment goods
  - Price of substitute goods
  - Market structure (concentration)

## DEMAND FACTORS

- Current price level
- Prices of compliments or substitutes
- Per capita income
- Exchange rates
- Trade agreements
- Government programs

## STRATEGY

- Using economic theory, predict the long-run market clearing price.
  - If the asset is overvalued relative to the expected market clearing price, then the asset is sold.
  - If the asset is undervalued, then the asset is bought.
- The result is a long-run approach to price speculation.

## SUPPLY FACTORS

- Factors of production
- Inventory levels
- Carryover
- Projected usage
- Government programs
- Production in other countries
- Weather

## HYPOTHESIS

- Every asset has some intrinsic value or price.
- Economics: Equilibrium price or market clearing price
- Finance: Fair market value
- However, market forces are complex and ever changing, thus prices can be distorted. This can result in an asset being overvalued or undervalued by the market at any given point in time.

## TYPES OF FUNDAMENTAL ANALYSIS

- Intuitive analysis
  - Use basic understanding of economic principles to hypothesize about prices.
- Quantitative analysis
  - Combine knowledge of economic theory with mathematical and statistical techniques to establish explicit relationships between economic variables and prices.

### LEADING INDICATOR MODELS

- Simplest, non-intuitive approach
- Analyst searches for a time-lagged relationship between an asset's price and other variables
- Similar to determining futures course of the economy based on interest rates, inflation, and unemployment

### EXAMPLE – PAGE 1

- Suppose an analyst believes the price of commodity X is associated with an indicator A
- %change in price X (t)=f(% change in A (s))
- Lag structure could be simple or complicated.
- Assume simple:  $\%PX(t) = b(\%A(s))$ 
  - $S > t$  = Lagging indicator
  - $S = t$  = Coincident indicator
  - $S < t$  = Leading indicator

### INDICATOR MODELS

- Logic
  - U.S. Department of Commerce publishes monthly data on applications for building permits. It is reasonable to assume an increase in permits will result in an increase in construction. Increased construction will lead to an increase in demand for plywood and lumber.
  - Thus, an increase in building permits will lead to an increase in the price of plywood and lumber at some future date.
- Assumption: Markets are not instantaneous

### EXAMPLE – PAGE 2

- $\%PX(t)=b(\%A(s))$
- b is called an elasticity-it is how elastic the commodity price is to a change in the indicator.
- Interpretation of b:
  - 1% change in the indicator A at time s results in a b% change in PX at time t
  - So, if  $b= 0.5$ , the A 1% change in A would result in a ½% change in PX.
- In reality, markets act quickly. By the time a position is taken, part of the effect may have been realized.

### POTENTIAL INDICATORS

<u>INDICATOR</u>	<u>MARKET</u>
Corporate earnings	S&P 500 Stock Index
Deficit projections	Interest rates
USDA crop production	Soybeans, corn, etc.
USDA prospective plantings	Soybeans, corn, etc.
USDA cattle on feed	Live cattle
USDA hogs and pigs report	Live hogs

### EXAMPLE – PAGE 3

- To determine how much of the effect has taken place by the time a position can be taken, the model can be solved for different lags.
- Assume we solve the model 5 times and get the following results:

t-s	b	Fraction of realized change
1	0.3	0.375
2	0.5	0.625
5	0.7	0.875
10	0.8	1.000
20	0.8	1.000

So, P increases by 0.3% for every 1% increase in A after the day of A's announcement

### EXAMPLE – PAGE 4

- By ten days, the full effect is realized.
- The movement between day 1 and day 10 is called the diffusion pattern (see diffusion diagram)
- Suppose A is announced and it takes a trader 1 day to react. Also, assume A(s) is 5% above the previous A.
- Then our expected price change is :
  - $0.8\% \times 5\% = 4\%$  price increase
- If it takes 1 day to react to A, then 37.5% of the price increase has happened before the trader reacted

### MULTIVARIATE ANALYSIS

- Goal: Identify, using economic theory, variables which explain the price of a commodity
- Use statistics to specify an explicit relationship between the variables
- Example:
  - $P_{cows} = f(P_{corn}, P_{beans}, \text{interest rate}, P_{hogs}, \text{US cow prod}, \text{WI cow prod})$
  - $P_{cow} = b_1(P_{corn}) + b_2(P_{beans})$
- If  $b_2 = 0.5$ , then  $P_{cow}$  will increase  $\frac{1}{2}\%$  if the  $P_{bean}$  increases 1%

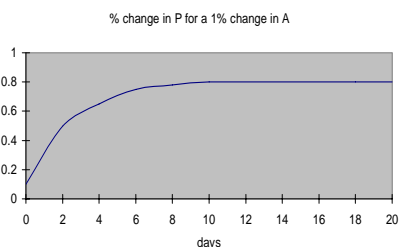
### EXAMPLE – PAGE 5

- If initial price is \$10, then a 5% increase in A will result in a 40 cent price increase
- Because of the delay in reacting to the release of A, the trader's expected gain in the market is 25 cents if the position is held until day 10
- Critical assumptions:
  - Getting the full 25 cents assumes nothing else affects the market over the 10 day period
- This is unlikely, thus supply and demand conditions must continually be monitored
- Note: This is a simple model. Diffusion and lag structures can be very complex.

### MULTIVARIATE ANALYSIS

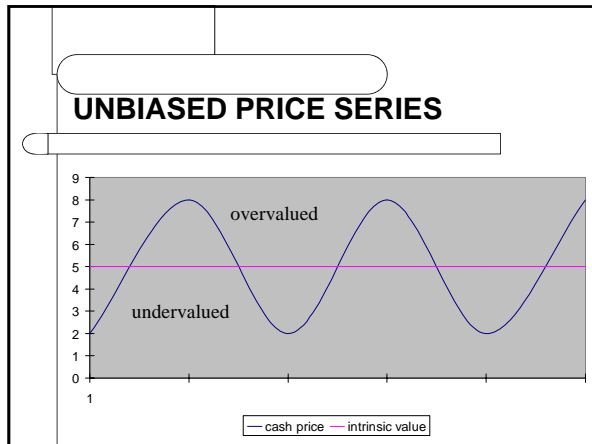
- Objectives: Use the price equation to estimate the market clearing price. Evaluate the current trading price relative to the estimated market clearing price. If the commodity is undervalued, BUY; if it is overvalued, SELL.
- Problems:
  - Determining the appropriate variables
  - Determining lag structure
  - Forecasting lagging and coincidental indicators

### DIFFUSION DIAGRAM



### MULTIVARIATE ECONOMETRIC MODELS

- Assumption: Market price is an unbiased estimator of the intrinsic value of a commodity
  - Does not mean the commodity is always correctly priced – but that the price is correct on average.



- ### SUMMARY
- Fundamental forces in the market are those that deal with the basic concepts of supply and demand conditions.
    - Traders using fundamental analysis must have an understanding of the interactions between supply and demand of a commodity.
    - They forecast potential shifts in supply and/or demand and analyze how such shifts affect price.