A Guide for Forecasting Soybean Futures Prices[1]

PATRICK J. MALONE, Fats and Oils Analyst, Commodity Division, Merrill Lynch, Pierce, Fenner and Smith, Inc., Chicago, Illinois

Abstract

The role of the spectator is discussed, and emphasis put on his study of fundamental market analysis, such as supply and demand projections; technical market analysis, such as chart trends and composition of open interest; and the basic trading rules for every trader. Both soybean oil and meal are considered. Statistics from the Commodity Exchange Authority are shown to be auxiliary tools.

THE MOST PHENOMENAL ADVANCES in United States agricultural production over the past three decades have been in soybeans. Although soybeans had been grown for centuries in the Orient, they were first introduced into the U.S.A. in the early 1920's. From only 4.9 milion bushels in 1925, production grew to 48.9 million bushels in 1935 and 193.2 million bushels in 1945. Even further expansion occurred in the post-World War II period with 373.7 million bushels grown in 1955 and 843.7 million bushels grown in 1965. Soybeans and their products are now the leading U.S. agricultural dollar export item. Whereas the early history of speculation in commodities in the country centered around cotton and wheat futures, they have now largely been displaced by soybeans. During this period of sharply increasing soybean-product usage there has never been a buildup to a surplus soybean supply position.

There are many responsible factors for the growth in the soybean industry, and these do not exclude the research and developmental work of chemists who, by improving the quality of vegetable oil products and by reducing production costs, have paved the way for continued expansion in the consumption of salad and cooking oils, shortening, and margarine. Since there has never been more than a six-week requirement of soybeans carried into a new crop season, demand has had to be closely tailored to supply by way of price. Therefore prices of soybeans and products have had a history of wide price swings, which have provided additional risks for everyone concerned with the industry: farmer, elevator, processor, refiner, and feeder. Thus a soybean futures market was begun on the Chicago Board of Trade in 1937, which offered all the parties involved from producer to consumer an opportunity to express market judgment. In July of 1950 trading in soybean oil futures was initiated, and in August of 1951 trading in soybean meal futures. Thus the soybean industry is unique in that all of the component factors: soybeans, oil, and meal are traded on futures contracts. The processor is not only able to fix the cost of his soybeans months ahead of actual purchases, but he is also able to fix the price at which he can sell either or both of his products. So that these cash interests can fix the cost or sales price of their soybeans or products, there must be a speculator who is willing to take the risk that they wish to avoid. Thus the speculator, by stabilizing the operational costs of the cash interests, is indirectly responsible for more stable and lower-priced consumer products.

The Speculator

The purpose of this paper is to establish the general framework from which the successful speculator operates in attempting to forecast soybean futures prices. He must concern himself with three major items: fundamental market analysis, *i.e.*, detailed supply and demand projections; technical market analysis, *i.e.*, chart trends, composition of open interest, etc.; and basic trading rules which every trader must follow.

Technical market analysis and general trading rules are interesting, but, to establish a market opinion in its proper perspective, the first approach should be the major points in the fundamental analysis of soybean futures prices.

The Fundamentals

Fundamental market analysis is basically dependent upon projecting demand and relating it to the known supplies. Since potential demand can sometimes be larger than the supplies, it is the actual supplies which shape the final demand. One of the most elemental laws of economics holds that price acts as the balance wheel between the factors of demand and supply. Thus if potential demand was actually greater than supplies, it would be the function of higher prices to reduce demand to the level of supplies. Likewise, if potential demand was much less than supplies, it would be the function of lower prices to increase demand towards the level of supplies. Although there are many complexities in the soybean industry, by far the most important are in the field of prices for soybeans and products. The key is not what the beans cost or what each or both of the products are worth. The key is in the spread between the cost of cash beans and the total return of cash oil plus cash meal. The relationship between the price of the beans and the value of the oil and meal is commonly called "conversion," which means processor profitability. Conversion reveals the availability of soybeans as well as the demand for the products and the supplies of products available; these factors determine domestic crush. Likewise foreign conversion reveals the availability of U.S. soybeans as well as the demand for the products and the supplies of products or substitutes available, and these factors determine foreign crush and therefore our exports. Thus conversion looms as one of the most important single factors in projecting soybean usage.

Conversion in Europe in recent years has been closely related to American domestic conversion. This is probably because of the fact that European crushers are directly influenced by American prices for both soybeans and soybean meal. Both products, soybean oil and soybean meal, are parts of a much larger supply of fats and oils and protein feedstuffs. Since substitution in some uses is possible for both soybean oil and soybean meal, it is necessary to take a look at the demand and supply of these substitutes as well as the factors which affect total fats and oils and protein feedstuffs demand. Soybean oil and its competitors will be considered first.

Soybean Oil

Per capita consumption of fats and oils is amazingly steady in the U.S.A. and amounts to little more than in 1930. Over the past 35 years it has ranged between 44 and 49 pounds per person. Thus total food fats and oils consumption has trended slowly upward through the years, equal roughly to the population increase, which is currently 1 to 2% a year. Soybean oil accounted for about 22% of total food fats and oils production in the U.S.A. in 1950, but by 1965 it accounted for about 43% of total food fats and oils production. The U.S. annually produces more soybean oil than can be domestically consumed so that some oil must either move for export or move into inventory buildup. A major part of this export necessity is fulfilled by the Public Law 480 program which offers long-term credit arrangements as well as soft currency purchases of soybean oil. But U.S. prices should still be competitive with world prices in order to fill the balance of the export requirements with free dollar sales.

[1] Presented at the AOCS Short Course, East Lansing, Aug. 29–Sept. 1, 1966.

[2] Present address: Mitchell Hutchins & Co., Inc., Chicago, Ill.

The world markets for fats and oils are extremely complex as materials used and quality required differs from country to country. Generally speaking, it can be said that, when U.S. prices are at a slight discount to Rotterdam soybean oil prices, odds favor a good amount of free-dollar-export business. On the other hand, the sharp premiums for U.S. oils which have existed for most of the current season favors only small scattered sales for free dollars. The other major outlets for soybean oil exports are through Public Law 480 and foreign-donation programs. Shipments under these programs are more stable than free-dollar sales as reductions can cause undesirable political repercussions. Thus exports of soybean oil depend upon the competitive price of U.S. oil in world markets as well as upon the current level of U.S. P.L. 480 and foreign-donation shipments. Since domestic demand for fats and oils is relatively stable in this country, total domestic requirements for soybean oil depends upon the available quantity of competitive fats and oils. Thus a few brief words on each of the competitive fats and oils is warranted.

Lard. About 18% of the 1965 food fats and oils production was in the form of lard. Production of lard is unresponsive to price as it is a by-product of the hog-slaughter industry. Most of the lard goes into shortening manufacturing, but it is also used in margarine and can be competitive with soybean oil, which represents close to 75% of the fats and oils used in margarine manufacture.

Cottonseed Oil. About 17% of the 1965 food fats and oils production was in the form of cottonseed oil. This share will drop sharply in the next few years as the 1966 cotton program, which will be in effect for the next four years, has reduced cotton acreage allotments by about 25%. Like lard, cottonseed oil production is unresponsive to prices as it is a by-product of the cotton fibre industry which, in turn, is facing increasing competition from synthetic fibres. Fair quantities of cottonseed oil are used in margarine and shortening manufacture, but it is particularly competitive with soybean oil in the manufacture of salad and cooking oils. Up until 1960 more cottonseed oil than soybean oil was used in salad and cooking oils, but by 1965 this had changed to 55% soybean oil, 35% cottonseed oil, and 10% other oils.

Butter. About 12% of the 1965 food fats and oils production was in the form of butter. Like lard and cottonseed oil, butter is also a by-product of another industry. Butter output is affected by the supply of milk and the use of milk in other dairy products. Recent sharp declines in milk production mean that fewer cows and heifers two years and older are kept for milk because beef cattle and hog raising are more profitable. Milk production figures are released on the 10th of every month by the Crop Reporting Board. Butter production figures are released both weekly and monthly. Cold storage stocks of butter are reported on the 15th of every month as of the 1st of the month.

Beef Fats. About 5% of the 1965 food fats and oils production was in the form of beef fats. Edible beef fats are recovered from the fatty tissues of cattle by rendering, which is the process of cooking to break down connective tissues to release the fat. Virtually all of the edible fats are edible tallow, and production of this fat has tripled in the past decade to nearly 600 million pounds in 1966. Volume of cattle slaughter limits the amount of beef fat available for rendering. However continued high edible tallow prices, in relation to both inedible tallow prices and lard, could provide the incentive for holding additional amounts of killing and cutting fats for edible tallow. It appears that edible tallow is the only source of fats and oils currently capable of continued expansion other than soybean oil. Edible tallow is primarily used in shortening.

Corn Oil. About 4% of the 1965 food fats and oils production was in the form of corn oil. Production of corn oil comes mainly from the wet-milling of corn, the main products of which are corn starch, sugar, and syrup. Thus corn oil is the by-product of another industry, just as are lard and cottonseed oil. Therefore it is unlikely that high corn-oil prices would ever increase production of corn oil, and the wet-milling processing of corn is likely to continue to grow about on a level with the population increase. More corn oil is still used in salad and cooking oils, but since 1958 its use in margarine manufacture has grown from 1 million pounds to 160 million pounds in 1965.

Other food fats and oils represent about 1% of human consumption and consist mainly of safflowerseed oil, sesame seed oil, and peanut oil. Since domestic intake of food fats and oils is relatively stable, the combined increased availability of these five major competitors represents roughly the amount of decreased demand for domestic soybean oil; or conversely the combined decreased availability of all five represents roughly the amount of increased demand for domestic soybean oil. Data on production, consumption, and month-end factory and warehouse stocks of soybean oil as well as the other fats and oils except butter are available from the Bureau of the Census (Series: M20K). These monthly Current Industrial Reports are available for $5 a year.

Soybean Meal

Soybean meal is fed to livestock and poultry for its protein food value. Annual usage in the U.S.A. is dependent upon poultry and livestock populations and the prices received for them as well as upon the quantity of protein substitutes available. Several different sources of protein are available for animal feeding. They include oilseed meal proteins, animal proteins, grain proteins, and urea. A brief explanation of each category follows.

Oilseed Meal Proteins. These include soybean and cottonseed meals as well as linseed meal, copra cake and meal, and peanut (groundnut) meal. In other nations they also include rapeseed meal and sunflowerseed meal. They are domestically by far the most important source of protein for feeding and account for more than 70% of total availability.

Animal Proteins. These consist primarily of fish meal but also include relatively stable quantities of meat meal and tankage. Fish meal is by far the most important and is very high in protein content (roughly 65%). It is primarily used as an ingredient in poultry and hog rations and is therefore competitive with soybean meal. About half of the U.S. supplies are imported, and these imports can be increased when the established premium for fish meal over 44% soybean meal narrows. Monthly production, imports, and stocks figures are published by the Census Bureau and can be obtained from the Feed Market News Weekly publication of the U.S.D.A.

Grain Proteins. These include gluten feed and meals, distillers' and brewers' dried grains, wheat millfeeds, rice bran, and alfalfa meals. Total supplies of grain proteins are fairly stable from year to year, and since they represent less than 7% of total protein availability, they are not considered important in forecasting soybean meal prices, especially because their protein is not high.

Urea. This is a nonprotein nitrogen compound, which is changed by bacterial activity in the ruminant digestive tracts of cattle, sheep, and goats into complex proteins. Its advantage over soybean meal is in price. One pound of urea plus six pounds of corn (or other equivalent feed grain) is considered equivalent to and can be substituted for seven pounds of 44% soybean meal. From January 1, 1959, world urea capacity increased about five times to the estimated January 1, 1966, capacity of about 10 million tons per year. Only about 15% of this capacity is in the U.S.A.

Production and month-end stocks for the oilseed meals are published monthly by the Bureau of the Census (series: M20J). Both the M20J and the M20K series for fats and oils are available for $5 a year. The growth in foreign and domestic soybean meal usage has been so dynamic over the past decade that availability of supplies has really been the most important price-determining factor. However, domestically, there are a few other important factors to be considered. The U.S.D.A. publishes yearly estimates on the number of grain-consuming animal units and the number of protein-consuming animal units. Both estimates are important, but naturally the latter is particularly important. The U.S.D.A. also publishes a monthly index of livestock and livestock product prices. The quantity of protein fed per animal unit also fluctuates in response to the relationship of livestock prices and feed prices. Of the protein-consum-

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ing animal units, poultry and hogs are the most important for soybean meal as about 70% of the usage is in these two categories. Poultry numbers can be divided into four principal classes: laying flocks, replacement chicks for laying flocks, broilers, and turkeys. The U.S.D.A. makes monthly production estimates for all four classes of poultry.

Projections for exports of soybean meal are subject to an infinite number of variables which are subject to change without warning. An example is the importance of fish meal exports from Peru, which were nearly 1.4 million short tons during 1965. Catching fish is not a steady proposition. The increase in the use of protein for livestock and poultry feed in the developed areas of the world has been so rapid that accurate forecasting of exports is questionable. Therefore the best approach is probably the simplest approach, that is, one must assume that meal exports will continue to expand although not at a steady rate. In making projections, European animal numbers, prices, world fishing-conditions, consumer incomes, and world oilseed production should be considered.

Other Fundamentals

Although demand for the two products, oil and meal, are the most important fundamentals in soybean futures price forecasting, there are a number of less important factors which can become major from time to time. They include the relationships existing between cash and futures markets; the location of, rather than the total supplies of soybeans; and the farmers' selling attitudes, particularly at harvest. In brief, it can be said that a good grasp of the fundamental factors affecting soybeans should give the speculator an idea of the average price level which soybeans will seek in a given season. However fundamental market analysis is a general approach to price analysis rather than an exact science. Consequently, although soybeans may be worth about 3.25¢ in a given season, they can trade as much as 50¢ above or below this during the course of the full season. Market prices are the result of the composite judgments of the market participants at a given moment. If all the participants were errorless, the prices would never change. Changes in price are therefore the result of speculative error. Since margins required for futures trading are so small, only 10 to 20% of the value of the contracts, it becomes necessary, especially for a beginner, to familiarize himself with the technical methods of analyzing all commodity futures markets, soybeans included.

Technical Market Analysis

Technical market analysis consists primarily of various methods of chart analysis as well as the use of daily volume and open interest statistics as aids to price forecasting. However two other technical market factors which require little or no analysis but yet can be substantial short-term market influences should be mentioned first.

Service Recommendations. They come primarily from two types of sources: First, advisory services, which charge their subscribers for these recommendations; and secondly, the large commission firms that handle speculative trading accounts and have market analysts who suggest trades to their customers as a part of the service offered by the firm.

Deliveries Against the Futures. This means that the owner of cash soybeans in a deliverable elevator at Chicago or the owner of a Chicago Board of Trade-registered soybean oil warehouse receipt or soybean meal shipping certificate elects to close out his short futures position by delivering a notice of intention to deliver the cash article to another person who is long futures. However most speculators do not wish to take delivery so they have the option of not accepting the delivery notice by selling out their long futures position and passing the delivery notice on to the next long in the market. Thus a large volume of deliveries, if not anticipated beforehand, can have the effect of igniting a quick wave of forced liquidation in the marketplace by those who do not wish to receive delivery.

Commodity Chart Analysis

By comparing current market action with that of similar chart formations of the past, the chartist attempts to measure the relative strength of buying and selling pressure. The relative advantages and disadvantages of commodity chart analysis has long been a source of controversy between pure fundamentalists and pure technicians. A few of the pro's and con's are outlined below.

Advantages. It reduces the possibility of misinterpreting news items or statistical items. It acts as a hedge against missing major news items or statistical items. It reveals the psychology or mood of the trading public which fundamentals cannot tell. It should be considered simply because so many traders use charts.

Disadvantages. The constant updating process of charts is time-consuming. Different analysts can obtain different interpretations of the same chart, thus one of them must be wrong. A pure chartist who completely ignores fundamentals probably represents too extreme a view to be a successful long-term speculator. Weather developments, overnight governmental activities, wars, and any number of unpredictable events can disrupt completely any forecasts made on the basis of established chart patterns.

In short, it is apparent that both the fundamental and technical market approaches contain valuable clues of probable market direction, and it would seem reasonable that combining the better part of both into an empirical method offers more advantages than either method separately. There are three different major charting methods. The two methods which are graphic in nature are the bar chart and the point-and-figure analysis. The third method is mathematical in nature and is the theory of moving averages. A brief description of each method follows.

Bar Charts. These are simply the daily high, low, and closing prices placed on a chart with the high and low prices connected by a vertical line and the closing prices represented by a short horizontal line. The same bar chart could be used to represent the weekly high, low, and closing prices. After several days or weeks of trading have been placed on a chart, the analyst attempts to establish trend lines, and from a wide assortment of historical chart formations he attempts to uncover "buy" or "sell" signals. Some of the more predominant formations are double tops or bottoms, head and shoulders formations, triangles, flags, pennants, and gaps. These formations are discussed thoroughly in books dealing with commodity futures markets and with chart analysis (1–3).

Point and Figure Analysis. This consists of using boxes rather than lines (bars) to represent price. Each box represents a price, and the graph consists of all the daily ups and downs rather than just the high, low, and close. Thus point-and-figure gives more detail than other charts. What is most confusing about this type of chart is that no regular time-intervals appear. On most charts, price is plotted in the vertical, and time is plotted in the horizontal. However in point-and-figure no importance is attached to the time element. It projects market potential by counting the boxes in a congestion area. This type of chart enjoys the honor of several not-so-flattering distinctions. Not only is it the most difficult to understand, but it is the oldest and least-used charting method. In addition, it is the most time-consuming method of charting. However a daily service of Morgan, Rogers and Roberts Inc. of 150 Broadway, New York, is available with detailed point-and-figure price changes for most commodities.

Moving Averages. These are calculated by adding the closing prices of a set amount of trading days and dividing the sum by the number of trading days. The moving average of any set period of time can be used, such as 3 days, 5, 10, 20, or 30 days. This is a rather popular charting method, which is noted for its uncovering of long-term trends. There are three primary variations of utilizing the moving average technique. First is use of the average itself, buying when the average turns up and selling when it turns down. Sec-

ond is to use it with the daily closing prices of the daily bar chart and buying when the moving average closes above the bar-chart close or selling when the moving average closes below the bar-chart close. Finally is use of two moving averages of different time-periods such as a 5-day against a 10-day. One would then buy when the 5-day closed above the 10-day or sell when the 5-day closed below the 10-day.

Statistics as Auxiliary Tools

The Commodity Exchange Authority releases daily open interest and volume figures for soybeans, soybean oil, and meal which can be used as auxiliary tools in price forecasting. Open interest figures can be deceiving as they are highly seasonal, reaching their peak at the harvest time when speculators absorb the largest quantity of hedges. Nevertheless, when they are related to price action, changes in the open interest can reveal much about the technical condition of the market. Excluding price movements of expiring contracts, the following reveals a summary of the technical condition of the market when open interest is related to price.

If open interest is up and the price is up, this represents forceful new buying and the market is technically strong. If open interest is up and the price is down, this represents forceful new selling and the market is technically weak. If open interest is down and the price is up, this represents short-covering and the market is technically weak. If open interest is down and the price is down, this represents long liquidation and the market is technically strong.

In passing, it should be mentioned that the larger the open interest, the more vulnerable the price structure becomes as the public is generally associated with the long side of the market and liquidating markets have a tendency of carrying farther than the fundamentals might warrant. When considering volume, the general rule is that prices will tend to move in the direction in which the volume of trade increases. The four following tendencies have been observed in relating price to volume. In a major price advance, volume increases on rallies and decreases on reactions. Conversely, in a major price decline, volume increases on price weakness and declines on rallies. As prices decline towards a major bottom, volume becomes reduced and then expands sharply as prices make a major bottom. When prices are rising towards a major top, volume becomes reduced near the top and then increases sharply at the top.

Basic Trading Rules

The majority of the more successful speculators have followed a definite set of trading rules over the years. Lack of organization has caused the demise of many big businesses as well as of many big speculators. Some very successful speculators know very little about the fundamental or technical condition of a given market but are still able to make money in that market simply because they have placed emphasis on preserving their trading capital as well as on using sound trading practices. Thus all of the previous guides mentioned for forecasting soybean futures prices would be useless if one did not mention some of the laws absolute which many successful traders of the past have used as well as some of the pitfalls which human nature sometimes falls into. The first six rules are concerned with capital preservation, and the last six are concerned with sound trading practices.

1. Only use excess funds after your ordinary obligations have been met for commodity futures speculation. Divide these funds into several equal units, and never risk more than one unit on any one trade.
2. Never overtrade, either financially or emotionally. Financial overtrading would violate the first rule whereas emotional overtrading can be large enough to alter your personality. This could warp your judgment and result in foolish trading errors.
3. Never let a profit run into a loss. After you once have a profit of 3 to 5¢ in soybeans, or 30 to 50 points in soybean oil, or 200 to 300 points in soybean meal, place a stop-loss order at the initial trade price so that you will have no loss of capital.
4. Never meet a margin call. The trend is obviously against you, and depositing additional funds will not alter the trend.
5. Never average a loss. Although dollar averaging in the stock market is a sound trading practice, it is one of the worst mistakes a commodity trader can make.
6. Never hedge. If your position in one month goes against you, never hedge by selling another month. You are only creating two liquidating decisions and an extra commission fee. Merely liquidate the original position outright. The only exception to this rule is the time when a position is desired for six months or longer for income-tax purposes, in which case hedging has a definite value.
7. Enter the market only when the potential profit is several times the potential loss. In other words, never buy or sell and assume a risk just to get a scalping profit.
8. Be just as willing to sell short as you are to buy because soybean prices have a history of extreme volatility, providing almost equal opportunities in both directions.
9. Do not buy or sell soybeans simply because the price is historically high or low. The reasons for the price reaching this level in the first place should be analyzed.
10. Do not act on tips or follow other peoples' advice unless you are assured of their qualifications. Investigate the trading record and reputation of any commodity services you want to subscribe to and, when opening an account with a commission firm, try to obtain a registered representative who devotes more of his time to commodities than to securities.
11. When in doubt, get out of the market or at least lighten up your position. Also do not initiate a position when in doubt, or otherwise do not trade merely for the sake of trading.
12. Do not take a profit without a good reason. One of the basic rules for commodity trading is to limit your losses and let your profits run. Once a successful trade has been initiated and the trend is in your favor, do not liquidate your position unless you feel that the fundamental and technical condition of the market has changed.

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