

ECONOMICS U\$A  
PROGRAM #15

THE FIRM:  
HOW CAN IT KEEP COSTS DOWN?

BY FRANK M. NESBITT

AIRSCRIPT  
JANUARY 8, 1986

## 15. THE FIRM: HOW CAN IT KEEP COSTS DOWN?

### PURPOSE:

To explain the concept of the production function, and to describe how firms can minimize their costs of production by utilizing an optimal combination of inputs and scale of operation.

### OBJECTIVES:

1. The relationship between the rate of output of a commodity and the rate at which inputs are used is called the production function.
  - a) an “input” is a factor, such as labor, machinery, or land, that contributes to production.
  - b) a production function “embodies” a given technology; a change in technology changes the relationship between inputs and output.
  - c) if a percentage increase in all inputs results in an increase in output greater than the percentage increase in inputs, the production process has economies of scale.
2. Some inputs can be changed more easily than others in response to a change in demand. Those inputs (such as labor, raw materials, or energy) are called variable inputs, and inputs which can only change in the long-run (such as a factory) are called fixed inputs.
3. If the successive additions to output lessen as more and more of an input is added (while technology and the quantity of other inputs are held constant), the input is subject to diminishing marginal returns.
4. To minimize its costs, a firm must choose a combination of inputs to meet the following condition: the marginal product of a dollar’s worth of any one input must equal the marginal product of a dollar’s worth of any other input used.

### KEY ECONOMIC CONCEPTS:

production function	specialization
fixed input	variable input
average product	marginal product
technological change	cost minimization
law of diminishing marginal returns	

### ILLUSTRATIONS:

1. Coke’s substitution of a low cost sweetener for sugar when the price of sugar rose.
2. the inability of Studebaker to compete with the Big Three because of economies of scale
3. the adoption by the Washington Post of a new printing technology

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ANNENBERG/CPB PROJECT (Logo and Music)

TEASER

DAVID SCHOUMACHER: In 1980, long before the flap over new Coke and old Coke, the major soft drink makers made a critical change in their beverages. Why would they change the key ingredient in their already successful products? Following World War II, the Studebaker Corporation had its most prosperous years. Why would this auto producer become extinct in less than a decade? In the 1970s, a small newspaper along the New Jersey coast, the Asbury Park Press, exploded into the state's third largest newspaper. What did the company do to make this phenomenal growth possible? No business can guarantee that it will make a profit. But there are some fundamental strategies that can increase the chances for success. The Firm: How Can It Keep Costs Down? With the help of economic analyst Richard Gill we'll investigate that problem on this edition of Economics U\$A. I'm David Schoumacher.

(MUSIC PLAYS - SERIES OPENING TITLES)

THE FIRM: HOW CAN IT KEEP COSTS DOWN? Appears on screen)

PART I

SFX: Bottling assembly line.

DAVID SCHOUMACHER: Soft drink companies spend millions of dollars on advertising to make billions at the sales counters. It is a 23 billion dollar a year industry. With that much riding on sales, every decision is crucial.

BILL COSBY: “The words I’m about to say will change the course of history...Here they are. Coca Cola has a new taste and it is the best tasting Coca Cola ever.”

DAVID SCHOUMACHER: In 1985, the Coca Cola Company announced to the world that it was changing the Coke formula. To millions of loyal customers, the new taste of Coke was an outrage and the rest is history. But five years earlier the company had quietly changed a key ingredient and it had gone unnoticed by the consumers. What was that change and why did the company take such a risk? In 1979, the Coke Company earned 420 million dollars on sales of nearly 5 billion. But the giant corporation faced cost problems...The price of sugar was rising sharply. Donald Ulrich is President of the Mid-Atlantic Coca Cola Bottling Company...

DONALD ULRICH: “Prices went from about \$19 sugar up to...some people were paying \$70 for sugar. And consequently, we had to move the price of the product up to the retailer and to the consumer. And that price gap was of such significance that it slowed the consumer from buying the product. They weren’t drinking as much, buying as much...so it really had quite a drastic effect.”

DAVID SCHOUMACHER: Worldwide weather problems and government restrictions created sugar shortages in the 1970s, sending shock waves through the soft drink industry. It took a lot of beet and cane sugar to sweeten the billions of cans and bottles sold every year. In the United States, we drink the equivalent of 465 soft drinks per year per person. Coke alone bought more sugar than anyone else in the country. Dr. Robert Barry tracked sweetener prices for the U.S. Department of Agriculture.

DR. ROBERT BARRY: “In the case of Coca Cola, which at one time was using about a million tons of sugar, every one cent increase in price means about 20 million dollars.”

DAVID SCHOUMACHER: When the price of sugar shot up 7 cents a pound in late 1979, the soft drink makers were desperate for an alternative. It came from one of America's most abundant crops...corn. The process of extracting high-fructose corn sweetener...HFCS...was perfected by a chemist working at Royal Crown Cola. Jesse Meyers, the editor of Beverage Digest.

JESSE MEYERS: "And at RC there was a chemist by the name of Martha Jones...who incidentally is now working for Coke...who was instrumental in developing a lot of these new products that RC was very innovative about. She is called by many in the industry the mother of HFCS...and she made sure that this product was up to the exact specific levels of each of these franchise firms and that it could be used interchangeably with sucrose."

DAVID SCHOUMACHER: Because American farmers produced corn so efficiently, refining those golden ears for their sugar makes high fructose corn sweetener about 10 cheaper than sugar from beets or sugar cane.

JESSE MEYERS: "The dictates of the marketplace say to the producer, 'You must be the low cost producer.' In a soft drink business, this is particularly so since it's a business driven by the high volume/low margin producer. So any edge that you can make, that you can get, any minute thing that you can shave off that makes the racer go faster, that cuts away from the wind pushing the product back, the better off you're going to be in the marketplace."

DAVID SCHOUMACHER: But would the switch of one type of sugar for another affect the taste of the product and its sales? The manufacturers made the change very slowly...starting first with their minor product lines.

DONALD ULRICH: "We were concerned every step of the way, but at the time when we were making the switches, we ran thousands and thousands of taste tests to make sure

that that wasn't happening...And then chemically analyzed everything that was happening to the product. What most people don't understand is high fructose is sugar... You know, there's cane sugar, beet sugar, and there's corn sugar...So it is sugar. It was just trying to get the impurities out of the product and make it as high a quality product, because the processing had not been there to do that."

DAVID SCHOUMACHER: It was not long before the manufacturers of corn sweeteners could guarantee quality levels and adequate supplies. The large soft drink bottlers like Coke started to convert...Did it make any difference in the product?

ROBERT BARRY: "The manufacturers of the soft drink companies...Coke, Pepsi...claim that it does not...that it is quite the same. There are some who would quibble with that."

DONALD ULRICH: "I don't think there was any reaction from the consumer because, even though it was not kept a secret, the consumer really wasn't aware that we had even introduced high fructose."

JESSE MEYERS: "The formula didn't change one whit. They used a different approach to get the same effect. We're really talking about a change of pucker...It's still the same kiss."

DAVID SCHOUMACHER: In 1980, after several years of tinkering, the sugar substitution worked. Consumers thought it was the same Coke and kept on buying it. In fact, it was a product the company could deliver at substantially lower cost and maintain profit levels. Soon, Pepsi and Coke's other competitors made the sugar switch themselves. Economic analyst Richard Gill explains why companies cannot afford to ignore cost-cutting opportunities such as this.

(MUSIC PLAYS - COMMENT AND ANALYSIS I)

(ECONOMICS USA LOGO appears on screen)

RICHARD GILL: From the point of view of the soft drink producers, the change from sugar to high-fructose corn syrup was clearly an important one, cutting their costs and sustaining their profits. From the customer's point of view, it would seem to have been a non-change: Coke in 1980 tasted no different from Coke in 1975. Consumers generally didn't even know a change had occurred. Still, the change did affect customers. By lowering costs, the substitution permitted soft drinks to be sold more cheaply than they otherwise would have been. In a competitive environment, lowered costs almost invariably translate into downward pressures on consumer prices. Such substitutions are not only beneficial. They are characteristic in a market economy. Just as there is more than one way to skin a cat, there is more than one way to make Coca Cola, grow wheat, load a ship, even to produce drinking water. In Africa, for example, even today, you may see water being collected in this fashion. In the United States, our water supply comes to us through a vast network of dams, reservoirs, and pipes. And one big reason for this difference is that labor is cheap and machinery expensive in Africa, while labor is expensive and machinery relatively cheap in the United States. The way in which we produce all our products...soft drinks or water...will be affected by the prices of the factors of production...raw materials, labor, machinery...that go into producing them. The businessman will find it in his interest to substitute the cheaper factor of production for the more expensive...high fructose for sugar, dams and pipes for expensive human labor. And, in most cases, even when we're unaware of the change, we, the consumers, will benefit.

## PART II

(AUDIO CLIP FROM STUDEBAKER COMMERCIAL)

DAVID SCHOUMACHER: Studebaker had been attracting public attention with its innovative cars since right after World War II. By 1948, Studebaker sales soared to 300 thousand and it had grabbed 4% of the market. Profits were more than 46 million dollars. For more than a century Studebaker plants in South Bend had been turning out top quality transportation...But even with its fast post-war start, Studebaker could not

compete. Why did this company fail in America's flourishing automobile market? In 1852, five Studebaker brothers began a business in South Bend, Indiana, that would grow into the largest manufacturer of wagons in the world. At the turn of the century, the company moved into the automobile business, first turning out car bodies and finally buying the EMF Motor Company. The success of this first production car briefly placed Studebaker as a member of the Big Three car makers. The early boom years were followed by a series of bad decisions about new models. The Depression drove Studebaker into bankruptcy. After reorganization, a streamlined management brought in designer Raymond Lowie to develop a new car.

(AUDIO CLIP FROM STUDEBAKER COMMERCIAL)

DAVID SCHOUMACHER: Sales of the Champion and lucrative wartime contracts brought the company back.

LESTER FOX: "Studebaker had done a lot of work, even throughout the war in terms of totally redesigning a new concept in automobiles."

DAVID SCHOUMACHER: Lester Fox was Vice President of the United Auto Workers Union at Studebaker.

LESTER FOX: "The new car did propel the corporation into national recognition that resulted in assembly plants in Canada and on the East Coast and in California...to meet the demand...in addition to the main plant here in South Bend."

DAVID SCHOUMACHER: The bullet nose models, starting with 1949, added to Studebaker's success. The joke was...Is it going backward...or forward?

DAVID DAVIS: "the line that was called the Champion was just a terrific car. It was ahead of its time in many ways...in its ability to deliver great gas mileage... to deliver

terrific comfort for four or five people in a relatively small package...and it was an audacious looking car.

DAVID SCHOUMACHER: Studebaker celebrated its centennial in 1952 with its best year ever...selling some 335 thousand cars. But then, its road to future profits started taking some turns for the worse.

RAY BURNETT: “1953, again, was a radical change...”

DAVID SCHOUMACHER: Ray Burnett was a national sales manager for the Studebaker Corporation.

RAY BURNETT: “and the low-slung sports car...and then we began to run into production problems. That is, there were a lot of decisions made too late in the season to be able to tool up for them. And we had an extreme amount of difficulty in getting automobiles that were really shippable and ready to go on the road. And so, consequently, the demand was very heavy because there was a lot of popular acceptance for the automobile...But we just couldn't, in volume, get them out the door.” (AUDIO CLIP FROM STUDEBAKER COMMERCIAL) “They all get excited when they see a new Studebaker streaking down the road!”

DAVID SCHOUMACHER: Well, not everyone. Car consumers were changing. People began getting choosier about what they bought. Model changes became essential in the industry. The Big Three car makers could afford to do this because they could spread the costs out over more cars. Their large production gave them economies of scale. But it was especially hard on the smaller independent car makers. It would cost Studebaker some 30 million dollars to introduce an entirely new model.

LESTER FOX: “You know, model change is terribly expensive in the industry, and of course the low-volume producer has to amortize these costs over fewer products...and, accordingly, it increases the unit cost.”

RAY BURNETT: “And this is a company which is really undercapitalized. We didn’t have the money to make the changes...the style changes that were necessary to catch the public’s fancy.”

DAVID SCHOUMACHER: The sales numbers began to hurt. Production fell by 2/3 in two years. Making only 100,000 cars in 1954, Studebaker was losing the benefits of the economies of scale. At the same time, the company was struck with high payroll costs negotiated during the boom years. Studebaker executives tried one way to increase its scale of production...a merger with another car maker. In 1954, an exchange of stock created the Studebaker-Packard Corporation.

LESTER FOX: “The merger of Packard and Studebaker has been likened to two staggering drunks trying to help one another across the street.”

RAY BURNETT: “I remember vividly, going to Detroit and looking over the Packard facilities, and they couldn’t produce cars either. They couldn’t get them to fit. All the executive parking lots were full of Packards. All the street was full of Packards because they weren’t ready to ship...Something was wrong with them.”

DAVID SCHOUMACHER: In effect, the financial community vetoed the merger by rejecting a 50 million dollar loan plan for retooling...to make parts interchangeable between Packard and Studebaker. Still, the company was able to offer new products in an attempt to increase sales. The Studebaker Lark made 1959 a profitable year...but it did not last. The Big Three came out with their own compacts and dominated the market. By the time Studebaker introduced its 1964 models, no amount of advertising splash could cover the fact that Studebakers were destined to become orphan cars. By the last year, production fell to 66 thousand units. Market share was less than 1%...and despite profits in other divisions of Studebaker-Packard, automobile losses had hit 40 million dollars over the last 4 years. Finally, in December of 1963, the Board of Directors voted to shut the doors in South Bend. When a company goes under, everyone points a finger

at everyone else, and Studebaker was no exception. Regardless of who was at fault though, the end became inevitable when the company shrank below the minimum size for survival. Economic analyst Richard Gill explains.

(MUSIC PLAYS - COMMENT AND ANALYSIS II)

(ECONOMICS U\$A LOGO appears on screen)

RICHARD GILL: In the American automobile industry historically, failure has been the rule. In the early part of the century, when Studebaker got serious about car production, there were 45 different American Car producers. When Studebaker failed in 1963, the number had been reduced to 4. All of which suggests that there were general factors operating, and one of them certainly was size. Whether you are thinking in terms of production costs, advertising expenditures or dealer networks, the large firm is likely to have decided advantages over the small in automobile production. Economists call such advantages economies of scale. When these economies occur, the individual firm's average cost per unit of output will tend to decline as its production size increases. We measure average unit cost on the vertical axis and the quantity of output produced on the horizontal. Economies of scale are shown by the downward slope of this average cost curve as production increases. Now huge firms do not always mean lowered costs. Large, inefficient business bureaucracies can often cause costs to be higher than otherwise. Eventually, most firms' cost curves turn up again like this. Also, if firms get too huge, they may be able to monopolize certain markets. That is to say, lowered costs are not always passed on to the consumer. Over the whole of our history, however, there is little doubt that economies of scale have made possible a greater national output and a lower cost in terms of our scarce resources.

## PART II

DAVID SCHOUMACHER: The folklore of American journalism is based on the excitement of getting out a daily newspaper. Reporters, pounding typewriters, the smell of hot lead being formed into words and the deafening roar of presses...Today, most of

that has changed. Initially, the computer explosion in the newspaper business was driven by the cost savings it promised. Newspaper analyst John Morton recalls that publishers saw the new technology as the miracle cure to mounting payroll costs.

JOHN MORTON: “You might say they all had dollar signs dancing in their eyes when the photo composition revolution, which was basically computer-based, started to move into the daily newspaper in really a big way in the 1970s. Most publishers recognized that they were going to be able, fairly quickly, to eliminate half their composing rooms. As far as costs are concerned, I think that the...if you just want to look at the profit and loss statement...it turns out to be people primarily. You’ve got people in the newsroom, in the advertising department, circulation, business, production. You know, it’s a fairly people intensive business.”

DAVID SCHOUMACHER: No business has been more completely transformed by the computer revolution than newspaper publishing. The first terminal hooked to a computer didn’t appear in a city room until 1970...Just 11 years later there were 40 thousand. Now you might expect large publications to switch to computers to reduce labor costs and improve productivity, but why would a small suburban paper in New Jersey make the costly commitment to this new technology? The Asbury Park Press started by the sea and stayed by the sea in its news coverage of the boardwalks and tourists. For most of its life the newspaper has been a typical small town resort paper, growing slowly, improving its production plant, occasionally adding space to its office building. By 1960, it was selling 27 thousand papers a day. Then, the suburban communities began springing up around the resorts and the population of central New Jersey exploded almost as fast as the career of native son Bruce Springsteen. (AUDIO CLIP FROM SPRINGSTEEN CONCERT) Reporting on everything from rock music to real estate for all of central New Jersey meant expanding fast. Almost overnight, the Asbury Park Press was trying to cover an area that was almost 30 miles east to west and 60 miles north to south. How could they create a product for such a large area without losing the special local quality that appealed to residents of Freehold or Red Bank? Tom Jobson is Managing Editor of the Asbury Park Press.

TOM JOBSON: “Essentially we cover two counties...Monmouth and Ocean counties...and they have 85 municipalities in those 2 counties. And one way or the other we cover each one of them...either by stringers or staff or 2 or 3 towns for each reporter. We cover the county seats of both counties and we have expanded because of demand for news of local interest. We have a bureau into Atlantic City...We have one in Newark. We have four reporters over in Trenton. I remember 2 years ago we put a reporter full time in Washington because we weren't able to get that news that we wanted...So I think it's an additive to give people a complete newspaper, but they still aren't interested in the hometown flavor.”

DAVID SCHOUMACHER: How to maintain that hometown flavor? John Morton...

JOHN MORTON: “So the way dailies have started to respond to this is to create a special section...initially it's usually done once a week...some of them are now doing it 5 days a week...devoted specifically to each specific suburban community...You know, have suburban news from that community, you'll have advertising from that community. In other words, it's a targeted edition of the newspaper, and the new technology has allowed newspapers to do that in a much more efficient way than they had been able to before.”

DAVID SCHOUMACHER: In order to produce that news for those individual communities, the Asbury Park Press turned to the computer...or more accurately, many computers...in the city room to file stories and layout pages...in the classified advertising department to take in information...in the makeup department to put together ads...in the composing room to control the photo typesetter...and in the art department to create graphics and fine-tune color pictures. Most importantly, the computers allow editors to tailor separate editions of the paper for different regions. Frank O'Hearn is the computer systems editor...

FRANK O'HEARN: "For a zoned edition it's very helpful because we can complete one edition, press one key that will copy the entire page and just some pieces of the page. A copy is done in about 5 to 8 seconds as opposed to redoing a whole page manually."

DAVID SCHOUMACHER: The result is 9 separate zoned editions...almost one for each point of the compass in the two counties, Ocean and Monmouth. There is a different special section inserted in each day's paper...and the capability to do extra tabloids on almost any subject from real estate to winterizing your car. The results have been impressive. In 25 years, the circulation of the Asbury Park Press has grown five-fold...from 27,000 to 127, 000 daily...190,000 on Sunday. At the same time, the paper's size has grown and advertising lineage has doubled and tripled. The publisher of the Asbury Park Press is Julius Plangers, Jr.

JULIUS PLANGERS, JR.: "Computerization has allowed us to do the many things that we do now...And without computers we obviously would not produce the product we produce today."

DAVID SCHOUMACHER: The publishers of the Asbury Park Press have been so concerned with keeping pace with growth that they don't dwell on how much computers have saved them through added productivity...But analysts note that, without computers, labor costs would have been increasing rapidly...eating into the newspaper's profits. Economic analyst Richard Gill points out how the introduction of new technology can change the cost picture for businesses that want to stay competitive.

(MUSIC PLAYS - COMMENT AND ANALYSIS III)

(ECONOMICS U\$A LOGO appears on screen)

RICHARD GILL: Under the pressures of the competition and the market, businesses, as we have seen, cut costs in many ways. They substitute less expensive inputs for the more expensive...high fructose corn syrup for sugar. They try to exploit economies of scale, as in the automotive industry. Most significantly of all, they can introduce, as the Asbury

Park Press did, new technology. They innovate. Here is what we might think of as a typical firm's average cost curve. Up to point A, costs are falling with increasing output...economies of scale. After A, the firm is getting too cumbersome. Bureaucratic inefficiencies begin to creep in, and the curve turns up again. Now what innovation does is to lower the entire curve. It shifts average costs downward all along the line. Much of the history of American economic progress can actually be told in terms of these continuing downward shifts of business costs due to innovation. In reality, all these various methods of cutting cost tend to go together. The Asbury Park Press was an innovator, but it also was substituting one factor of production for another...machinery for labor. Furthermore, when the process was complete, it was producing at a much larger scale than before. Cutting costs: A virtual necessity for businesses who wish to stay in business. And their necessity ultimately redounds to our, the consumers' benefit!

DAVID SHOUMACHER: To survive in rapidly changing markets, businesses have to learn to take risks to cut costs wherever they can. By substituting cheaper raw materials or new technology, managers of business firms can increase their margins of profit. If they can't keep up with that change, or can't afford to, they are forced to shut their doors. For Economics U\$A, I'm David Shoumacher.

ECONOMICS U\$A (logo and music)

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