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FOUNDATIONS OF ECONOMICS GROWTH

Dr. Daniel Rumberg

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INDUSTRIAL COLLEGE OF THE ARMED FORCES

WASHINGTON, D. C.

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FOUNDATIONS OF ECONOMIC GROWTH

7 September 1962

CONTENTS

	Page
INTRODUCTION--Dr. Janus Poppe, Member of the Faculty, ICAF...	1
SPEAKER--Dr. Daniel Hamberg, Professor of Economics, University of Buffalo, Buffalo, New York.....	1
GENERAL DISCUSSION.....	17

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DR. POPPE: Economic growth is a concept that is much discussed these days, and there is considerable disagreement among economists on the type and the rate of growth we should have.

To explain to us what is meant by economic growth we have with us today Professor Daniel Hamberg of the Department of Economics of the University of Buffalo, who will lecture on Foundations of Economic Growth.

Dr. Hamberg is raring to go, I should say. We had to restrain him until the audience was here. Dr. Hamberg, we welcome you for your first lecture to the College.

Dr. Hamberg.

DR. HAMBERG: Admiral Rose, Gentlemen:

It is a pleasure to appear before you today, even though I feel a bit outflanked, to speak to you on the subject of economic growth, which has virtually become a byword around the country, and this long before the present Administration adopted it as a key part of its own program.

As a matter of fact, I approach my task here today with just a little bit of humility--not too much--for I must speak to you in a brief span of time on a subject that has engrossed economists since the year of Adam Smith and his successors. The essential theme, the abiding interest, of classical economists was precisely the subject of economic growth, and since the thirties, and certainly since the end of

World War II, this subject has once more assumed a position of primacy among the writings of economists.

In view of the immensity of this subject, I have chosen to limit my remarks today to two not unrelated concepts of economic growth, concepts which are particularly relevant to an understanding of U. S. growth as well as that of other industrial countries of the West.

Let me interrupt one second and break the rules a bit. I gather that generally the speaker speakes in uninterrupted fashion. I will ask you, and if you like, you can break the rules on two occasions, namely, in connection with those equations on the board as I discuss them, because they are essential to my lecture. If there are questions, as there may well be, please feel free to interrupt, but only at that point.

Let me approach the first of these concepts of economic growth I want to discuss by way of a few words on the source of our interest in this subject. With a growing population, with improvements in the productivity of labor, the available labor supply is constantly growing. At the same time, the construction of new plant and equipment and improvements in the productivity of existing structures and facilities are now constantly taking place. The result has been an increase in our country's capacity to produce of about 3.5 percent a year since 1889, although strikingly only 2.9 percent a year since 1929.

These facts have extremely important implications for the problem of employment. A steady growth in the available labor supply must be matched by an equally steady growth in aggregate output and also in aggregate spending to buy that output.

Otherwise a slow but inevitable rise in the volume of unemployment will set in, and I think you see evidence of that in the last 5 or so years since 1957, if not a year or so earlier. The same is true of a growing stock of plant and equipment. When business firms invest to enlarge their stocks of plant and equipment they do so in the expectation that the additions will be absorbed profitably into the processes of production. But this can occur only if aggregate production or sales grow. Failure to do so means eventually a contraction in production, idle capacity, and idle men. In short, an economy with a growing labor supply, a growing capital stock, and an expanding technology not only can produce an ever-increasing amount of output but it must do so. It can never stop expanding, for the price of stopping is depression and unemployment. Such an economy is faced with much the same kind of problem as confronted Alice in Through the Looking Glass--that, in order to stay in the same place, that place be defined as full employment. An economy must relentlessly continue to expand its output and its spending. As long as there is a growing labor supply, growing productivity of labor, and expanding capital stock, there are indispensable prerequisites. The pressure to expand is relentless. There can be no stop short of unemployment and depression.

Far from presenting a bleak prospect, however, this situation is filled with potential promise--the problem of employment and stability aside. Clearly in the face of a growing population national output must grow in order to preserve existing living standards. If it can grow fast enough for per capita output to grow, so much the better, for this condition of course implies a rise in living standards.

The present state of world affairs has given an additional and an immediate

sense of urgency to the need for maintaining a constantly growing level of output. Faced with the necessity of maintaining a large military establishment and with providing economic and military aid to those members of the world community who are resisting the onslaught of communism, the United States must have an ever larger amount of output to devote to such ends. Thus, the larger the volume of production the less the pinch on living standards. It is clear that, if you go before the Congress and the people and ask for more and the more involves possibly higher taxes, the easier it is to get these things the less the pinch on living standards. In fact, with the rising level of per capita output, and if need be an increase in defense spending and foreign aid simultaneously, an increase in our domestic living standards could occur.

This discussion leads me, then, to the first of the growth concepts, or, better, growth rates, that I want to discuss. We may call this first one the full-employment growth rate of the national income or product. It is sometimes called the ceiling growth rate. This growth rate is the maximum potential rate of growth which, in the presence of full employment, is permitted by the growth in labor supply, measured in man hours, and the rate of change or growth in productivity, measured in terms of output per man hour.

We may write this growth rate approximately as you see it in Equation I on the blackboard. It may seem that economists are a bit perverse in their choice of symbols, but this is only ostensibly true--they are not really.

The Y stands for national income or produce. The reason we don't use I is that it is reserved for another term, which you will also see on the board--

investment. So Y stands for national income or product. L stands for the labor supply. O in this equation stands for output per man hour. The labor supply is measured in man hours here, for reasons I'll elaborate on in a moment. Any good fraternity man will recognize the symbol, delta, standing for change or increase. A change in any quantity, divided by the preceding total, gives you a percent change. Any absolute change divided by the preceding total gives you a percent change. The subscript f stands for full employment.

So Equation I says that the percent rate of growth and full-employment output is--and this is approximately correct--equal to the sum of the percent rate of growth in labor supply in man hours plus the percentage rate of growth in output per man hour.

So, for example, if the labor supply is growing at the rate of 1.5 percent a year and output per man hour, or productivity of labor, in other words, is growing at the rate of 2 percent a year, then combined we say they determine a potential growth rate of the national product of 3.5 percent a year.

This is your first chance to interrupt if you want to ask a question at this stage. I am glad to see that we are all alert this morning.

Two things are worth noting about this formula--one, as I have already mentioned, that the labor supply is measured in man hours instead of numbers of people here. Simply put, the reason is that we have to allow for a decline in the length of the work year if we want to talk about some effective labor supply. Clearly, the amount of labor becoming available for production, the increase in the amount of labor becoming available, is not proportionate to the growth of the number of people in the labor force if at the same time the length of the work year is declining, say,

because of a shorter work week, longer vacations, or more holidays. This is, of course, precisely what happened. The work year, for example, is down by approximately a third, from about 60 to about 40. So, if you want to talk about an increase in the available labor supply, you have to adjust for changes in the length of the work year, and you can easily do so by measuring your labor supply in man hours instead of numbers of people.

Second, although we measure productivity in this equation in terms of labor, we are not attributing this growth solely to workers. On the contrary, the productivity growth rate, delta O over O, reflects jointly all the factors that determine productivity growth, such as the composition and the quality of the labor force, the growth in the available capital stock per worker, improvements in management, and economic organization in general, as well as progress in the techniques of production.

In terms of my earlier remarks, we can view Equation I in two alternative ways--first, that it is the rate of growth needed to provide full employment of the growing labor supply, as well as to provide reemployment of labor initially released from production as the result of advances in productivity.

Alternatively, we can view I as a statement of the growth in the economy's productive potential, that is, in its capacity to produce. This is the bright side of the same picture.

Before proceeding further with an analysis of this growth rate, let us spend a few minutes reviewing the main sources of economic growth in the United States since 1929. For this I draw on the research of Dr. Edward F. Dennison of the Research Staff of the Committee for Economic Development, located right downtown

here. His book, The Sources of Economic Growth in the United States and the Alternatives Before Us, appeared earlier this year, in the spring. The effort to apportion the sources of U. S. growth is no simple matter, and a lot of educated guesswork--but still guesswork--and assumptions have gone into this research. Nevertheless, the CED study is the most complete piece of work so far done in this area, and its results are suggestive, if nothing else, about orders of magnitude involved in appraising the relative importance of the sources of this Nation's growth.

Recall that the national product since 1929 has grown approximately at the rate of 3 percent a year. About .8 of 1 percent, or about 27 percent, of this growth rate is attributable to the growth in the labor supply. Had the work year remained unchanged from 1929, increased employment would have accounted for about a third of the 3 percent growth rate, or 1 percent, but shorter hours cancelled somewhat more than a fifth of the growth of the number of workers. Investment, which permitted a rise in the amount of capital goods per worker, was the source of growth at the rate of a bit over .5 of 1 percent, or accounting for about 19 percent of the 3 percent growth rate.

Going on to other sources of our economic growth we find that about one-half, that is, these first two, explain almost 50 percent of the 3 percent growth rate. Of the remainder, about one-half is attributed to the historical increase in education of the labor force. Real national product, in more explicit terms, has increased about .6 of 1 percent, which is about a quarter of the total growth rate, as a result of the prosaic fact that each year's labor force has been on the average

better educated than the previous year's.

This leaves about 30 percent of the full growth rate, or about .9 of 1 percent, to be accounted for. CED research indicates a slight loss of output because of greater restrictions against optimum use of resources--for example, from tariffs, from farm price support programs, or from labor resistance to new techniques. But the loss of output from these and other restrictions is estimated as comparatively slight.

About one-third of 1 percent, or about 11 percent of the total growth rate, is attributed to so-called economies of scale, that is, to the gains from increased specialization allowed for by expanding markets.

Somewhat surprisingly, the CED study credits the rest, accounting for one-half of 1 percent a year, or 16 percent of the total growth rate, to technical progress. I say "surprisingly," because of the general tendency to attribute most of the growth rate not due to increasing labor supply to technical progress. Nevertheless, it is interesting to observe that together education and technical progress account for 40 percent of the recorded growth of the 30 years between 1929 and 1959. Of the 3 percent a year increase in real national product, in other words, about 1.2 percent must come mainly from what goes on in people's heads.

Now let us return to the full employment growth rate in Equation I. We may observe that this growth rate provides the basis for estimating capital requirements for investment outlets in the private sector of the economy, and thereby, in conjunction with the second of the growth rates that I want to discuss, provides the basis for determining long-run or secular trends, that is, trends in the direction of

inflation or stagnation.

Allow me to write Equation II on the board. Having done so, let us discuss its components. The major new element, as opposed to Equation I, is the introduction of the ratio delta K over delta Y. This ratio is known as the marginal capital output ratio. It indicates how much on the average throughout the economy additional capital stock, delta K, is needed to produce a dollar's worth of additional output, delta Y, at full capacity production. Or this ratio is nothing but an expression of a rather obvious notion that, if plants in general are operating more or less at full capacity and want to expand output, they have to enlarge their capital stock, the stock of plant and equipment. This ratio is an expression simply telling us how much additional capital stock, on the average throughout the economy, is needed to produce an additional dollar's worth of output.

In economic parlance, delta K, or increase in capital stock, is called investment. When we speak of investment we mean literally the purchase of capital stock. We don't mean it, usually in economics, in the financial sense, as the acquisition of securities. We mean the purchase of capital goods. So an increase in capital stock is by definition investment.

So from Equation II it can be seen that we can approximate the demand for capital , associated with long-run growth and expressed as a fraction or proportion of the national income, by multiplying the full employment or ceiling growth rate by the marginal capital output ratio. So for example let us assume--as is approximately correct--that on the average throughout the U. S. economy it takes 3 hours' worth of additional capital to produce a dollar's worth of increased output.

In other words, this marginal capital output ratio is 3. If, as earlier, the full employment growth rate is 3 percent a year, then the demand for capital, expressed as a proportion of the national income, will approximate 10.5 percent per annum - 3 times 3.5.

Algebraically, the delta Y can come out here, and then there is this expression. Since delta K equals/1, I can write it in that form. So this investment ratio is the long-run demand for capital expressed as a proporation of the national income, an expression of investment outlays.

So we say this is the long-run economic growth rate, the full employment growth rate, the maximum potential growth rate, and this marginal capital output ratio.

This is your second chance to interrupt.

QUESTION: Doctor, did you just repeal the multiplier ?

DR. HAMBERG: No. It is not in there yet, but you know we never miss a chance to use it. It's in here (indicating) concealed a little, except to the sophisticated eye. It is not in here (indicating) at all. There isn't any need for it.

STUDENT: Then I don't understand. If it takes $3 of investment to produce $1 of additional goods, where do we make any money?

DR. HAMBERG: I don't get the connection. What's the connection? You don't really believe that you spend the $3 in one day and it's a current expense.

STUDENT: No, but you have delta K there.

DR. HAMBERG: That is investment, yes, but you amortize this over a long period of time. That's part of your current expenses. With your receipts from your additional output you make a profit, regardless of how much you have invested.

O. K.? It is O.K.

QUESTION: What about the subscript f?

DR. HAMBERG: It got left out. Here's the way we adjust it. Our aim is to please. In opposition, as it were, to the full employment growth rate, we have one which is known as the equilibrium, or full capacity growth rate of the national product. This growth rate fulfills in a dynamic or gross way the standard macro-economic conditions, the equilibrium conditions, of equating plant saving with plant investment. Given the saving ratio, if you like, at full employment, the saving ratio S over Y, expressing saving as a proportion of the national income, and the capital output ratio, we can write Equation III, and then cancel terms and arrive at IV, and by definition arrive at V.

From V we see that thus it is that the rate of growth of the national product in Equation III, the percent rate of growth, is, with a given saving in capital output ratio, an equilibrium rate of growth, in the sense of equating plant saving and plant investment. In other words, given these two ratios, there is only one rate of growth that will cause this equality to hold, this equilibrium condition, in which all that is saved is reinvested--or, if you like, all the income received will get spent in one form or another--consumption goods or capital goods--or all the income generated in production will get spent back on the production in one form or another--consumer goods or capital goods.

This growth rate is also called the full capacity growth rate, because in equalizing plant saving and investment this realization assures that aggregate demand will grow apace with the growth in productive capacity, that is,

incremental capital stock originating in the investment associated with it.

So we can view the delta Y or Y expression as an equilibrium or, better, a full capacity growth rate. Achievement of the growth rate that yields this equality will assure a full capacity growth, will assure that aggregate demand will grow apace with increases of productive capacity, that is, increments of capital stock associated with it.

We now have before us a tool for rendering rough judgments about whether an economy is saving or investing too much or too little, whether, in other words, it is faced with a secular problem of long-run inflation or secular stagnation.

From Equation V we find that associated with equilibrium or full capacity growth is a certain rate of capital accumulation or investment, I over Y. From Equation II we find that associated with full employment growth is a certain rate of demand for capital, also expressed as a proportion of the national income.

If the full employment rate of capital formation, I over Y, sub f, exceeds the equilibrium or full capacity rate, I over Y, the alternatives are either excess demand inflation or unemployment or both, for, an actual rate of capital formation equal to the full employment rate means that investment demand exceeds full capacity saving and investment. In other words, the demand for capital originating in the capital requirements of a growing labor supply and an advancing technology outruns the rate of capital accumulation associated with full capacity or equilibrium growth--hence the condition of excess demand, inflation, prevails.

If, on the other hand, the actual rate of investment equals the equilibrium or full capacity rate, part of the growing labor supply will be unemployed, or under-

employed, for lack of capital equipment with which to work. An intermediate rate of capital formation implies excess demand inflation and growing unemployment simultaneously. This kind of condition you should recognize is characteristic of underdeveloped countries, which typically are plagued with shortage of capital, unemployment, and excess demand inflation.

What is the solution? You are probably familiar with this, too. Some saving in capital formation as a proportion of the national income; that is, raising the equilibrium growth rate up towards the full employment growth rate by raising this ratio (indicating) and, of course, hopefully, slowing the population growth.

In the opposite situation, in which the full employment rate of capital formation, I over Y sub f, is less than the equilibrium rate, I over Y, then I believe the alternatives also are unemployment or inflation. In this case, however, unemployment is due to deficient demand; for an actual rate of capital formation at the full capacity growth rate, I over Y, means that the economy is saving and investing too much relative to the demand for capital originating in the capital requirements of the growing labor supply and the advancing technology. Excess capacity and slump are inevitable in these conditions. Inflation will result if the fiscal and monetary authorities endeavor to cure the slump and unemployment by pushing investment to its full capacity rate, for then the underlying scarcity of labor will make itself felt and a wage-price type of inflation will accompany the lower unemployment. The alternative between unemployment and wage--price inflation in industrial economies like that of the United States suggests that their problem is that of equilibrium or full capacity growth rate above the full employment growth

rate.

Solution? This may sound cruel to everything that we stand for, but one of the solutions in this case is less saving as a proportion of the national income, less saving and a lower full capacity or equilibrium rate of growth, so that you bring it down below the full or equal to the full employment rate, or, and or, a more rapid rate of technical progress. I assume we'll all agree that raising the rate of population growth is not particularly desirable. Therefore I won't suggest that as another possibility.

On the basis of economic history, I would venture the suggestion that in the normal course of economic development there is a natural evolution from the type of unemployment and excess demand inflation characteristic of underdeveloped countries to the type of deficient demand, unemployment and wage-price inflation characteristic of the advanced industrial economies. In the first place it is apparent that the rate of population growth and therefore labor supply growth is higher in the early stages of economic development than in the later. Secondly, the labor supply available for industrialization and growth tends to grow more rapidly in the earlier stages of development because of the well-known shift of production in the composition of the national product, I should say, from agriculture to industry, thus releasing employment, releasing labor for employment in manufacturing.

I might interrupt to say that since the twenties, when we closed the immigration doors the labor supply provided or released by agriculture has been a major source of our industrial labor supply since 1920.

Finally, the backlog of technology available from the more advanced economies provides vast potentialities through rapid advances in labor productivity. But when an economy has largely accomplished the shift from agriculture to industry, when it has arrived at the frontiers of technology, and when it is the services sector that is expanding most rapidly, these sources of growth potential dry up, and the full employment growth rate declines.

On the other side, the capacity to save tends to be higher in the later stages of economic development than in the earlier ones, with the result that the saving ratio, S over Y, and therefore the full capacity growth rate, is higher.

So I am suggesting that in the normal course of economic development, whereas in the earlier stages the apparent characteristics or tendencies are for the full employment growth rate to exceed the full capacity growth rate, due essentially to a low saving ratio in the early stages of economic development and a rapid growth in the two components of the full employment growth rate, both sides tend to change, and it becomes easier to save in the later stages of development. It is apparent that saving ratios do rise up to a point, anyway, as economic development proceeds.

Similarly, for good reasons, we can expect the determinants of the full employment growth rate to decline, so that the two growth rates merge, and possibly go the other way in relation to each other, as is suggested by the experience of the United States.

If it is asked how the countries of Western Europe in the Common Market seem to have avoided the characteristics I have identified with economic maturity, I would suggest that recent historical circumstances put them in a position

temporarily akin to that of the underdeveloped countries. In some countries, like France, there has been a rise in the rate of population growth, which was almost inevitable, considering how low the growth rate of population had fallen. In all countries there has also been occurring a fairly rapid shift of labor from agriculture, and personal services too, to manufacture. In all countries, too, industries that had fallen far behind advancing technology during the stagnant twenties, the great depression, and during World War II, have been in the process of catching up to the advanced technology.

West Germany has also benefitted from a phenomenal rise in the ratio of employed persons to the total population, one of the determinants in the growth in the labor supply, as well as an influx of workers, of course, from East Germany, and skilled workers, to boot. Just imagine how some of these underdeveloped countries would benefit from an influx of skilled workers and entrepreneurial types of people in addition.

Most, if not all, of these gross stimuli are likely to diminish considerably, however. So that, unless the rate of expansion in the frontiers of technology is greatly accelerated, I, for one, look for an inevitable decline in the rates of growth of the European economies and an increasing resemblance to the rate of expansion of the U. S. economy.

Thank you.

DR. POPPE: Dr. Hamburg is ready for your questions, gentlemen.

QUESTION: I would like to ask a detail question before you get into the important things, with relation to your two points in the mathematics here which illustrate the logic that you have so well expressed verbally. I don't understand the significance, first, of Equation V where, if you have the saving over Y, and if you multiply the two you get the simple relationship.

DR. HAMBERG: Right.

STUDENT: Is that the same?

DR. HAMBERG: Yes. All I have done is express that saving equals the investment condition, talking in relative terms instead of absolute terms. But you are quite right.

STUDENT: Shouldn't the left end be Y sub f?

DR. HAMBERG: What do you mean? This (demonstrating)?

STUDENT: Yes. All the Y's are all Y's or f's.

DR. HAMBERG: They could be. You can interpret it that way, yes. This is the saving ratio with full employment, and hence this is the investment ratio necessary to provide equality between saving and investment at full employment.

STUDENT: Secondly, if available man hours times output per man represents total product, why are you using an additive?

DR. HAMBERG: I said approximately--and this is for simplicity--the real expression would come out to 1 plus this times 1 plus this minus 1. In other words, it's a compound interest formula. You are right for noticing this. But for small values this is approximately correct. So it has the virtue of simplicity.

QUESTION: There appears to be a growing tendency towards mergers and amalgamations in industry for many reasons, such as diversification, increasing business, production, and so forth. However, this does result in a reduction of competition. I would like to know whether you feel that this has an effect on our economic growth.

DR. HAMBERG: Well, I would like to be able to give you a nice, forthright, direct answer. If I had any bias on the subject the answer would be yes, it does have some retarding effect, although there are lots of pros and cons. However, I would say that if we are looking for explanations of the recent retardation we can find much simpler, more obvious, and less subtle explanations--if you like, fiscal policy.

Fiscal policy, I am convinced, today is a fantastic drag on our growth rate. I am not prepared to say that it is the only source of drag. As a matter of fact I am inclined to guess that it probably isn't. I am certain that we could have a much higher rate of growth without engaging in any fantacies about 4 to 5 percent with a fiscal policy that was less bound with the notion of balancing the budget come hell or high water under any circumstances outside of downright recession.

I am convinced that we could release ourselves from this myth, which, despite the talk about myths and the pleas about releasing ourselves from them, still is part of the full course. The swings in our budget are simply fantastic. In down swings there is no question but that they stabilize, as we move to deficits in the down swing, mainly because taxes fall so rapidly. Therefore, we have undoubtedly

purchased a great deal of stability as a result of our tax structure. But I am also convinced that we purchased stability in the other direction, too, mainly at the expense of economic growth, because, conversely the swings toward budget surpluses or balanced budgets are just phenomenal, the way our tax structure is set up on the one hand and the relatively slow rate at which government spending expands on the other hand.

In the last two quarters it has been a little better, mainly because the President's efforts to strengthen the military establishment took effect actually as a result of the spending in the last two quarters; that, I should say, was the last quarter of 1961 and the first quarter of 1962--but that's finished. There was a tiny rise in government spending in the immediately last quarter. But the tax drag is still there, and of that I have no doubt in my mind, not a single doubt, and of course this is widely shared by now. I have never been more upset and disturbed, if not disgusted, by the refusal of the Congress to entertain any kind of proposal in the way of a tax reduction. It just leaves me shaking my head, as you can see.

QUESTION: It is hard to say in the country today, when we have unemployment and overcapacity in industry, that the problem is not more investment, but it is revision of depreciation and the new tax law, too. Do we need spending?

DR. HAMBERG: Well, it's not quite that simple. If you will pardon the expression, this is the layman's view. The layman views every recession as an under-consumption phenomenon. This can be . What we are suffering from at the moment is a lack of aggregate demand, an aggregate demand in the private sector,

in any case, consisting of not only demand for consumer goods, but for capital goods, too. You can show in your own most sophisticated model that investment also has to grow to sustain total demand.

Now, investment hasn't been growing. Investment, that is private investment, is running virtually at the same rates as it did in 1957. As a proportion of GNP it has fallen from about 11 to 9 percent, which is abnormally low.

Admittedly, of course, these things reverberate and they are interrelated. Part of the reason investment has fallen is that aggregate demand has been slack, and so excess capacity prevails, and of course it is hard to induce additional investment when you've already got enough facilities to take care of most of any growth in output.

On the other hand, if, for example, accelerated depreciation by a faster tax writeoff would stimulate investment demand, just for modernization and reduced cost in producing existing output, this would be just as stimulating as an increase in consumption demand, and might very well have important side effects in addition.

I for one, and I am surely in the minority, am not completely taken in by the argument that somehow we are suddenly in a very poor cost position vis-a-vis the rest of the world. I am sure that is true in some industries here and there, but, after all, we've had, and did have from 1946 to 1957, away beyond a relatively high rate of investment. This means our capital stock must be fairly up to date.

Certainly, if you try to explain changes in our balance-of-payments position there are much more obvious explanations than this sudden deterioration in our cost

position vis-a-vis Western Europe. We had an abnormal trade position. Historically we were away out of line in our exports, mainly because of the destruction of the European economies and therefore their export markets. It was almost inevitable that they would recover a good share of their former export markets, and that's exactly what has happened.

It is true that their plant equipment is probably quite up to date. How much more so than the American economy I don't think is an obvious proposition, by any means. We haven't been sitting on our haunches since World War II. So I would guess that, if their costs are somewhat lower, that they are more efficient in some respects, and that their plant and equipment are a bit more up to date, this must be only marginal in scope, except perhaps here and there in occasional industries.

I think steel might be a possibly notable case in point in some lines of steel production.

I know one big answer right off the bat--the steel industries' extreme reluctance until very recently to invest in one of the most, I think, revolutionary basic steel-producing techniques, the oxygen converter, because they had this heavy investment in open hearth. They argued for years that the oxygen converter wasn't suitable to the American economy, because it produces steel in small batches, whereas the open hearth produces in so much larger batches, and that we have a big economy, and so forth and so on. This was just sheer rationalization, because since about 1958 and 1959 most of the new basic steel-producing facilities have gone in this direction. And the oxygen converter is immensely more efficient than the open hearth.

The European economies grabbed at this new technique earlier than we did. This may give them some advantage. It is my impression that these things may be localized in occasional industries here and there. I refuse to believe that suddenly everything has deteriorated because of relative cost position. It's too simple, especially, as I said, when there are more obvious explanations.

I could go along like this forever.

QUESTION: Doctor, you have indicated that the 4.5 to 5 percent growth rate you consider to be unrealistic. My question is: What would you consider we should strive for?

DR. HAMBERG: Well, I would say that we should strive for 3.5 percent and then worry about going higher. Let us get that. After all, before 1929 our growth rate was 3.8 percent per year--between 1889 and 1929. Since then it has been 2.9 percent. Since 1957 it has been 2.3 percent. It doesn't make any difference what base years you use. I have run every darn base year you can imagine, just to avoid the finger that my growth rate was based on the wrong year, and so forth.

The economy has been growing since 1957, without question, at about 2.2 or 2.3 percent a year. This is obviously well below our potential. Without engaging in quarrels about whether we can achieve 4 or 4.5 percent, I'd like to see us get to 3.5 percent and then let's see where we go from there. After all, if we went from 2.3 to 3.5 percent, this would be 1.2 over 2.3. What percent is that? It's about 50 percent greater, or a little more. It's a 50 percent increase in your growth rate. Well, that will be impressive, if we can pull that off.

That's another reason why I have a little difficulty swallowing the 4 or 5 percent

figures. If you view these not as absolute increases but as proportions, the increments, as proportions of the longer average growth--if you say you want to go from 3.5 to 4.5 percent, this is 1 over 3.5, and this is about 30 percent increase.

If you are suggesting that the economy has been growing at a rate since 1889 of some 30 percent below its potential, I have difficulty swallowing this. As I say, we've got enough to do to get up to 3.5 percent, without worrying about the others. We are surely not ready to stick our chests out on the recent performance. Therefore I am saying, let's leave that question hanging and get back to about 3 or 3.5 percent and see what we can do from there.

QUESTION: Doctor, what sort of program or means would you propose so that we could attain this 3.5 percent?

DR. HAMBERG: Well, for one thing, I pointed earlier to what I think is a basic drag on the economy, the tax structure. I would propose a general reduction in taxes. And I would also even be willing to go out on a limb, much against even some of my basic predilections, and center a reduction on corporate income taxes. I have some figures to show. I am not going by some of the more casual arguments. I have some figures to show that the big reason for these fabulous swings in our budget on a downturn and on an upturn, the drag on the economy in the downturn, is due mainly to the well-known volitility of profits as a proportion of the national product during the swings in the economy. The marginal tax bite as a result is entirely too steep relative to the demands of per capita on the other side of the picture.

In other words, I could add here to this S over Y ratio another one called

B over Y. B stands for the balance of the budget, the algebraic balance of the budget. What I am saying is that, given the rather small marginal government spending ratios the marginal tax bite as the economy goes up out of the recession is fantastic and it generates if not outright surpluses big swings in the direction of surpluses. If I add B over Y, it can be plus or minus. It doesn't matter. But, clearly, if B declines, even if it is a deficit but gets to a smaller deficit, it has the same deflationary effect.

So I would say that there is a very strong case to be made today for a substantial reduction in taxes, and I wouldn't hesitate to say as much as $10 billion.

Another source has come to my attention recently. Here I would say that the way to deal with the problem is not at all evident, if for no other reason than at this point in time we don't know what the explanation is. It is interesting that in recent years the growth, the percent of growth rate, in man hours worked is fantastically low. Part of this is clearly due to unemployment, to the slowness of growth itself. In other words, it works back. I am sure that the same thing was evident before 1957 when we had vigorous growth--3.8 percent, probably largely due to the stimulus of the Korean War and post-World-War-II backlogs. This is a matter of investigation.

In other words, I can point a finger here (indicating) and say that for some reason that I can't account for--and I might say the Department of Labor, at my behest, is trying to break down the various reasons by examining the various determinants of this total figure, because after all in an aggregate you get a lot of determinants, and to see just where the slowness has been--the solution here

is not evident. This is just too low to be taken as anything normal, this growth rate in man hours worked. It is running at about a rate of .2 of 1 percent a year. Why? As I say, I don't know. It is a fantastic phenomenon. It is away below the long-term average growth, which was about 1.7 percent a year.

QUESTION: Under the circumstances, what would you consider a proper means to encourage a decrease in savings, as an estimate?

DR. HAMBERG: Well, you see, I am viewing the saving problem now. I am thinking of it in terms actually of that additional ratio, B over Y. So immediately I can think of the effects of the tax reduction in two ways, posed, if you like, as a stimulus to demand. But the other side of that same coin is to lower B over Y, the algebraic budget surplus, because, at this point, although there is some evidence that the saving ratios are a little higher than normal, and have been in the last couple years, they have probably contributed to the slow recovery of the last recession. They don't strike me as sufficiently above what they were in years of vigorous growth to point the finger solely, let us say, at the private sector saving.

Remember our budget surplus as such is a form of saving. On the other hand, an algebraic decrease in the budget deficit is just as deflationary. You see, if I had a budget deficit I would write S over Y minus B over Y. A budget deficit is an outlet for private saving. On the other hand, if I get a huge swing, meaning a decline of the deficit, that's just as deflationary as an absolute surplus, despite, incidentally, the notions that deficits are inflationary and surpluses are deflationary. If this were true then you couln't explain the most rapid inflation we had in years,

in the years 1946 and 1947, when we ran big budget surpluses, nor the great depression in the face of big budget deficits, or, let's say, the recession in 1959, the famous Eisenhower deficit, of $12 billion. If budget deficits are inflationary, how is it that we had a recession with a $12 billion deficit? Myths.

DR. POPPE: Dr. Hamberg, on behalf of the Commandant, thank you very much for a very stimulating lecture.