

## ECONOMICS U\$A LESSON #11

(MUSIC PLAYS)

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Stasio: Economics U\$A. One of a series of programs designed to explore Twentieth Century micro and macro economic principle. The subject of this edition is Productivity. Our guest is John Kendrick, Professor of Economics at George Washington University and adjunct scholar at the American Enterprise Institute. I'm Frank Stasio.

President Carter: We've always believed in something called, "progress." We've always had a faith that the days of our children would be better than our own. For the first time in the history of our country, a majority of our people believe that the next five years will be worse than the past five years.

Stasio: When Jimmy Carter made that troubling observation in nineteen seventy-six, he gave recognition to a trend that had begun almost a decade earlier. It is true that Americans had come to expect progress and continual improvement in their standard of living. Those expectations were founded on more than a hundred years of economic growth. The rate of growth varied from decade to decade. But for most of the twentieth century, the U.S. economy grew faster than the rest of the industrialized world. United States per capita income grew to the fourth highest in the world in only its first seventy years as a nation. By the turn of the century, the United States had taken the lead in per

capita income. By most standards, America was the fastest growing country in the world. Key to this continued growth was the steady rise in one very important measure of economic progress, productivity. John Kendrick is a Professor of Economics at George Washington University and adjunct scholar at the American Enterprise Institute.

Kendrick: Productivity is the relationship of output, the goods and services that are produced to the labor and other inputs used in the process of production. Often a simple measure of productivity is used, output per worker or per labor hour. However, even better is a broad measure that relates output to labor, capital and natural resource inputs. Many people confuse production and productivity, GNP's total value of production. But productivity is a relationship between the quantity that is produced and the quantity of labor and other inputs required to produce it.

Stasio: Between eighteen seventy-one and nineteen thirteen, productivity per worker in the United States grew by two point two percent per year. That means that the output of goods and services for each hour worked, grew by two and two tenths percent. Professor Kendrick explains how productivity is measured.

Kendrick: You can do it two ways. One is to measure the phys.. physical volume of output, such as tons of steel or uh, barrels of oil or bushels of wheat. And you uh, you weight these together. You combine them based on a measure of their relative importance, which is price, but price held constant as of a base period. So that an aggregate such as the real gross national product or GNP moves only as the physical volume of goods moves from one period to another, not because of price changes. The other way to do it, is to deflate the GNP in current prices or other measures of the value

of output by a price index. That is you divide through the current values by prices to eliminate the effects of price change. So you have movements in constant prices as we say. Oh, and then, of course, we measure the inputs in physical volume, labor, not in wages and salaries, but in labor hours worked and the materials inputs in terms of the physical volume of materials and the plant hours or machine hours in terms of the capital goods.

Stasio: But simply dividing worker hours and capital into total output, even after adjusting for inflation, will not give a completely accurate picture of how much it takes to produce the goods and services we enjoy.

Kendrick: We do not adequately capture the improvement and quality of goods and services produced. We all know that TV sets are a lot better now in terms of a good picture and earlier on radios were improved greatly as static was eliminated and fading and so forth. So that durable goods gradually got improved, but we only pick up those improvements in our production measures to the extent that they are assoc...associated with increased costs. We uh, we tend to measure the improvement in quality in terms of the...of the greater cost involved in the higher quality product. However, some innovations have given you higher quality at lower cost. And we miss those improvements altogether.

Stasio: Productivity figures can also become distorted because they cannot account for certain improvements in our standard of living. This tends to keep the growth rate artificially low.

Kendrick: The GNP numbers and other production index do not take account of improved quality of the environment, of air and water, nor of improved health and safety, nor is equity of an...an employment practice is reflected in output. However, the cost of complying with regulations do increase the inputs. That is we have to spend more to uh, to meet these requirements and that increases the cost and the inputs. That has been estimated to have held down productivity growth also by about ten percent.

Stasio: Is anybody now trying to...trying to redress that? Would it be valuable at all for us to find a way to put a value on improvements in health and safety standards?

Kendrick: It would if we could. However, that's uh, that's really difficult to measure these highly qualitative aspects of the society or of the environment. And I think it's better to recognize that our measures do exclude these quali...quality of life factors and address those separately and more subjectively and measure what we can measure, but not mix it up with soft estimates that lack precision.

Stasio: The United States held the lead in productivity growth until the early nineteen seventies. But then suddenly something changed. America's productivity rate plunged from a high of three percent between nineteen forty-eight and nineteen sixty-six to less than one percent between nineteen seventy-three and nineteen eighty. These numbers may sound small, but the effect of a two-point drop in productivity can be dramatic.

Kendrick: Due to the power of compound interest, three percent rate of increase means a doubling every twenty-four years. So that it is important and the three percent increase in productivity defined as output per labor hour for this purpose, is somewhat greater than the increase in output per capita per person. That's been about two percent, which means

our plains of living, our standards of living double about every thirty-five years. So these small numbers are...are quite important. Even point one is important. A tenth of a percent is important, in thinking about growth rates because of the power of compounding.

Stasio: What happened in the nineteen seventies to put the brakes on America's remarkable progress in productivity? First, it's important to see that there were some immediate pressures that caused a worldwide slowdown in productivity growth.

Kendrick: About the time of the oil shock, when OPEC quadrupled the price of crude petroleum, the rate of productivity growth slowed down, not only in the United States, but also in most other industrialized countries, that is some of the less-developed countries and also in the communist block. So it was virtually a worldwide slowdown in the growth of productivity beginning around nineteen seventy-three. So obviously people began to question why had this happened.

Stasio: And what are some of the theories now about why it happened?

Kendrick: Well, one of the important things is that with the quadrupling of the price of oil that helped to sell off an accelerating inflation, which continued to get worse throughout the seventies, because later on there was another doubling of oil prices in nineteen seventy-nine. And with rising price levels and accelerating inflation, the value of profits declines. And so led to some reduction of investment.

Stasio: Kendrick says the drop in investment has an important effect on productivity because as investment declines, the amount of capital per worker falls, in effect leaving workers with fewer tools or less-efficient equipment to do their jobs.

Kendrick: The quality of the capital goods is very important. In addition to the quantity of machinery and equipment per worker and obviously if a worker has more tools to work with, he's going to be able to do a more efficient job. But also there's the level of technique which is embodied in the equipment so that technological advance embodied in capital goods is very important. The most recent models of machinery and equipment and of plants tend to be more efficient. So the increase in investment is quite important in giving us newer and better capital goods, I would say. The fact that total investment was dropping somewhat for the reasons that I mentioned, the fact that profits, purchasing prof...profits was not as good. Because of that the average age of plant and equipment no longer was declining. Prior to nineteen seventy-three, the average age of equipment was falling, which means it was becoming more efficient. It's the opposite of...of people beyond some point. You become less efficient as you got older. But with equipment the younger it is, the more recent technology is embodied in it. And that was going on until seventy-three, but after that actually the age began increasing somewhat, which is negative on productivity.

Stasio: After World War Two and until nineteen seventy-three, investment was high, leading to annual growth and the ratio of capital-to-labor of three percent a year. After nineteen seventy-three, the ratio of capital-to-hours worked dropped by almost a full percentage point. The drop in the capital-to-labor ratio accounted for nearly one fifth of the total drop in growth of productivity in the nineteen seventies. And as capital

equipment declined, the workforce itself grew. The sudden huge influx of new workers into the economy also held down the growth of productivity.

Kendrick: The baby boom generation began coming into the labor force in the mid-sixties. Actually, the United States' productivity growth was already slowing down somewhat by the latter sixties, but even more after nineteen seventy-three. Those young workers have less experience. Their average wage rate and the value they add to product is less than that of prime-age workers. So that bores in the labor force, probably accounted for about ten percent of the slowdown in productivity.

Male Voice: Ignition sequence starts. Six, five, four, three, two, one, zero, all engine running, liftoff. We have a liftoff. Tower clear.

Stasio: Research into new technology can have a dramatic impact on the growth of productivity. America's Space Program in the sixties is a good example of the kind of progress that can be made, when investment is poured into technological advances. Spending on research and development by private industry and government increased steadily between nineteen fifty-three and nineteen sixty-nine. But then in the early seventies, when adjusted for inflation, the total actually fell. After the initial dip, R&D spending began to rise again, but at a much slower pace than in the previous two decades.

Kendrick: R&D as a percent of GNP, the gross national product, dropped from about three percent in the mid-sixties, down to only two point two percent in nineteen seventy-seven. Since then it has been gradually increasing and is now back up to about two point seven percent, which is one reason why I'm somewhat optimistic that productivity will be more back on track in the eighties than it was in the seventies.

Stasio: What was R&D like, the investment in R&D like before the seventies? The trend.

Kendrick: Well, the trend had been steadily up from only about one tenth of one percent of GNP in nineteen twenty. Up steadily through World War One and on up to this three percent number that I mentioned with now hundreds of thousands of scientists and engineers involved, just in the research and development function. However, after we phased out of Vietnam, there was a drop in the government funding of R&D and the leveling out of private funding, with increasing unemployment of scientists and engineers in the early seventies, which really was a tragic waste of our most valuable human resources at that time.

Stasio: Research is divided into two categories, basic and applied. Basic research is scientific investigation that is pursued without a particular economic application in mind. This is sometimes called, “pure research.” Applied research takes the findings of basic research and tries to put them to work in the economy.

Kendrick: Does productivity growth change with changes in the ratio of basic and applied research? I don't think we can see that in...in the productivity numbers, but basic research comprises about ten percent of total R&D. Most scientists think that that is extremely important that there be enough basic because the more practical kinds of research projects draw on that advancing knowledge of, that basic gives us without regard to its immediate applications, but usually it does have application. So that enough basic is important and it has increased somewhat in...in recent years. But the more immediate cause of new inventions is the applied R&D of course and the invention, once it's

translated into commercial application, becomes an innovation. That's when it effects productivity.

Stasio: Is there a difference in the kind of, in who does the research? Is it more productive for private industry to do it? Or is increase in government R&D lead to greater productivity?

Kendrick: Well, generally we think that it's the privately performed R&D that has more productivity impact. However, remember that industry performs much more R&D than it finances. It finances a little over half of the research and development. The rest is largely financed by government, although non-profit institutions are also a source of...of funding. But industry performs the greatest part of R&D even though some of it is funded by government. The government-funded R&B, R&D tends to be concentrated more in the space and defense area. We do know that much of the space research has civilian application, probably less of the military R&D would have civilian applications that would help to increase productivity.

Stasio: In some industries, such as chemicals, the marginal rate of return on investment in research and development is as high as fifty percent. The importance of R&D spending was not lost on the Carter Administration. Jordan Baruch is a technology expert and former Commerce Department official.

Baruch: The president saw a report by the National Science Foundation that showed a decline in industrial research and development. And the first question that was asked by the policy office of the White House was, "why the decline?" And that question was then modified to, "what can we do about the decline in industrial research and development?"

But as we all realized that research and development was only a little part of the innovation process. We finally got to the question, “well, what should the federal government do to encourage industrial innovation?”

President Carter: The actions that I’m announcing today meet this goal.

Stasio: In nineteen seventy-eight the Carter Administration launched a Domestic Policy Review on industrial innovation, which offered suggestions for improving growth and productivity.

President Carter: First of all, they will loosen some of the stifling restraints that have been placed upon innovation by government. Secondly, they represent a first major step to forging a public and private partnership, which will rally cooperative efforts to spur industrial growth.

Stasio: The Domestic Policy Review stressed over and over again the damping effects of government regulation on technological innovation. As we’ve already pointed out, the cost of health and safety regulations, can artificially lower productivity figures because the benefits cannot accurately be measured. The policymakers found it difficult to ignore the growing cost of compliance with federal standards, while productivity growth declined. Some politicians also cast a suspicious eye on regulated industry, such as trucking and airlines. For some time, many economists had been saying that government regulation of some industries, discourages competition, which can promote bad business practices and lead to less productivity. A process of deregulation and relaxing government standards began under the Carter Administration and continued through the

Reagan years. Another popular target for slow growth and productivity was the effective taxes on investment.

President Carter: We have the highest percentage of outmoded industrial plant and equipment of any of the industrial nations. I stood in Ohio in a great, empty shell of a building that was once a steel plant. The weeds are beginning to grow up. Closed because they could not afford to modernize and punitive taxes and those excessive regulations mandating additional costs on them had been responsible.

Stasio: In nineteen seventy-nine, Ronald Reagan waged his first presidential campaign on the promise of restoring America's growth rate by freeing the marketplace from government interference. He would get the government off the backs of the people. Reagan's popular political theme was embodied in an academic theory called, "supply side economics." John Kendrick.

Kendrick: Those economists felt that uh, that the government influenced incentives to work and to slave and to invest. And if we reduced marginal tax rates on wages and salaries, people would have an incentive to work more. If we reduced taxes on income, then people would have more sa, incentive to save and to invest and these would increase the supply of goods and services.

Stasio: The supply side theory was buttressed by the research of Arthur Laffer, whose Laffer Curve implied a relationship between taxes and productivity. Arthur Laffer.

Laffer: People don't work to pay taxes. People work to get what they can after taxes. People don't increase the productivity of their (unclear) or their labor or their production

process, to give the money away to the government. They do it to make more profits themselves. And when you cut the taxes, you increase their incentives for doing that activity and you'll increase productivity output in employment. Who cares about productivity when you don't get any benefits from it? And frankly people don't work for nothing. They work to get paid and when you increase the amount they get after tax, you'll find them doing more of it.

Reagan: We move on to the individual, you and me, and my proposal is for a ten percent cut in the income tax across the board, not a special cut for someone while someone else, you know, rob Peter and pay Paul. We're all named Peter, today. We, (Applause) ten percent, a ten percent in nineteen eighty-two and another ten percent in nineteen eighty-three, a thirty-percent cut over a three-year period.

Stasio: Armed with the Laffer Curve and overwhelming popular support, Ronald Reagan pushed through a seven hundred fifty billion dollar tax cut in nineteen-eighty one. The tax package offered incentives not only to workers, but it was also designed to encourage businesses to increase investment. Barber Conable was a Congressman from New York at the time. He added a provision to the Tax Bill that would allow firms to write off their capital investments more quickly.

Conable: The basic Reagan idea was to have a simple proposal of two parts, rate cuts and cuts for business that would be given in such a way that would encourage investment and, therefore, improve productivity. And the ACRS ten, five, three Jones Conable Bill was the second half of the proposal. I felt it was very necessary in short to encourage productivity growth, to encourage savings. I am not a Keynesian. I don't believe that you

can handle economic policy solely by taking those steps that will stimulate consumption. I think you've got to...to give some incentive to savings, too.

Stasio: Productivity growth did speed up some in the eighties and supply siders were quick to take the credit.

Conable: It not...not only led to better productivity, it also led to an increase in production, in employment. See, to increase output in employment and production in the system, there are two ways of doing it. One is productivity, which means you get more for each worker. And the other one is to increase the number of workers. And what you found happening is that both went up. We not only got a lot more employment, we also got a lot more productivity per employee, which is just the perfect combination.

Stasio: But other economists argued that what appeared to be supply side effects, were in fact driven by Keynesian demand theories.

Kendrick: The stimulus of investment helps to increase demand and through a multiplier has a ripple effect on the economy. So that the demand side tax cut of...of President...Presidents Kennedy and Johnson, when Walter Heller was chairman of the Council of Economic Advisors, from the demand side the tax cuts were seen as good at that time. And now from the supply side the tax cuts are seen...seen as good because in both cases investment was stimulated.

Conable: You can call it anything you want. The question is, it works. Now those of us in sort of the academic garb who like to get into footnotes and argue their, sure you can

say, “well, was it a demand shift or was it a supply shift?” Who cares? Production output employment increased enormously. Now I think it was a supply shift.

Stasio: Kendrick points out that when policymakers design tax cuts they should be aware of their effect on the allocation of resources.

Kendrick: In the Tax Act of nineteen eighty-one, sometimes called ERTA, Economic Recovery Tax Act, there were accelerated depreciation allowances permitted for so-called accelerated cost recovery system. Those tended to effect different industries differently, particularly the industries that had a lot of long-lived equipment like steel and autos were benefited more than the industries with less capital goods and with equipment of shorter lives such as the high-tech kinds of production. So that even though I don't think the framers of that legislation meant it, the impact was uneven and that causes some distortion in the allocation of resources in the economy.

Stasio: Let's recap some of the key points in our discussion on productivity.

Productivity is the relationship between the amount of goods and services that are produced and inputs, including labor that are used in the process of production. For most of this century the United States led the world in improvements in productivity. This was largely due to better education and training, technological growth, capital investment and abundant natural resources. But beginning in the late nineteen sixties, the U.S. suffered a slowdown in the rate of productivity growth. Economists attribute the slow rate of growth and productivity in the late sixties and throughout the seventies to the large number of young people and women who entered the workforce during that period. Increased government regulation, oil shocks, a decline in the proportion of national

output dedicated to research and development and a falling rate of growth in the capital-to-labor ratio, that is the proportion of plant and equipment per worker. The government attempted to improve the capital-to-labor ratio by passing a tax package in nineteen eighty-one, that offered incentives to firms to invest in new equipment. This action was supported by a theory called, “supply side economics” that proposed to stimulate economic growth and productivity by removing government disincentives to invest and produce. Deregulation of certain industries in the late nineteen seventies and early eighties was another attempt to improve productivity. Economists and policymakers felt that government interference in those industries increased production costs and discouraged competition, promoting poor business practices and reducing productivity. Changes in the growth of productivity are measured in tiny amounts, but even small percentages of decline in the growth rate can have dramatic effects on the nation’s standard of living over the course of a generation.

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Stasio: You’ve been listening to Economics USA, one of a series of programs on micro and macro economic principle. Our guest has been John Kendrick, Professor of Economics at George Washington University and adjunct scholar at the American Enterprise Institute. Economics USA has been produced by the Educational Film Center in Annandale, Virginia. I’m Frank Stasio.

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