

Finance 425

Business Forecasting

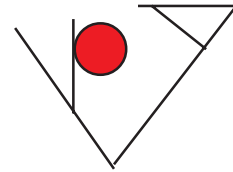
Cases

Pieter A. Vandenberg

Finance 425

Business Forecasting

Cases



The cases that are part of this packet are designed to simulate actual forecasting situations. You will need to define the problem, collect the data, apply the appropriate forecasting techniques, and present the solution. The cases were designed so that no one knows the answers, not you, not other students and certainly not the instructor! So we are all faced with the same situation—How do we make forecasts and how do we decide that it's an acceptable forecast, without knowing the actual results? Kind of like it really is!

So keep in mind that in order for people to conclude that you have a reasonable forecast you must do a convincing job of data collection, analysis, and presentation. This means, for example, being aware of the surrounding environment; being sure to use multiple techniques to develop your forecast; and being realistic about your ability to deliver a reasonable forecast. No one will be convinced if you feed some data into a computer program and let a program pop out an answer. Remember an important part of effective forecasting is the background you supply about the context of the numbers and the forecast.

I am willing to talk to you about your cases. I will not make decisions for you. Ultimately, you will have to decide what to do and how best to make and deliver the forecast. Frequently, discussion is useful in helping you decide what you should do. You can ask questions in class or you can see me as a group, or individually.

The important learning objective in these cases is the process, not the final answer. Yet, unless you take getting the final answer very seriously you will not go through the right process.



How Many Students?¹

You have just gotten a part time job at a small consulting firm in Mission Valley. You are very happy because you believe that the experience is likely to be related to your major. So far your part-time jobs have not been related to your major and this has been a source of frustration. You look forward to becoming involved in something very different than the problems you have been exposed to so far in your academic career. Like many students getting close to graduation you are ready for a change!

It is Monday morning October 22, 2002 and you are reporting for work for the first time. You have a meeting with Tho Nguyen the owner of Nguyen Associates the firm you are working for. Upon arrival Mr. Nguyen greets you with: “We have just landed a new consulting contract and we think your background is going to be very helpful to us.” You begin to feel real important.

What background do you have that could be so helpful in this consulting job? He continues that the consulting job is with San Diego State University. (You begin to smell a rat—this was the place you were trying to escape from!) He explains that the University is interested in doing a better job of forecasting the number of students that are going to enroll for the next three semesters, that is the Spring of 2003 and the Fall/Spring of 2003/2004. In addition they are interested in a long-term projection of enrollment trends. This long term projection is less a numbers issue then a statement of general trends that SDSU can expect to face.

There are two numbers that the University is concerned with, he continues. The first is simply the number of students, which is defined as number of students taking at least one class (could be as small as 1 unit or even less). The historical number of students is shown in Figure 1. The second number is actually more important to the University since it determines the amount of funding supplied by the

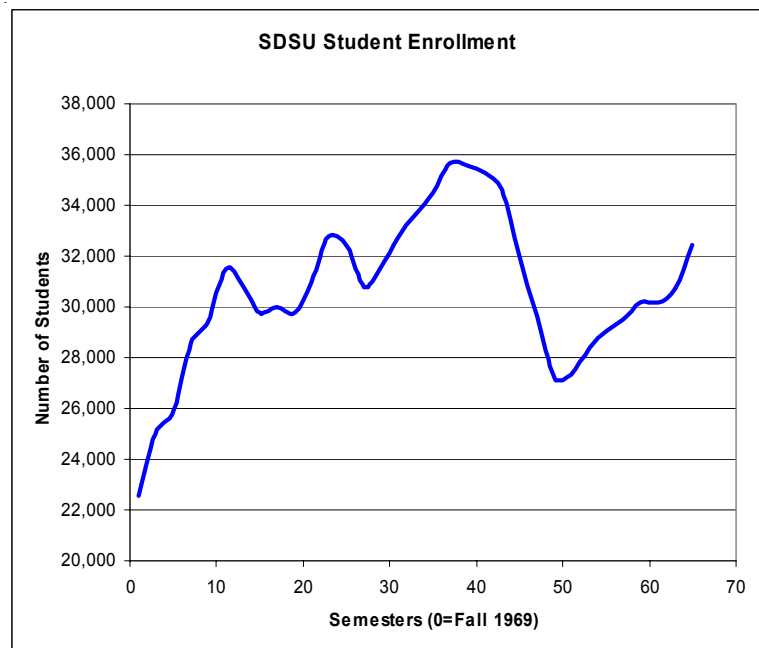


Figure 1

¹ This case was prepared by Pieter Vandenberg for classroom discussion rather than to illustrate either effective or ineffective handling of an administrative situation. It was prepared from publicly available information and does not necessarily represent the views of San Diego State University. © 2002 Pieter A. Vandenberg

state, that number is referred to as FTES—Full Time Equivalent Students. This number is computed by taking the sum of students enrolled times the number of units they take divided by 15. This creates an imaginary number of full time students. Figure 2 shows the historical FTES. The University wants both numbers estimated. Mr. Nguyen continues by saying: “You are probably aware that a number of changes have occurred at San Diego State and within the California State System and these changes have impacted SDSU.” The net impact of these changes and probably a host of external events have resulted in declining enrollments for several years, followed by an increase in the last few years. General forecasts are that university enrollment in California will increase for the foreseeable future.

A significant portion of the decline in the early 90’s was planned, in the sense that a new campus was opened in San Diego County because of the over-crowding at SDSU. At the same time a number of fundamental economic events had affected the entire state as well as San Diego. Fees had also increased significantly during this time period. The last two years fees have been constant or declined slightly and the economy in California has rebounded and has grown steadily in the last half of the 90’s. The result has been increasing enrollment. All of these, and perhaps other factor, have resulted in a change in the environment that SDSU operates in and the University has contracted with us to provide them with a forecast of the enrollment for the next three semesters.

Current forecasting practices at SDSU have been very ad hoc and have been carried out in various parts of the University. The description of these is not well organized and therefore is not likely to be of much help.

“So,” Mr. Nguyen says, “you can see why I said your background is going to be very helpful. In fact I’m going to put you in charge of developing the necessary historical data, locating any supplemental data/facts that you think might be appropriate and developing the necessary forecasts. You will also need a final report to present to the University by end of the current semester.” (You say to yourself this is sounding more and more like a class assignment.) “Unfortunately, I’m leaving town until the middle of December and will be out of touch with you so you will be pretty much on your own. But I’m sure you can handle the situation.” (You think to yourself, “Thanks a lot!”)

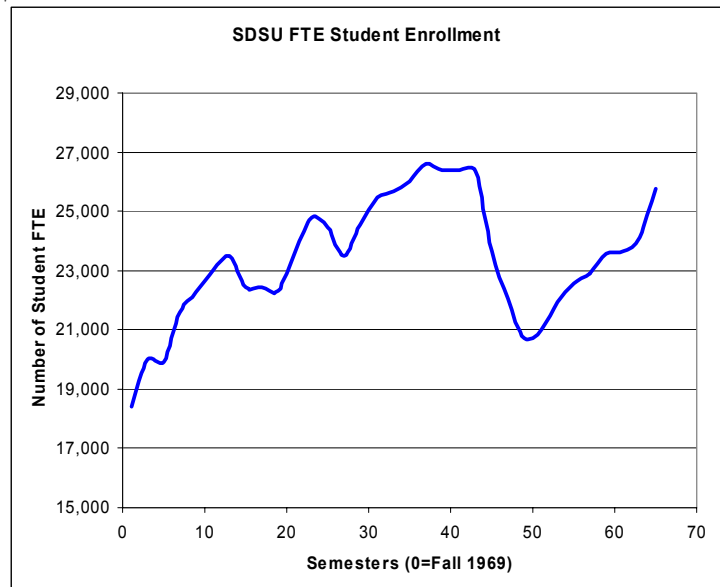


Figure 2



Automobile Manufacturers and Parts Conference¹

“Well the annual meeting of our members is sneaking up on us,” says Joel Arlin, President of the *Automobile Manufacturers and Parts Conference Inc (AMPC)*. In the next few months we will have to develop and present our annual forecast of automobile sales for the next calendar year. Our annual conference is very important to a “consulting” firm like ours. We consider the annual conference an important chance to develop additional potential members and consulting opportunities. It is a very important business opportunity for the firm.

AMPC has a number of different classes of members. Some are automobile manufacturers; in fact, every large automobile manufacturer operating in the United States is a member. They also have several parts and service suppliers to the auto industry that are members. In addition a number of financial institutions are also members. These tend to be the ones that specialize in lending to participants in the automobile market.

This includes both firms that lend to the consumer, as well as those that provide specialized financing for automobile dealers. The firm has also succeeded in getting a number of automobile dealers to join, particularly those from the larger retail markets. AMPC has also attracted members from the retail automotive supply industry such as auto parts suppliers and oil companies. Portfolio managers and security analysts also are members. They use the services of AMPC to build industry expectations for the following year in order to make recommendations as to investment strategies.

As a result AMPC now has over 900 members. In addition there are number a of firms that exhibit at our conference. These of course represent a source of revenue for AMPC since there is a charge for booth and display space at the conference. Members are allowed to send a fixed number of representatives from their firms, and then can register additional individual for a registration fee. Thus AMPC has four sources of income. The first is the annual membership dues. These are based on the size of the firm. Large firms may pay as much as \$20,000 to be members. Our minimum membership is \$1,000 (which represents the largest category). For this members get a set of standard reports, provided monthly, geared

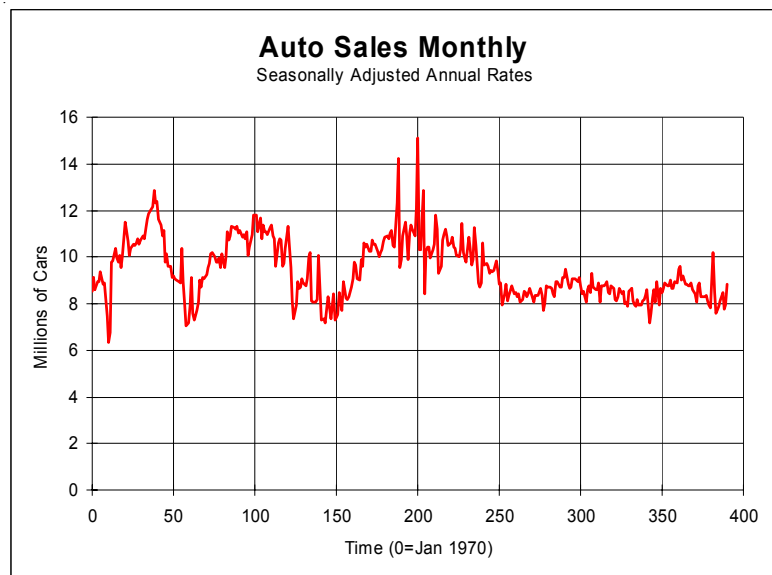


Figure 1

¹ This case was prepared by Pieter Vandenberg for classroom discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

© 2002 Pieter A. Vandenberg

to their membership status about the state of the industry in addition to the special annual report. The second source of income is the fees the firm charges for booth and display space at the annual conference. The third is the registration fees that are collected from both members and non-members. The fourth source of income is specialized consulting services AMPC to offers to individual members, beyond that covered by the standard reports.

The automobile industry affects a large number of individuals and firms in this country. The industry is a very large employer, a large potential customer, and a major component of Gross Domestic Product. AMPC has been able to take advantage of the interest that such a large industry generates among a variety of individuals and firms. This has allowed us to grow and prosper as a firm. The firm expects to continue growing. Although AMPC is not the usually type of consulting firm, it has always

Table 1

Selected Motor Vehicle Indicators, by Model Year: 1992 to 1997

[In thousands of units (12,868 represents 12,868,000), except as indicated. A model year begins on Oct. 1, and ends on Sept. 30. It covers the fourth quarter of one calendar year and the first three quarters of the next calendar year]

Sales and expenditures	1992	1993	1994	1995	1996	1997
New motor vehicle sales	12,868	13,913	15,179	15,233	15,460	15,380
New-car sales	8,160	8,428	8,936	8,736	8,654	8,259
Domestic	6,195	6,595	7,173	7,167	7,361	6,924
U.S. nameplates	5,048	5,348	5,707	5,518	5,428	4,964
Transplants	1,146	1,247	1,466	1,649	1,933	1,960
Import	1,966	1,833	1,763	1,570	1,293	1,335
New-truck sales	4,707	5,486	6,244	6,498	6,806	7,121
Light	4,446	5,167	5,869	6,070	6,389	6,707
Domestic	4,026	4,789	5,499	5,666	5,976	6,155
Import	421	378	370	404	413	552
Other	261	320	375	427	417	414
Domestic-car production	5,643	5,827	6,548	6,466	6,194	5,879
Avg. expenditure per new car ¹ (dollar)	16,893	17,526	18,431	18,849	19,397	20,305
Domestic (dollar)	16,281	16,595	17,406	17,695	18,064	18,580
Import (dollar)	18,861	20,998	22,598	24,111	26,972	29,296

¹ BEA estimate based on the manufacturer's suggested retail price.

Source: U.S. Bureau of Economic Analysis, *Survey of Current Business*, November 1997. Data from American Automobile Manufacturers Assoc., Inc., Washington, DC, and Ward's Automotive Reports; seasonally adjusted by BEA.

viewed its relationship with its members as a consulting type relationship. AMPC supplies expertise that members cannot readily get elsewhere.

Figure 1 shows the monthly sales of automobiles (annual rate) since 1970. As can be seen automobile sales are quite volatile and have ranged from a high of 17.1 million annual units in September of 1986 to a low of 6.4 million annual units in November of 1970. These differences mean significant swings in production over the last 23 years. It also means significant swings in automobile industry profits, for manufacturers, suppliers, dealers, and retail support industries. According to *Consumers*

Bankers Association Reports, (Apr. '98): “Automobile price increases exceeded income growth in the early 1990s so that, by 1995, only half of households could afford the average car and 40% could afford the average truck, down from 54% and 57%, respectively, in the late 1980s. Loan maturities—some of which are already at 60-72 months—are stretching out again to address affordability.”

While demand has varied greatly the sales price of an automobile has continued to rise during this entire time period. Table 1 shows the average expenditure by the consumer on a per car basis for the six years between 1992 and 1997. Thus even though the expenditure, per car, has shown a steady increase the revenue of the automobile companies has shown volatility because of variability of unit demand.

Figure 2 shows the sales of light trucks since 1993. This category has shown rapid growth over the last 10 years, but it has been particularly noticeable since the real price of gasoline has dropped through out the 1990's. Recently of course the price of gasoline has increased nationwide and one of the issues facing the industry is the impact of this increase on the demand for automobiles as well as the mix of cars sold. Higher priced automobiles and light trucks tend to also have relatively poor mileage.

In light of this situation the conference attendees are always very interested in the forecast of demand for automobiles for the next year. The highlight of the conference each year is the release of the expected demand for automobiles for the next twelve months. This report is closely read by everyone. It is given considerable attention by the media and frequently quoted. This document is viewed by AMPC as an important marketing tool. Since they have had a reasonably good track record at forecasts the feeling in the industry is that AMPC is an excellent source of consulting advice about prospects in the automobile industry.

You have just been assigned by Joel Arlin to develop the forecast for next year. You are to forecast the demand for automobiles for next year (Calendar 2003) and develop the report that will be distributed to conference attendees.

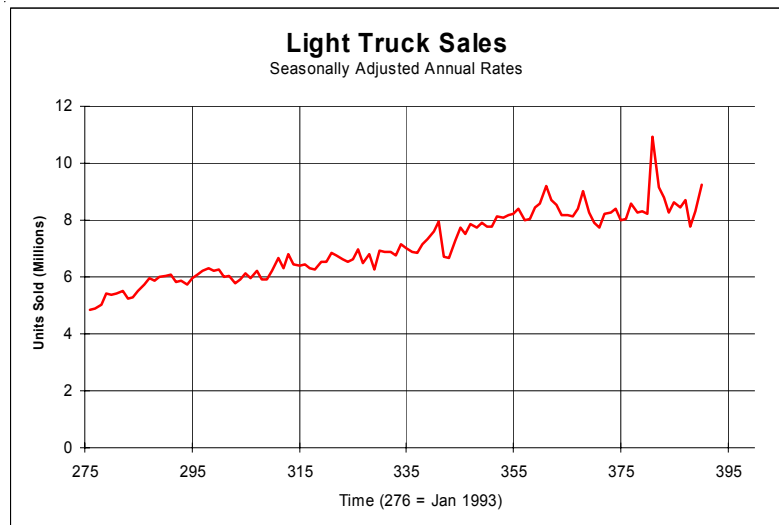


Figure 2



Family Mortgage Company¹

You have accepted a job at Family Mortgage Company. FMC is a full service mortgage company that originates and services mortgages throughout the U.S. You have been hired as a financial analyst. Financial analyst is a particularly vague term and no one is absolutely sure what actual functions one performs. It turns out that part of the functions of the job you took is to provide a forecast of conditions in the mortgage markets next year (Calendar 2002).

While the entire forecast is composed of many parts you now just working on the demand side of the equation. The demand for mortgages comes basically from three sources.

1. Is the refinancing of existing mortgages. This creates revenue for the firm even if in some general sense

the total amount of mortgages outstanding does not change. Much of FMC's income comes from the fees that are charged during the refinancing process as well as opportunities created by the selling of mortgages to the final investors. There is of course some risk involved since interest rate changes can mean gains or losses. The demand for refinancing is basically driven by the changes in interest rates, given a forecast of interest rate movement the prediction of refinance business is fairly easy.

2. The second source of demand for mortgages comes from the sale of existing homes.

The stock of existing homes is well known and not uncertain. The demand for mortgages is dependent on the turnover of existing homes. The turnover of existing homes is a complicated function of a variety of variables. Including, but not limited to, the over-all economic activity, the rate of interest, and population growth.

3. The third source of mortgage demand is from the sale of new homes. This number is relatively

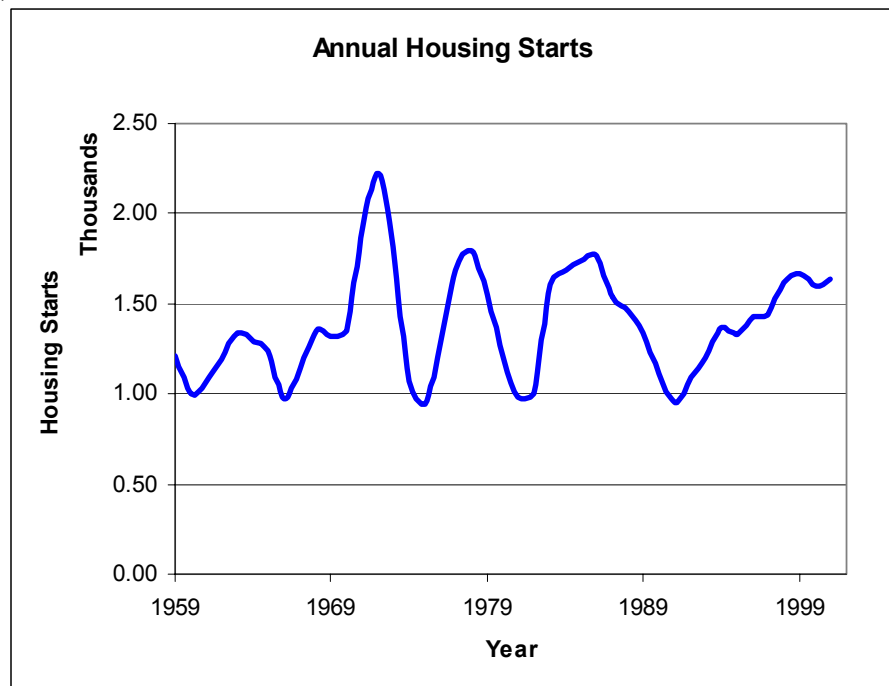


Figure 1

¹This case was prepared by Pieter Vandenberg for classroom discussion rather than to illustrate either effective or ineffective handling of an administrative situation. It was prepared from publicly available information and does not necessarily represent the views of San Diego State University. © 2002 Pieter A. Vandenberg

volatile since it represents capital formation by households. If the demand for homes drops the building of new homes responds very quickly and much of the demand for homes is filled by the existing stock of homes. If the demand for housing increases the demand for homes rises very quickly. Thus the building of new homes is much more volatile than the demand for housing.

Your job then is the build a forecast for hous-

ing starts for the year 2002. You are aware that housing starts have held up very well in the last year, in fact it has consistently been identified as the “bright spot” in the economy. Other sectors, particularly business investments have been stagnant or even falling in some specific areas. The consumer spending has in general been doing relatively well.

Construction spending on new housing has helped to keep the economy moving and thus has been closely watched by everyone that is concerned with aggregate economic activity. Figure 1 shows housing starts on an annual basis since 1959. Housing starts are shown in Figure 2 on a monthly base, these figures are more relevant since you need to forecast on a monthly basis.

FMC is concerned with the aggregate housing starts for the year, but is also interested in the trend month to month of housing starts. So you are asked to do a monthly forecast for housing starts. The trend through the year for housing starts is important because this will help FMC forecast the demand for mortgages and enable it to address the need for funds. The demand for mortgages is of course the demand for cash that FMC needs to supply. Thus in order to have a rational planning process the demand for cash by FMC’s customers is absolutely essential.

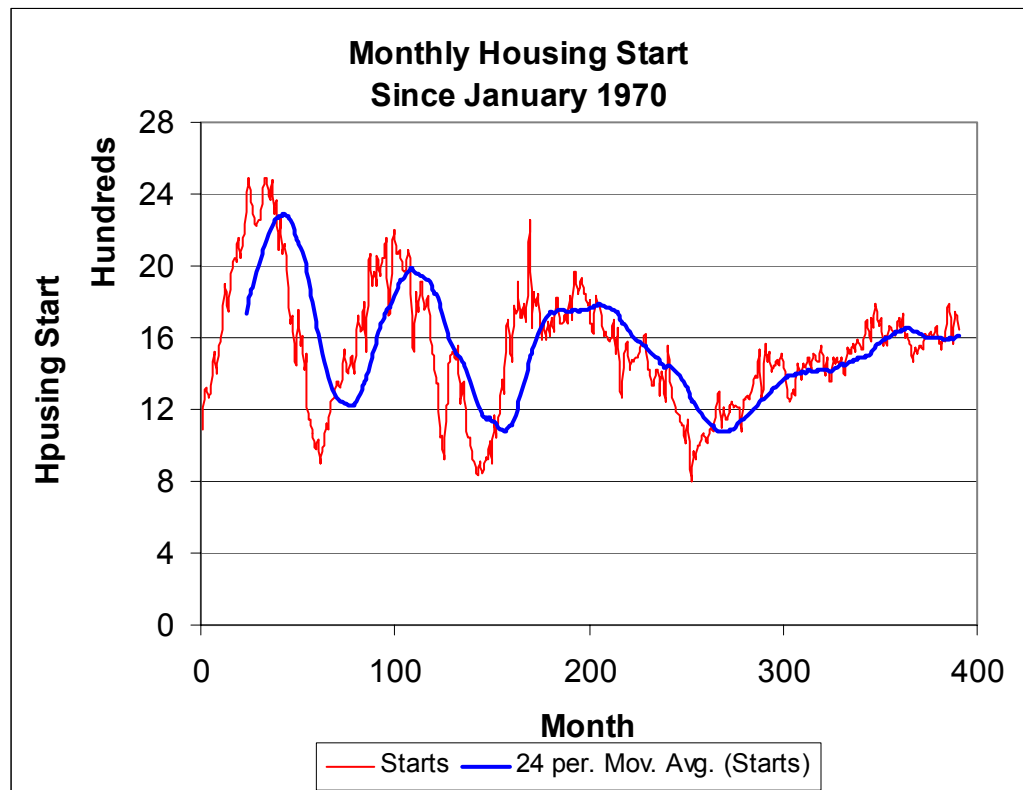


Figure 2

through the year for housing starts is important because this will help FMC forecast the demand for mortgages and enable it to address the need for funds. The demand for mortgages is of course the demand for cash that FMC needs to supply. Thus in order to have a rational planning process the demand for cash by FMC's customers is absolutely essential.



Great Plains Product Company¹

“Well,” says Nancy Florentino, your boss, AI think we have finally made some progress. Top management is willing to consider a broader definition of their market. They are willing to consider selling outside the United States. That’s quite remarkable you think to yourself since as near as you can figure out top management seems to consider California and New York foreign markets. They are very parochial! Great Plains Products Company is very successful in selling its products to local markets in the Midwest. Ms. Florentino was hired by Great Plains two years ago to help with long run planning. She was in charge of developing a plan for the next 10 years. You were hired by Ms. Florentino six months ago to help her develop the plan.

Great Plains has been successful in selling its product in their area, which includes the farming states of the greater Mississippi River basin. They manufacture a variety of specialty products that are used in farming. These products,

sold through exclusive dealers, include such items as stock tanks (in various sizes). These are basically galvanized tubs that are used to provide water for large animals. They have recently begun to experiment with plastic materials to build tanks. However, the company has used galvanized steel for 100 years and are not sure that they should change. They also provide much smaller scale equipment for specialized markets such as poultry ranches. This includes watering and feed troughs. Great Plains also manufactures a variety of equipment to provide specialized feeding and watering for smaller farm animals such as pig, goats, sheep, etc. They also manufacture windmills and the appropriate support equipment for distributing water from wells. The company has a reputation for being very old-fashioned, but at the same time everyone agrees that their equipment is extremely well designed and as a result has a very long life. Their warranty is among the best in the business.

However, they are faced with the realization that the market for their products may begin to decline in the United States. Many areas of the world may find that they have a comparative advantage in

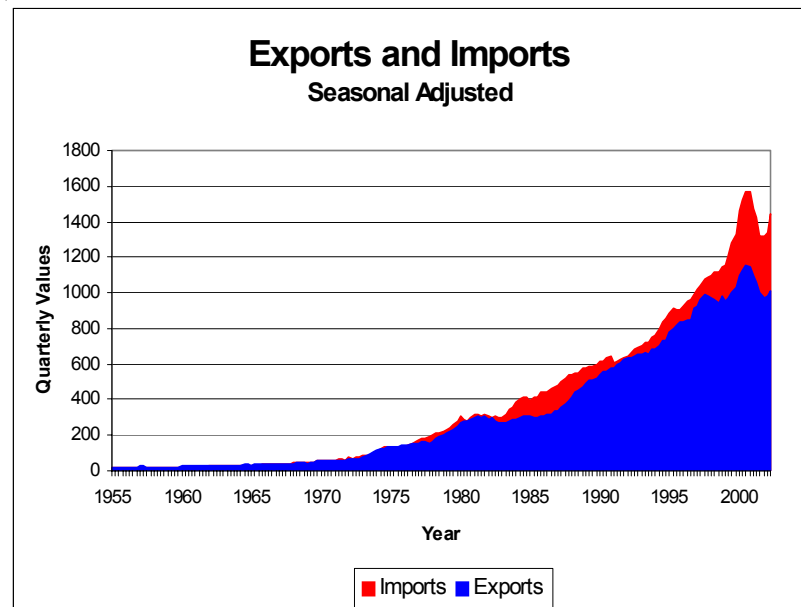


Figure 1

¹ This case was prepared by Pieter Vandenberg for classroom discussion rather than to illustrate either effective or ineffective handling of an administrative situation. © 2002 Pieter A. Vandenberg

producing agricultural products and therefore more countries will begin to produce these products. This will reduce the number of US farmers, making it more difficult for Great Plains to find customers in the domestic market. Figure 1 shows the rapid growth in the size of monthly exports and imports for the United States. As such Great Plains needs to develop a plan to begin to sell their products in other parts of the world. This has been a very difficult concept for the managers of Great Plains. They have always concentrated their efforts on the US and are proud of the fact that have developed close longterm relationships with their dealers. In fact the president of Great Plains takes great pride in telling everyone that he knows all of the top 100 Great Plains dealers by their first name. He feels that this personal touch is a very important part of the success of Great Plains. He wonders how he can achieve this with dealers half way around the world. Figure 2 shows that while monthly Net Exports are still negative, meaning we import more than we export as a country, the gap has closed significantly in the last few years and then widen again.

However, after much discussion among the managers of Great Plains the reality is beginning to sink in, driven home by the business slow down of the early nineties. Great Plains is recovering but more slowly than from previous recessions, mainly because the demand for farm products worldwide has not been as strong as the US economy. NAFTA implications are also of concern to the company. Will other manufacturers move into the market?

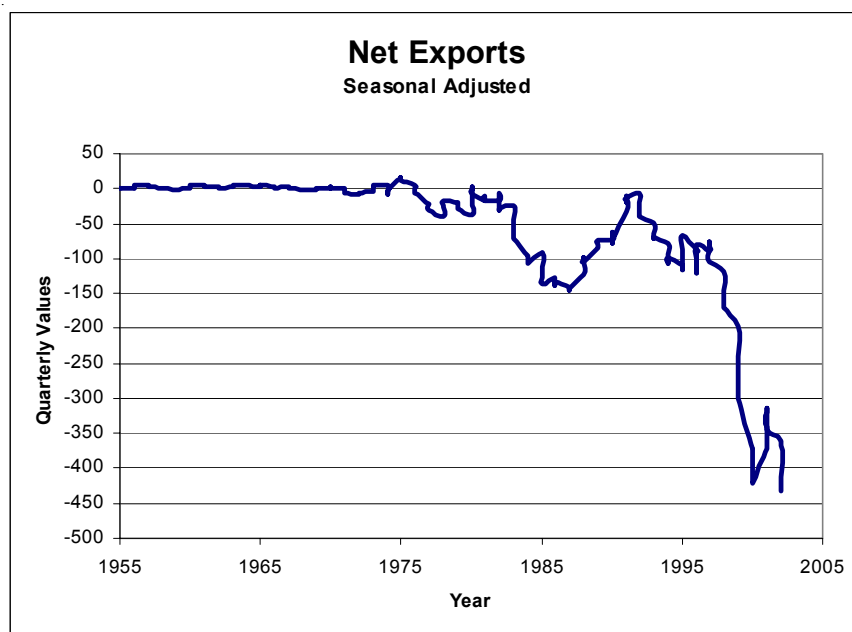


Figure 2

Great Plains has always had a company retreat for top management and their sales force each year. These usually occur in the early winter, when the snow is up to the front doors of the their manufacturing facility in Wisconsin. This is an excellent time to provide training to their sales force and to provide them with information about the company. Top management usually meets with the sales force during this retreat. But their major reason for going is that they have a chance to think and plan for the future of the company in a setting where they are not bothered by the day to day problems of the running the company. It has been a very successful device for the firm. They usually travel to a nice warm climate, in a Aforeign location,@ such as California or Florida to have their meeting.

This year Ms. Florentino has suggested San Diego, California as the meeting site. She suggested this because she has arranged a visit to Mexico for top management. They will meet with some possible dealers in Mexico and have a brief tour of some Mexican farming areas to see how their products might be received there. Top management has approved the idea. As part of the program they have also requested that they be briefed on several factors.

They want to start with a general overview of the size of the export/import market in the US. In fact they are interested in the position of the US trade deficit and what it might do over the next few years.

One said Aif all of the collective companies in the US can't be successful in international trade then I don't believe we could be. So they have asked for a briefing on the over-all US trade position and the forecast for the next five years for Export, Imports and the Trade deficit. They are also interested in the size of the general market they are in. You have

discovered that the Commerce Department classifies the type of product that Great Plains makes as:

Other industrial, agricultural and services machinery. @ Figure 3 shows the quarterly exports and imports in this market. As can be seen, the US in some quarters enjoyed a trade surplus in this market, but it has fallen in recent times, but appears to be making a come back in the last year. Ms. Florentino feels that this will be viewed favorable, by top management since it indicates that US firms appear to be able to compete effectively. Since Great Plains is an effective competitor in the US market there is no reason to believe they would not be successful in the international market if they prepared and managed properly.

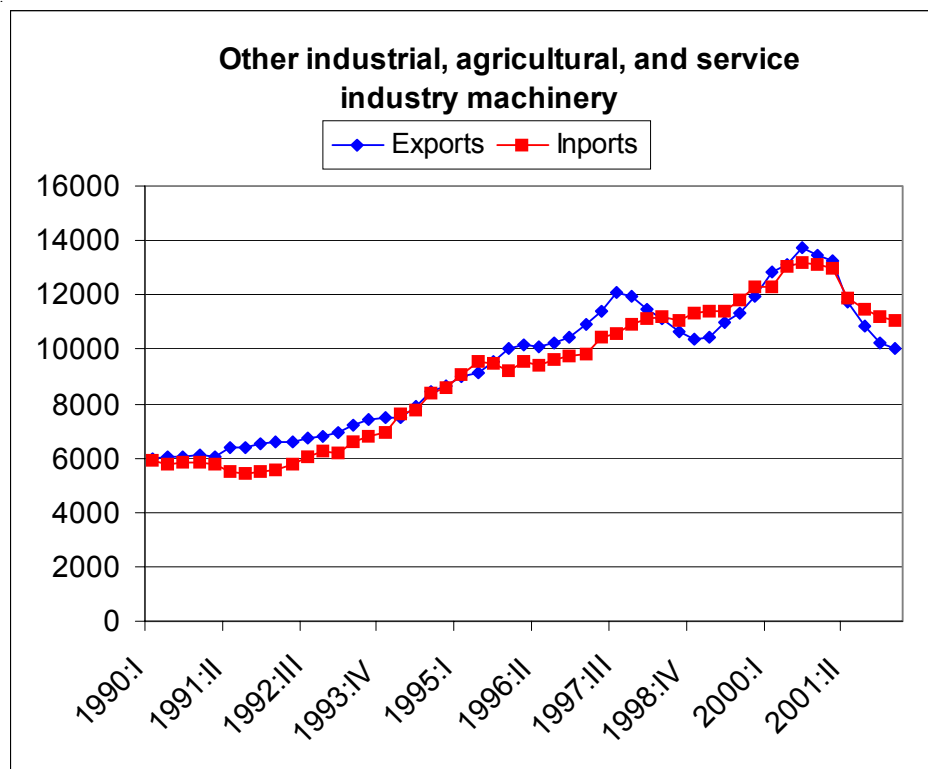


Figure 3



Where's the Market Going? ¹

Well you've finally graduated. Not only that, you have managed to land a job with a very reputable portfolio management firm in La Jolla. This firm manages a number of large portfolios for wealthy individuals from around the country. The firm uses a number of models and practices a variety of money management techniques. They are generally considered to be one of the better portfolio managers in the industry.

They actually have a number of different clientele that they serve. Some are very short-term oriented others are much longer term oriented. They use a variety of theoretical constructs to manage these portfolios. Since you have just started to work for the firm you have not yet figured out all the ins and outs of what it is that

they do. You realize that like all firms they have to satisfy their clients or they will be out of business. This may at times require that they do things that under some theoretical constructs make very little sense. At this point you recognize that it is best not to enter into a discussion about these kinds of issues. You realize that you are the new kid on the block and your major implicit assignment at this point is to get the lay of the land and perform the tasks you are given to the best of your ability.

One group of individuals manages its portfolios using the concept of Beta and the Capital Asset Pricing Model. Another group believe in timing the market and wants to know when the market is likely to go up or down. Another group wants to manage their portfolios in such way that they will "beat the market" return for the next year. The firm has realized that all three groups have something in common. They need a forecast of the "market." Since you are the "new kid" on the block the firm's president has decided that you are a perfect individual to provide this forecast and to write a report that will be sent to

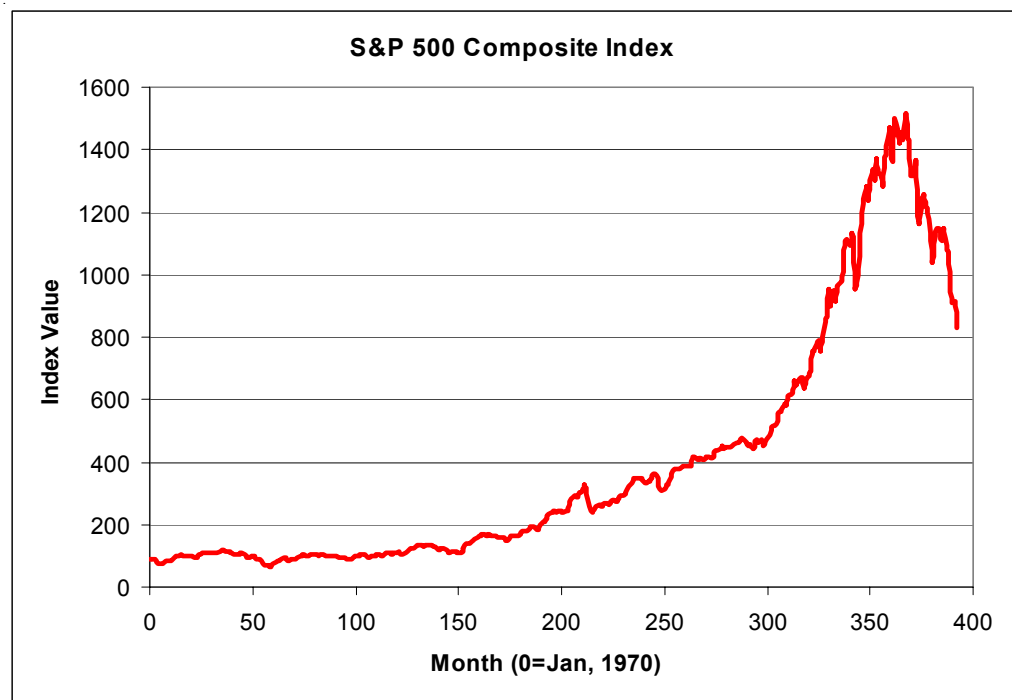


Figure 1

¹ This case was prepared by Pieter Vandenberg for classroom discussion rather than to illustrate either effective or ineffective handling of an administrative situation. © 2002 Pieter A. Vandenberg

clients who request information about the expectations for the market for next year (Calendar 2003).

Figure 1 shows the historical (monthly) S&P 500 index. Figure 2 shows the dividend yield (monthly on an annual basis) on this composite portfolio. These two values are necessary to compute monthly holding period returns. Thus you are to supply forecasts of the monthly close of the Standard and Poor's 500 Stock

Market index. In order to satisfy the various clients the President has stated that he wants the actual level of the index, as well as a monthly holding period return for each month. This is to provide input to those people who plan to use the CAPM to make decision about investment portfolios. You will also be need to supply information about how much an investor must earn next year in order to "beat the market" return for next year.

The last thing the president says is that you will need to be ready to present the report by the end of November, because the firm holds an annual meeting for its clients and they will be very interested in your forecast. He remarks that it's a great opportunity for you to show what you can do!

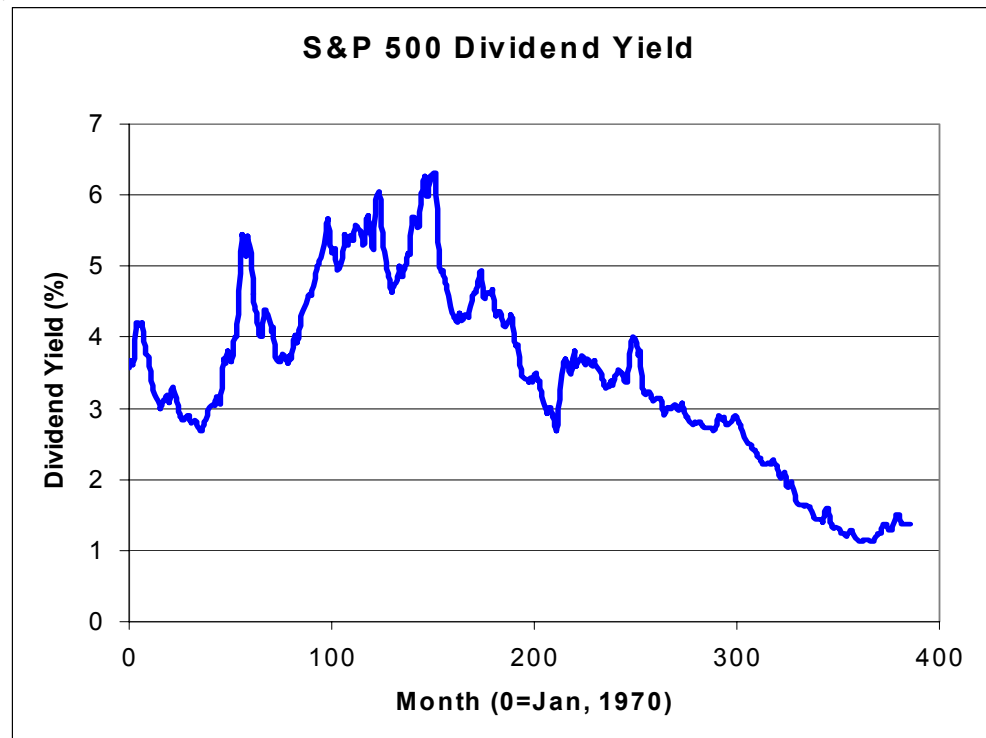


Figure 2

A note on the Capital Asset Pricing Model

The CAPM is a model that believes that much of the risk of a security can be eliminated by holding a properly diversified group of securities. The risk of any security can be broken into two parts. The first is the part that can be diversified away (frequently called unsystematic or unique risk) and the second is the part that cannot be diversified away (frequently called systematic or market risk). The trick to managing a portfolio is to make sure that it contains no unsystematic risk.

This is frequently accomplished by measuring the systematic component of risk for each security. The systematic component of risk can be measured by a value called beta. Technically beta is not systematic risk but is perfectly correlated with systematic risk. It could more accurately be described as an index of systematic risk. Beta is scaled such that the average non-diversifiable risk is assigned a value of 1.0. Thus a security with a beta of 2.0 is twice as risky as the average security. A security with a beta of .5 is half as risky as the average.

The expected return on a security can be measured by its relative risk using the following formula:

$$E(R) = R_f + \beta (E(R_m) - R_f)$$

This equation says that the expected return on a security [E(R)] is equal to what you could earn on a risk free investment [R_f], plus the relative risk of the security [β] times the risk premium on the average risk security which earns the average market return [$E(R_m)$] from which you would subtract the risk free rate of return.

Thus once an investor knows the three components on the right hand side the investor can compute the expected return. Betas are generally available from a variety of sources. Although their stability is frequently questioned the firm assumes that investor will be able to make a judgment about the appropriate beta. The firm assumes that the risk free is also reasonable easy to obtain because they seem to receive very few requests for information about this variable.

This leaves the expected return on the market. The firm's clients appear to be very interested in the firm's forecast of this variable for the next year. The expected return for any month is a function of two values. The first is the change in the value of the market portfolio, the second is the dividend payment on the securities in the portfolio. In short the wealth relative (1+return) is:

$$E(R_{m \text{ for any month}}) = \frac{\text{Value of the index}_{\text{End of the month}} - \text{Value of the index}_{\text{Beginning of the month}}}{\text{Value of the index}_{\text{Beginning of the month}}} + \frac{\text{Value of dividends received}_{\text{During the month}}}{\text{Value of the index}_{\text{Beginning of the month}}}$$

Since the end of one month is beginning of the next you will need to forecast only values for the end of each month for the value of the index, and the expected amount of any dividend that will be received each month. To get an estimate of the annual expected return it is only necessary to compound the monthly return to the end of the year.