NATIONAL ACCOUNTING SYSTEMS

16 September 1960

COLONEL HARVEY: Admiral Patrick, Gentlemen: For the past week you have been exposed to many facets of economic life in the United States. I think that without exception every one of our speakers has used statistical data to some degree, to prove or disprove certain economic beliefs.

At this juncture I think it might be well to repeat what the instructors have probably emphasized, and that is that statistics in the economic field are often unreliable, but nevertheless they do represent the only tools we have for accounting purposes.

So today we will look into the field of accounting systems at the national level, some of the gaps that exist in our present systems, and how we might modify some of our procedures to better serve our purposes.

As you have noted from his biography, our speaker, in addition to being a gifted educator, has had a long and varied background as a Government economist, culminating with his service on the President's Council of Economic Advisers up until 1958.

I might add that he holds two graduate degrees from Harvard University, whose economics department seems to have a corner on the market of advising at least one of our Presidential aspirants.

The title of today's lecture is "National Accounting Systems." It is my pleasure to introduce for his second appearance at the College Dr. Paul W. McCracken, Professor of Business Conditions, School of Business Administration, University of Michigan. Dr. McCracken.

DR. McCRACKEN: The allusion to this being my second appearance reminds me of an exchange of correspondence that was supposed to have taken place between George Bernard Shaw and Winston Churchill. While the latter was Prime Minister, he received a note from Mr. Shaw, in his own handwriting, saying, "You will find enclosed two tickets for the opening night performance of my new play; one ticket for yourself and one for a friend, if you have one." In the course of time Mr. Shaw received a note from Mr. Churchill, in Mr. Churchill's own handwriting, in which he said, "I regret to say

that I have a commitment on the opening night performance, and am therefore returning these tickets. Please send me two tickets for the second night, if there is one."

I am delighted to be here to discuss the general subject of "National Accounting Systems" and to outline some of the uses of this structuring of data, as well as some of the unresolved problems which still exist.

We ought to remind ourselves at the outset that there are in this country three more or less active social accounting systems, not just one. We have first of all our national income and product system, and this is the one with which we are the most familiar.

The national income and product system of accounts had a rather orthodox type of evolution. Our current national income and product system of accounts actually had its origin with some basic research at the National Bureau of Economic Research in New York, the one of which Arthur Burns has been head of for so many years. Back even in the twenties the National Bureau was doing some pioneering work in attempting to make some estimates of national income. That doesn't sound like a very dramatic thing right at the moment, but of course back in the twenties that was pioneering. This work developed slowly, as basic research does. Even the concepts had to be clarified. For that matter there are still a lot of unresolved conceptual issues even yet.

Then we got into the great depression. One of the questions was: What is going on in this depression? The analysis tended to run in terms of a deficiency of investment opportunities or of investment. Inevitably the question arose: What is actually happening? We didn't have any systematic estimates of national income by components. So we set about to develop them.

The National Bureau then developed its full-blown system of estimates of what they called gross national product, with this work led by Simon Kuznets. Then the Department of Commerce was charged by the Congress with the responsibility for developing continuing estimates of national income.

The first Government estimates on a systematic basis of gross national product saw the light of day in the May 1942 issue of the "Survey of Current Business."

Then, about 1948, the isolated estimates of gross national product developed into a full-blown system of accounts. At that time they were cast more or less in their present form, though there have been developments since.

Well, that is only one of our system of social accounts. There are two others. One of them is our input-output or our interindustry analysis. This in a sense is not unrelated to the national income and product accounts, but the problems this system is designed to illuminate are somewhat different. Interindustry analysis in essence is an attempt to derive estimates or measures of the technical interrelationships interconnecting the various sectors of the economy. The so-called input-output tables present the economy sliced up into various sectors, the number depending on the statistical detail desired. There was one table which sliced it up into about 50 sectors, and there was another which sliced it up into 200. What you are measuring, then, is the amount of product from one sector required by another sector per dollar of output of that second sector.

This is particularly useful in attempting to measure the total impact of a certain given exogenous change in the economy on a certain industry. Let me illustrate that with a very simple case. Suppose the output of the automobile industry increases by $1--what is the impact on the steel industry? Well, you could estimate per dollar or per automobile how much additional steel would be required.

However, that of course may not be the end of the story. If output in something like the auto industry goes up it may be that they well need additional machine tools. There will be an indirect demand for steel tripped off by this increase in the auto industry. If the machine tool industry has to supply the auto industry with machine tools, there may be some ancillary industry backup here that also feels the effect of that and makes a draft on the steel industry. So you've got these echo effects which extend sometimes fairly far back into the economy.

I think one can say that the input-output analysis in a sense brings back into the picture the transactions which by definition are consolidated out of the national income and product system of accounts, namely, the intermediate transactions. We'll see more about that in a moment. Well, I don't want to belabor this further.

The third system of national income accounts that we have in the United States is the flow-of-funds data which are currently made available on a quarterly basis by the Federal Reserve System. The flow-of-funds system, or the money-flow system, has itself been undergoing a considerable evolution. This work actually has been going on in the Federal Reserve for about 20 years, but on a pretty much pioneering basis, attempting to develop the concepts and the sources of data.

In essence, what the flow of funds started out to try to do was to provide a schematic portrait of not only the transactions involved in the production of current output but also what we might call the capital transactions of the economy as well.

The economy is divided into about 11 transacting sectors--consumers, corporations, banks, other financial institutions, et cetera. We had the total sources and uses of funds flowing between each sector and each of the other sectors--not only purchases of current output and sales of current output but borrowing, and financial transactions also.

This has been condensed a bit, and in the data which are published in the "Federal Reserve Bulletin" here, the Federal Reserve monthly publication, in the statistical section, have become in essense a picture of the pattern of the flow of savings into the capital markets. That is, where do the savings come from? They come from the banks, from the insurance companies, from the various other financial institutions on the one hand. You can visualize these flows coming into the money in capital markets, and you can visualize the funds also flowing back out of the capital markets to the various demanders of funds.

For those who are particularly interested in an analysis of the developments of the money and capital markets this kind of approach is of course useful.

So we have these three approaches--the national income and product accounting system, the input-output approach, and the flow of funds. The first and third are really the only active accounting systems, because the input-output analysis at the present time is more or less quiescent.

I would like to turn from this now to a more systematic examination of the use of the national income and product accounts as a means of visualizing the economic process. When it comes to something as complex as the whole economy, obviously we have to have some kind of summary picture in order to be able to visualize it. As a matter of fact, the same thing is of course true for a corporation. If you want to have some kind of summary picture of the way the numerous manifold activities of a large corporation are working out, you are not going to get it by walking through the plant. There can be all kinds of activities there and you can't really gage it. Pretty quickly what you are going to do is ask to look at the income statement.

Chart 1, page 6.--I have chosen here U.S. Steel, partly because their financial statement provides about the kind of a breakdown I want to use to tee off into the national income and product account.

Fundamentally, this income statement answers two questions. First of all, it answers the question: What is the total volume of sales of this corporation? In this case the products and services sold in 1959 were some over $3.64 billion. That is on the right-hand side. Secondly, the income statement of any corporation, in this case U.S. Steel, provides information answering the question: What were the total costs incurred, together with, hopefully, some profits realized, in the process of producing and marketing this output of goods and services? And of course the left-hand side of the account here answers that second question.

The first item here is products and services. This is products and services bought from other business. This would be the coal, the paper clips, the pencils, the paper, and so forth, that U.S. Steel purchases from other enterprises. That's about a third, as you can see, of the total sales.

The second item here is total employment cost--$1,576,200,000. This would be wages and salaries, pension payments, and social security contributions, and that sort of thing.

Third is interest payment, essentially on long-term debt.

The fourth item is State, local, and miscellaneous taxes. Those are not income taxes, by the way, which came on later. And by the way these are all essentially the terms which U.S. Steel uses in its own income statement.

CHART 1

U.S. STEEL CORPORATION 1959
(In millions)

Products and services bought	$1,278.2	Products and services sold	$3,643.0
Employment costs	1,576.2		
Interest	17.6		
State, local, and misc. taxes	93.5		
Wear, exhaustion of facilities	189.9		
Income taxes	233.0		
Income	254.6		
	$3,643.0		$3,643.0

Next is wear and exhaustion of facilities--in other words, depreciation, $190 million.

Then the rest would be profits before taxes, the sum of the last two items, of which income taxes are $233 million. And net income then, after taxes, is $255 million.

That exhausts the total. So that the income statement of U.S. Steel fundamentally answers these two questions: First of all: What was the total output of goods and services produced and sold by this company in the course of this fiscal year, 1959? Secondly: What were the costs incurred--or we might say the incomes paid out--together with the profits realized in the process of producing this volume of output?

This is the kind of summary picture that is very conventional when we try to analyze the results of the operation of a corporation as a business in the course of a year.

Well, now, let's look over the top of our bifocals for a moment, and visualize exactly the same thing except on a consolidated basis, where we would consolidate the income statements of all businesses in the country. We put them together and make out of them a consolidated income statement for all businesses in the country.

Now, before we leave this slide here, if it is a consolidated income statement for all businesses, one item in this statement is going to drop out. What item is that? It will be the first item on the left-hand side--products and services bought from other businesses. This item would merely represent interbusiness purchases and sales, which by that definition would cancel out. I think you can see this best if you think of it in terms of, say, a company like General Motors.

In the General Motors income statement you will not have included here the sales of spark plugs from the AC Division to the Chevrolet Division, and then the full value of the sales of Chevrolet also. That would be counting the sale of those spark plugs twice. So, when General Motors presents its consolidated income statement for all of its divisions, these interdivisional purchases and sales--which would show up, of course, if you were casting up an income statement just for a division--would be consolidated out.

So if you have a consolidated income statement for all of the economy, by definition the interbusiness purchases and sales will drop out of the picture. Well, if we in effect consolidate all of these income statements for all businesses, then, what we get is what has come to be called the basic national income and product account.

Chart 2, page 9.--Look at it here for just a moment. It may look a little different from the one we just had, but fundamentally it is really very similar. On the right-hand side, what information do you have? We have information bearing on this first question which we posed for U.S. Steel, namely: What was the total value of output--now for the whole economy--not for just one company? What was the total value of output for the whole economy?

On the right-hand side here we have this information on what the total value of output for the whole economy was, and according to this estimate it was $480 billion. It does happen that on this right-hand side we also provide a little additional detail on where the markets for this output were found. We can do the same thing, of course, for the income statement of a corporation. That is, in the case of the U.S. Steel income statement, we could have had sales to the auto industry, sales to the construction industry, and any kind of breakdown you want. We didn't bother to go into this detail.

This item down here, this $479.5 billion figure, is exactly parallel, conceptually, with the output of U.S. Steel, the sales of U.S. Steel. It's the value of the total output of goods and services produced in the economy.

Of this $480 billion, $312 billion was absorbed or purchased by consumers directly. Another $71 billion of our gross national product here, the total output of goods and services, went into the maintenance and expansion of our production facilities. Bear in mind that this is gross national product, not net national product. I'll come to that in just a moment. Therefore, these capital outlays are total capital outlays, without regard to whether they are for replacement or for expansion.

CHART 2

NATIONAL INCOME AND PRODUCT, 1959
(In billions)

Compensation of employees	$277.4	Sales to consumers	$311.6
Net income	15.6	Capital outlays	71.1
Rental income	12.0	Net exports	-0.8
Proprietors' income	46.3	Sales to government	97.6
Corporate profits	47.2		
Indirect business taxes	42.0		
Capital consumption allowance	40.2		
All other	-1.2		
	$479.5		$479.5

Source: U.S. Department of Commerce

Third, we have to have an item in here which shows the extent tc which our markets for goods and services abroad exceed the markets for foreign produced output in this country. I think you can see that, in an exactly equilibrated world, where imports and exports were exactly equal, we could take the total sales of output domestically and that would be equal in value to our total output in this country, though it would be true, you see, that in a technical sense some of the things you would be counting here would be things that people bought from abroad; but, for every dollar of that foreign output that you included there, there would be a dollar of our output that would find its market abroad--not here.

But, of course, in the real world these two figures, imports and exports, don't always balance out, and so we have to have a measure of the extent to which, if you simply rack up the total purchases of output by the various domestic sectors of the economy, you may not quite accurately measure the total value of output produced in the American economy.

Now it happened in 1959 that our exports, as defined for national income purposes, fell slightly short of our imports. But it's a minor figure and I don't want to dwell on it.

Finally, here, we have that part of our output which found its market in Government purchases of goods and services. It's $98 billion. Let me make a couple of comments about this. In the first place, this is not Federal expenditures alone, as is evident in the size of the figure. It's Federal, State, and local government purchases of goods and services. In the second place it is not total Federal, State, and local expenditures. It is only Federal, State, and local expenditures for goods and services. There are large elements of expenditure, which do not show up here at all. The two major categories which do not show up in this $98 billion figure here are so-called welfare payments and also interest on the public debt. And these are quite substantial.

So on the right-hand side here, then, according to this consolidated statement, we turned out $480 billion of output in 1959, of which $312 billion was purchased by consumers, and $71 billion went into the expansion and improvement of our productive facilities, and $98 billion found its market in Government expenditures.

Now, on the left-hand side we have also information which is exactly parallel to what you would find in the income statement of a corporation, except that the first item up here is the second item in the U.S. Steel income statement, because the first item dropped out.

Compensation of employees, $277 billion; interest $15.6 billion. Rental income is next. Proprietary income here represents the income of unincorporated business, professional people, and farmers. By the way, if I had put net farm income in here you would be surprised at how small it is. The fact of the matter is that farm income currently accounts for some 5 percent of our total national income, though accounting for somewhat more than that in percentage of opportunity.

Corporate profits are $47 billion. Then, indirect business taxes--this would be sales and excise taxes. These constitute in essence a part of the sales dollar, but of course do not accrue to individuals. Then, capital consumption allowances, which in essence are depreciation. Then miscellaneous things which I won't go into. The important miscellaneous item in this case is the statistical discrepancy, I might add. Of course by definition, conceptually, the total on the left-hand side is equal to the total over here (on the right). This is a double-entry way of looking at the economic process in the same sense as the income of a corporation.

There is one item that ought to have been put in here but it is not here. If we had stopped at this point (indicating) and struck a total, the total of these five items here would be what is technically known as national income. So, if you see some estimates of national income as so many billion dollars, the picture will be different from gross national product. National income is simply the sum of those five items. If the dust overlaying your course of elementary economics when you were in college is not too heavy, you will recall that the sum of those five items is simply the income of the factors of production--wages, labor income, property income, and profits. The income of the four factors of production is national income. Then we move on to these various items which add to gross national product.

Well, that's the structure of the basic national income and product account. As I say, the best way to visualize it quickly--the logic of the basic national income and product account--is to visualize it as moving from the income statement of one business to that of a consolidated income statement for the whole economy.

Chart 3, page 13.--Now, a moment ago I said, "Let's look over the top of our bifocals." I guess now we will have to use a telephoto lens or something. I want to utilize the concept of the national income and product account as a way of visualizing the economic process in motion, so to speak. The national income and product account, you may recall, had totals on the right-hand side and on the left-hand side. Now let's just look at it in terms of its absolute bare bones.

On the right-hand side here we say that in period one we had $500 billion of output produced and sold in a certain time period. By definition $500 billion of income was paid out or accrued to some income recipient. Now, at this stage we want to define a time period rather theoretically. I am going to borrow some concepts here from the English economist, Sir Dennis Robertson, who is one of the very few economists who is technically a brilliant economist and also can be definitely entertaining to read. Most of the literature that those of us in this profession have to read tends to suffer from a severe case of verbal constipation (and from diarrhea sometimes, I might add). But this is not true of his writing.

Well, this time period that we want to visualize for theoretical purposes here we shall define as follows: It is a period of time so short that the income received in one period--the figure on the left-hand side--is not brought back into the marketplace and spent on output until the next period. Now there is no such time period except conceptually. We won't worry about that.

All right. Now, what is the one necessary condition for business activity to remain unchanged from one period to the next? Well, I think we can lay that condition down right now. That one condition is that all of the income received in one period--period one, here--is brought back into the marketplace and spent in period two. If it is, then we get $500 billion of output sold again in period two, which by definition generates $500 billion of income on the left-hand side, as you can see. Then period two becomes nothing more than a carbon copy of period one. So the level of business activity has remained unchanged.

Those of you who may be concerned about the implications of this should bear in mind that this has nothing to do with whether saving is a good thing or not. This condition can be met with any level of saving. What happens is that you, being thrifty and prudent, spend short of your income and save, but some of the rest of us, being prodigal, will spend in excess of our income. So that the two of us together in the aggregate, bring all of the income dollars back into the marketplace to be spent.

By the way, the most persistent and consistent deficit spenders in the economy are not consumers and are not government. They are businesses. It will be a sorry day if this is not the case, because the economy will then run down. We are not making any distinction here between what you might call outlays for current expenses and capital outlays. They are all, as you see, on the right-hand side. In the aggregate, businesses traditionally spend more than they take in. This is certainly true of a business entity such as the public utilities industry.

So period two here then is just a carbon copy of period one. Let's go on to period three. Suppose that for some reason you are optimistic and you decide to step up your spending, even though your income hasn't changed at all. There are all kinds of ways to do this. You can draw down your bank balance, cash in your war bonds, or whatever you wish. So, suppose everybody else happens to make the same decision, to step up their spending by 10 percent.

Now in period three we get the $500 billion spent and another $50 billion besides. So in period three we have a demand for output of $550 billion. But that's not the end of the story, because this is a double-entry system. If $550 billion of output gets produced and sold in period three, $550 billion of income will be received by someone. And now we are really off to the races. If, with incomes running at $500 billion, people were willing to spend in the next period $550 billion, with incomes now running at $550 billion there would presumably be some response to the fact that incomes had now increased also.

Chart 4, page 15.--A change in business activity can always be broken down into two basic components or elements which we can see or visualize through this national income and product account. First of all at some point in the economy, there must be a change in demand relative to this prevailing level of income. It has to be a change in demand. You can cut back spending or step it up, there has to be what you might call an autonomous change in demand in the sense that it is not explained as a result of some change in income.

But, secondly, those whose incomes are thereby altered can be expected to change their spending, probably more or less in the same proportion, and the full change in the level of national income, then, can be visualized in a sense as kind of a moving-picture film, you see--a series of these national income and product statements. But the changes occur fundamentally as the result of these two elements of change in the economic process. The autonomous change up here is most apt to come in capital outlays or in Government spending, but it can also occur in consumer demand.

CHART 4

Changes in business activity change

because--

- at some point there is a change in spending relative to income;

- those whose incomes are thereby altered change their spending.

Look for example at the autonomous and wholly unexpected burst of demand on the part of consumers for automobiles in 1955. There was a kind of step up in demand that you could not explain in terms of what was happening to incomes. But, on the other hand, the stepped up pace of activity in the auto industry and in the ancillary industries in back of it in turn increased wage rates, put pressure on capacity, and forced other industries to step up their capital outlays, and ended up with this concatenation of echo effects, so to speak, which in the aggregate may well be larger than the precipitating change here at the top.

This is, in a sort of capsulized form, about the first half of a semester on the national income product account. I rather pride myself, as a matter of fact, that I have been able at the University to draw this out into practically a full course, though it has required a little work.

Now I think you all have this sheet (see following page) which just at the last moment I decided I wanted to have here. Unfortunately I didn't correctly report the number I would need here, so I didn't have quite enough. Now, we have here the full structure of the national income and product account. The first one up at the top, as you will notice, is practically the same one we had on the screen--the basic national income product account, with the GNP breakdown on the right-hand side--with new data, by the way. And on the left-hand side we have the same thing except that I took those first five items and consolidated them and called them national income--in this case $400 billion. Then there are capital consumption allowances, indirect taxes, and miscellaneous items which add up to $482 million.

Now, in order to try to get at these various changes in the economy somewhat more accurately, what we have done in the rest of this structure of accounts, particularly in the next three, is to take each major item of demand for output on the right-hand side of the basic national income and product account and match it against the elements of income on the left-hand side out of which those outlays are made.

NATIONAL INCOME & PRODUCT, 1959
(In billions)

National Income & Product Account

National income	$399.6	Personal cons. expend.	$313.8
Capital cons. allow.	40.5	G.P.D.I.	72.0
Indirect bus. taxes	42.6	Net exports	-1.0
All other	-0.6	Gov't purchases	97.1
Total	$482.1	G.N.P.	$482.1

Personal Income & Outlay Account

Personal cons. expend.	$313.8	Personal income	$383.3
Personal taxes	46.0		
Personal saving	23.4		
Total	$383.3	Total	$383.3

Foreign Transactions Account

Exports, gds. & services	$22.9	Imports, gds. & services	$23.8
		Transfer pymts.	1.5
		Net foreign invest.	-2.5
Total	$22.9	Total	$22.9

Government Account

Purchases, gds. & services	$97.1	Personal taxes	$46.0
Transfer pymts.	26.8	Corporate pfts. taxes	23.2
Net interest	7.1	Indirect bus. taxes	42.6
Subsidies, etc.	0.6	Social insurance	17.3
Surplus	-2.5		
Total	$129.1	Receipts	$129.1

Savings & Investment

Resid. const.	$22.3	Personal sav.	$23.4
Other "	18.0	Retained earnings	10.0
Producers durables	25.8	Capital cons. allow.	40.5
Inventories	5.9	Gov't surplus	-2.5
G.P.D.I.	72.0	Stat. discrep.	-1.8
Net foreign I.	-2.5		
Gross invest.	$69.5	Gross saving	$69.5

Take the second account here--personal income and outlay account. On the left-hand side here we have personal consumption expenditures, which is the first item of the basic national income and product account. Those outlays are made out of personal income. If you look at corporate profits, for example, that's less germane, because, except for dividends, personal consumption expenditures are not made out of that income.

So on the right-hand side we have personal income, which would be wages and salaries, social security income, interest income, and that sort of thing.

How is personal income disposed of? Well, first of all, personal taxes have to come out; then consumers are free either to spend it on consumption goods or not to spend it but to save it. Those are the three alternatives there.

Now the foreign transactions account happens to be broken down in a little bit more detail than we had up here. We have our total exports of goods and services, which constitute in essence the receipts of the American economy vis-a-vis its foreign transactions. How were these dollars which were spent in this country by the rest of the world obtained? Well, our imports from the rest of the world were the major items that provided dollars to the rest of the world. Transfer payments, or foreign aid, were one part of it, and another was the extent to which there was a flow of private investment, net, going to the rest of the world.

We have another account for Government purchases of business services--except that here we have the full pattern of Government expenditures. Purchases of goods and services was only one item, and was 97.1. Transfer payments, welfare payments, and that sort of thing, was $27 billion. Interest on the public debt was $7 billion. Those were the major ones. So that in the aggregate last year total Government expenditures of all kinds and at all levels were $129 billion. As a matter of fact, they were a little more than that, because we ran a negative surplus or a deficit, so that total outlays were actually $131.6 billion.

Now on the right-hand side, personal taxes, corporate profits taxes, going to the top of the account here, list those elements of receipts which are germane to Government spending. Then what we do is collect the deficits and the savings, the deficits and the surpluses. Personal savings, corporate retained earnings, capital

consumption allowances--these are the gross savings of the economy. Then we have the gross capital outlays over on the left-hand side here, including net foreign investments. These include residential construction, other construction, machinery and equipment purchases, and the extent to which inventories were accumulated or liquidated--they were accumulated last year. Those four items add up to gross private domestic investment--that $75 billion figure in the first account. Net foreign investment is here. We now have the gross investment in the economy. The pluses and the minuses, of course, have to be equal in a double-entry system.

So we have here in a sense the capital account, rounding out our system of national income and product accounts.

Thank you.

COLONEL HARVEY: Gentlemen, Dr. McCracken has a few more slides he would like to show you very briefly prior to the question period.

DR. McCRACKEN: One disability that every speaker has is the presumption that there are still some remaining pearls of wisdom that simply must be exhibited, even though time is short. I plead guilty to the same thing.

Before we have the slides, if you have those sheets on national income and product I just want to take about 30 seconds here to show how one can trace through this process of economic change that we were talking about a moment ago.

Let's suppose we have a step-up in Government spending. For example, let's get down to the Government account--purchases of goods and services. That's $97 billion. Suppose that goes up $10 billion. One of the advantages of the double-entry system is that you never lose sight of the other side of the transaction. If that $97 billion goes to $107 billion then Government purchases in the top account here, of course, by definition, goes up. But, if that goes up, somebody's income goes up, doesn't it? Something has to be increased on the left-hand side in the double-entry system. Presumably in national income it will be a combination of wages and salaries and profit. To the extent that it is wages and salaries, personal income goes up. But if personal income goes up, personal consumption expenditures are very apt to respond. So if personal consumption expenditures go up, we go up to the left account here, and that item goes up,

and then that affects national income, which affects personal income. You see, these are the dynamics of the process here.

Well, so much for that.

Chart 5, page 21.--One of the uses of national income data is, of course, forecasting. It occurred to me that you might be interested in how well economists do in using all of these tools here. I would like to call your attention to this one right over here (indicating).

Right after the war, as you can see, economists were not too optimistic about the prospects of the American economy. The circle shows the point at which the forecast was made, and the head of the arrow shows where economists said industry would have to go in that period. So it went on its merry way, though the economists were sure it would go down. You will notice that economists do learn. Finally they decided they had been wrong all along. So they predicted no change. That was the beginning of the final postwar recession.

Chart 6, page 22.--I mentioned that autonomous changes are very apt to occur in capital outlays, research has been going on to see to what extent we can anticipate these. The Department of Commerce and the SEC now have regular quarterly surveys of a sample of businesses, asking them to estimate what their plant and equipment expenditures are going to be a quarter or two in advance. On this chart let's look at the top one. The solid line shows the actual. The heavy broken line shows the first anticipation, looking rather far ahead. The light broken line shows the second anticipation, which is still closer. You can see that they do fairly well.

I want to call your attention to one thing. If you will look at the 1957 peak there, you will notice there--and to some extent it shows up in 1953--a tendency at the upper turning point for these surveys to overestimate what plant and equipment outlays will actually be. To state it the other way around, they tend to fall off a little more rapidly than their earlier expectations would imply.

For what it is worth, we are currently in a phase where the successive increases or projections are being scaled down. I should say this is not an optimistic omen.

CHART 5

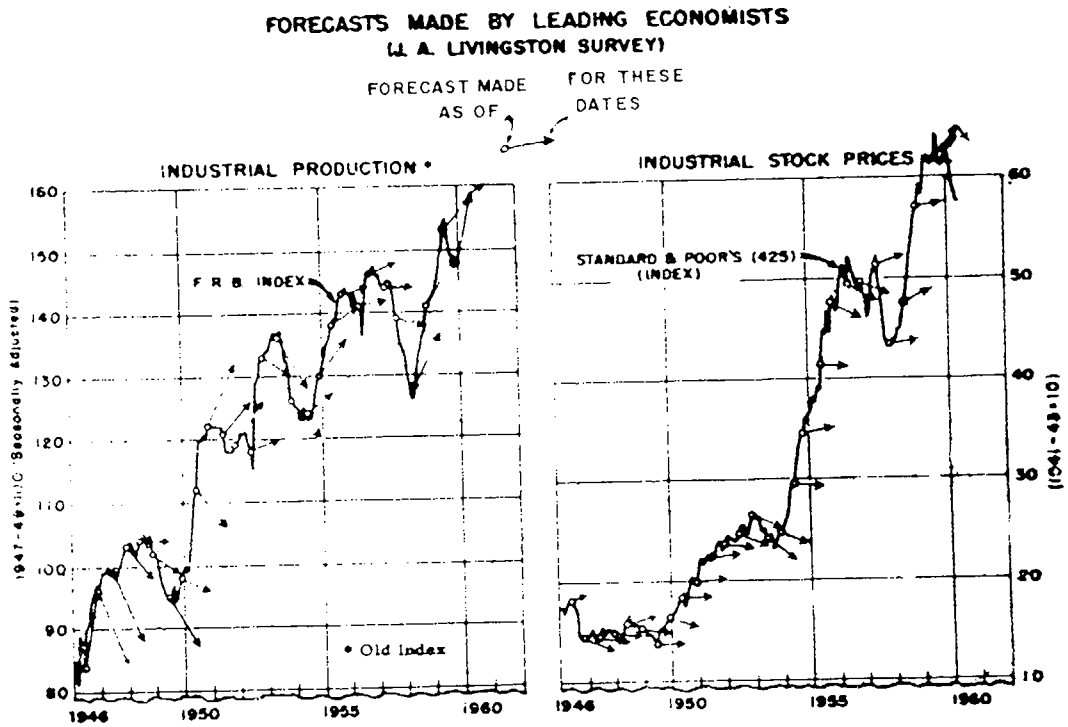
FORECASTS MADE BY LEADING ECONOMISTS
(J. A. LIVINGSTON SURVEY)
FORECAST MADE AS OF
FOR THESE DATES
INDUSTRIAL PRODUCTION *
F R B INDEX
* Old Index
INDUSTRIAL STOCK PRICES
STANDARD & POOR'S (425) (INDEX)
160
150
140
130
120
110
100
90
80
60
50
40
30
20
10
1946
1950
1955
1960

CHART 6

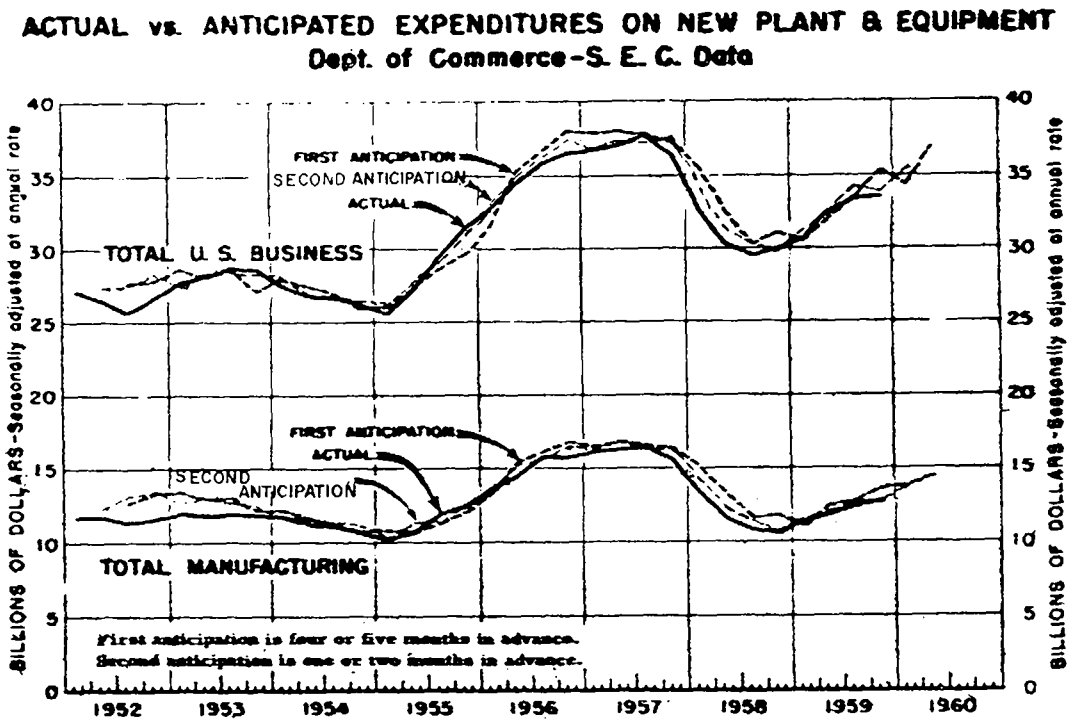
ACTUAL vs. ANTICIPATED EXPENDITURES ON NEW PLANT & EQUIPMENT
Dept. of Commerce-S. E. C. Data
BILLIONS OF DOLLARS-Seasonally adjusted at annual rate
FIRST ANTICIPATION
SECOND ANTICIPATION
ACTUAL
TOTAL U. S. BUSINESS
FIRST ANTICIPATION
ACTUAL
SECOND ANTICIPATION
TOTAL MANUFACTURING
First anticipation is four or five months in advance.
Second anticipation is one or two months in advance.
0
5
10
15
20
25
30
35
40
1952
1953
1954
1955
1956
1957
1958
1959
1960

Chart 7, page 24.--We also have some estimates by the National Industrial Conference Board on capital appropriations. This is asking businesses, not for what they expect to spend but what they are currently appropriating for subsequent capital expenditure programs. This happens to go through only 1959. You may have seen in the current issue of "Newsweek" that capital appropriations data are turning down. In the black line there you will notice that the appropriations data do tend to lead actual expenditure. This pattern also I should say is not a reassuring harbinger of things to come.

Chart 8, page 25.--Another system of forecasting is the mathematical or econometric system. We have certain economic laws or interrelationships, such as in this case here that the demand for a product is influenced by changes in prices. We can state it that way in words. Or we can go to the blackboard and the professor can draw a line that declines to the right. That's a demand curve. Or we can state it algebraically, as an equation. If we have sufficient statistical information, we can derive estimates of the parameters and have an equation which captures or expresses this economic law. Now, if we have a series of these equations, a system of equations that is determinate, we can solve our system of equations and derive actual estimates for our variables. If one of those variables happens to be national income, we can derive an estimate of what national income would actually be.

Chart 9, page 26.--Let's take a simple model here. Suppose we have as the first equation here $Y = C + I + E + G$. That's just the definition of gross national product. Gross national product is the sum of expenditures by consumers, capital outlays, net exports, and Government expenditures. Suppose we also say that consumer spending is a function of income. I just chose these figures out of the air and say consumption is equal to $.64 \times Y$. Suppose we say that investment outlays also depend on changes in the level of income. This is an oversimplification, to be sure. Then we can substitute those two equations, and the top one, Y is equal to .64 Y (which is C) plus .16 Y (which is I), plus E plus G. Here then GNP is going to equal E plus G over .20. And if we make independent estimates of net exports and Government spending, we can derive an estimate of gross national product. And we know that for each dollar change we can have change in E and G, gross national product will change $5 as the result of these echo effects that we were talking about a moment ago.

CHART 7

CAPITAL APPROPRIATIONS

THOUSAND LARGEST MANUFACTURING CORPORATIONS

Fourth Quarter, 1959
(Billions)

Open backlog	$7.55
Plus: Newly approved	2.84
Less: Committed or spend	2.64
Canceled	0.15
Equals: Closing backlog	7.60
(Capital expenditures)	(2.66)

Source: N.I.C.B.

CHART 8

ECONOMETRIC MODELS

1. Economic laws can be expressed in words--or equations

$$S = a P^{-b}$$

2. If a system of equations is determinate, it can be solved to get values of variables.

CHART 9

ECONOMIC MODEL

1. $Y = C + I + E + G$

   $C = 0.64\,Y$

   $I = 0.16\,Y$

2. Then:

   $Y = 0.64\,Y + 0.16\,Y + E + G$

   $Y - \frac{E + G}{0.20}$

3. For each change in $(E + G)$

   of \$1.00, Y changes \$5.00.

Chart 10, page 28.--Well, that was a simple model. Here is what a real-life model actually looks like. This happens to be one which was developed by the Research Seminar in Quantitative Economics at the University of Michigan. It's a 22-equation model. There are only 18 actually shown here. I just opened up this book here (indicating) and photographed these two pages. I thought you might be interested in seeing what a real-life econometric model looks like.

Chart 11, page 29.--This takes one of these equations, which happens to be the equation which tries to express the demand for consumer goods and services. In brief, what this equation says is the demand for consumer goods and services is the function of wage income less taxes, earners, profit income (nonwage income), agricultural income less taxes, the level of consumer spending in the last period, the volume of liquid assets held, and this population factor.

You notice that the figures in parentheses are the probable errors of the parameters in this equation. You will notice that the income parameters here are significant, but the other parameters are not particularly significant. Look at that one over there--the probable error is about 50 percent of the size of the parameter itself. You could almost X that out.

Let me just say this: The trouble with an econometric system is, oddly enough, that it is too simple. Even here, you see, we are really saying that consumption depends only on income and a couple of other variables that don't have much significance. The fact is we know that you get significant changes in consumption that you cannot explain by changes in income or these other factors here.

So that a model which gets extremely complex mathematically is still far too simple to describe economic reality.

Chart 12, page 30.--This is the forecast which was made last November just grinding this econometric model here. I won't go through it in detail, but you will notice that they came out with a decline in gross national product of $3 billion in 1959 prices, and a slight rise in unemployment, with a significant increase in the price level.

CHART 10

ECONOMIC OUTLOOK

Equations

(1) Consumption Function:

$$C = -46.8459 + \underset{(.060)}{.618}(W_1 + W_2 - T_w) + \underset{(.060)}{.4635}(P - S_C - T_N - T_C) + \underset{(.060)}{.386}(A - T_A) + \underset{(.079)}{.155}C_{-1} + \underset{(.023)}{.049}L_{-1} + \underset{(.158)}{.554}N_P$$

(2) Inventory:

$$I_H = 17.314 + \underset{(.028)}{.159}(Y + T + D_R + D_N - W_2 - I_H) - \underset{(.122)}{.625}K_{H-I}$$

(3) Residential Construction:

$$I_R = \underset{(.006)}{.066}(W_1 + W_2 - T_W + P - T_C - T_N - S_C + D_R) - \underset{(.006)}{.0210}K_{R-I}$$

(4) Plant and Equipment:

$$I_N = .530(P - T_C - T_N + A - T_A + D_N) - .0685K_{N-I}$$

(5) Residential Depreciation:

$$D_R = -10.491 + .1025\frac{K_R + K_{R-1}}{2}$$

(6) Depreciation of Plant and Equipment:

$$D_N = 16.461 + .1918\frac{K_N + K_{N-1}}{2}$$

(7) Inventory Identity:

$$K_H = K_{H-1} + I_H$$

(8) Residential Identity:

$$K_R = K_{R-1} + I_R - D_R$$

(9) Plant and Equipment Identity:

$$K_N = K_{N-1} + I_N - D_N$$

STATISTICAL MODEL OF ECONOMIC ACTIVITY

(10) Labor Demand:

$$W_1 = -8.228 + .4033(Y + T + D_R + D_N - W_2) + \underset{(.034)}{.1237}(Y + T + D_R + D_N - W_2)_{-1} + \underset{(.160)}{.2117}t$$

(11) Corporate Profits:

$$P_C = 12.854 + \underset{(.0549)}{.8617}P - \underset{(.0574)}{.2244}P^{-1}$$

(12) Corporate Savings:

$$S_C = -6.4136 + \underset{(.029)}{.7465}(P_C - T_C) - \underset{(.0011)}{.0403}B_{-1}$$

(13) Wage Rage:[a]

$$w - w_{-1} + 9.0489 - 1.4403(N - N_W - N_E) + .8654(P_{-1} - P_{-2} + .4363t$$

(14) Production Function:

$$Y + T + D_R + D_N - W_2 = -166.434 + 3.8128\left[h(N_W - N_G) + N_E\right] + \underset{(.060)}{.3030}\frac{(K_R + K_H + K_N) + (K_R + K_H + K_N)_{-1}}{2} + \underset{(.196)}{3.8072}t$$

(15) Price Identity:[a]

$$p = \frac{hN_W w}{W_1 + W_2}$$

(16) Income Identity:

$$p = Y - W_1 - W_2 - A$$

(17) Income-Production Identity:

$$Y = C + I_H + I_R + I_N + G - T - D_R - D_N$$

(18) Corporate Balance Identity:[a]

$$B = B_{-1} + S_C$$

---

[a] These equations were not employed in the 1959 forecast

CHART 11

CONSUMPTION EQUATION

$$C = -46.8459 + \underset{(0.060)}{0.618} (W_1 + W_2 - T_w)$$

$$+ \underset{(0.060)}{0.4635} (P - S_c - T_n - T_c)$$

$$+ \underset{(0.060)}{0.386} (A - T_a) + \underset{(0.079)}{0.155} C_{-1}$$

$$+ \underset{(0.023)}{0.049} L_{-1} + \underset{(0.158)}{0.554} N_p$$

Source: John B. Lansing, "A Statistical Model of Economic Activity As Applied to 1959," Conference on the Economic Outlook, Proceedings, November 3-4, 1958, pp. 55-64.

CHART 12

1960 ECONOMETRIC FORECAST
(1959 Prices)

	1959 Actual	Predicted Change	1960 Forecast
Cons. Expend.	311.6	1.0	312.6
G P D I	71.1	-6.4	64.7
Net Exports	-0.8	0.2	-0.6
Gov't	97.6	2.2	99.8
G N P	479.5	-3.0	476.5
Unempl.	3.7	0.7	4.4
GNP Deflator	100.0	3.5	103.5

Source: Commerce Dept. and Prof. Suite

COLONEL HARVEY: Dr. McCracken is ready for your questions.

QUESTION: Dr. McCracken, you show net foreign investment as a negative of $2.5 billion, and in the Government account there is a saving on investments and services of $2.5 billion. Is this coincidence?

DR. McCRACKEN: Yes, that's a coincidence.

QUESTION: Will you please give us an indication of where you expect gross national product to go in time of war?

DR. McCRACKEN: Well, let us think in terms of an economy that would remain essentially intact, such as a World War II kind of situation. We could probably draw back into the labor force enough to add, say, 5 to 10 percent to output. We could increase hours. We might thus get a GNP up from $500 billion to about $600 billion. The Federal budget would then approach about $300 billion per year.

We can visualize the policy problem here. We would have to increase your tax structure in such a way as to hold personal income to the kind of figure such that the sum total of your consumer spending that might be tripped off, and private spending that might be tripped off, is not going to add up to more than your productive resources. As a matter of fact, of course, you could not equilibrate that and would have to control the economy directly.

Let me illustrate that here at the blackboard. Take your national income and product account. Over here we have private demands. Let's say they are 60 and Government 40. And private income say is at 60 and taxes 40. Everything balances out, you see. Now suppose in wartime the 40 goes up to, say, 80. Theoretically you could increase taxes enough and to reduce private incomes by enough so that everything balances.

The problem is that you may have to increase taxes so much that you dampen initiatives. So you run an unbalanced economy and avoid disorderly developments by direct rationing, allocation, prime controls, and controls over manpower. Since you are from OCDM, you know more about this than I.

I think that all of what I have said is probably academic, however, because I started by assuming that the economy would remain intact. But it would seem to me that if we ever got into anything like

all-out war now it is doubtful if we would have the economy sufficiently intact so that these calculations would mean anything. However, in an intermediate situation this kind of visualization may be appropriate. It is at least a good way to visualize the policy problem. We could undoubtedly right now increase our output by 10 to 20 percent easily--by operating under forced draft.

QUESTION: I would like to ask a question about the accuracy of estimating GNP for the underdeveloped countries, and what would be the best approach we can make.

DR. McCRACKEN: Well, I am reluctant to say. Let me say that underdeveloped countries aren't the only ones with estimating problems.

The first thing, it seems to me, to bear in mind in interspacial comparisons of national income is to avoid any critical assumption that you can reduce these complex matters to simple comparative figures. The fact that the gross national product estimate for country A is $500 billion and for country B is $200 billion does not automatically tell us that one country is making twice the contribution to the material welfare of its people that the other country is making.

For example, you've got the definitional problems. For example, what about the whole development of what you might call household contributions to economic activity? When I was a boy my mother, on a farm in Iowa, would bake bread. Now she buys bread. That activity by being transferred from the household into the market place, now adds to gross national product. Yet the same activities are being conducted now as before. This is relevant to the point. I think in the underdeveloped countries they have a lot of subsistence, household activity which has been transferred to the marketplace in our system. Thus the national income data overstates the gap between us.

There are also major problems in terms of foreign exchange. What exchange rate do you use? Most of you have traveled a great deal more than I have, but I have had occasion to visit several other countries. One of the things that immediately strikes you is that an exchange rate which may equilibrate international transactions is no indication of the domestic purchasing power parity.

Take a country like Japan. The exchange rate, which is 358 yen, as I recall it, to the dollar, is such that at first blush, when you find out what Japanese university professors are being paid, you wonder

how in God's name they can live. Yet they do and comfortably. You quickly come to the conclusion that 358 yen in Japan buys more than a dollar here. Thus if you take our national income in dollars and their national income converted into dollars in terms of the prevailing exchange rate, you are not getting a fair comparison of the relative magnitude of the contribution of their economy in relation to ours. Cautiously used, however, these data are helpful in comparing the economic power of two countries and one of the few overall measures we have.

COLONEL HARVEY: Our time has run out. Dr. McCracken, on behald of all of us, thank you for a most lucid explanation of a very complicated subject. If nothing else holds, all these incipient capitalists will take a closer look at the annual reports of the corporations in which they own stock.

(4 May 1961--5,400)O/de:ds