

ECONOMIC OUTLOOK USA

SPRING 1978

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SURVEY RESEARCH CENTER
Institute for Social Research
THE UNIVERSITY OF MICHIGAN

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ECONOMIC OUTLOOK USA is designed to aid private and public decision makers in achieving a better understanding of the economic and social environment in which they will be operating. The analysis in this publication incorporates direct measurements of the expectations, attitudes and plans of both consumers and business firms with the economic and financial variables traditionally used in forecast models. The philosophy of this publication is that a blend of anticipatory and traditional measures provides richer insights into prospective developments, insights which will produce more consistently reliable forecasts of both economic and social change.

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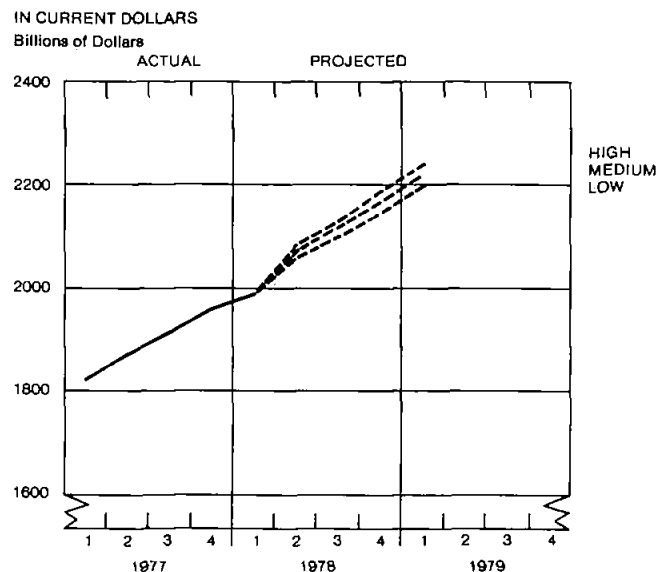
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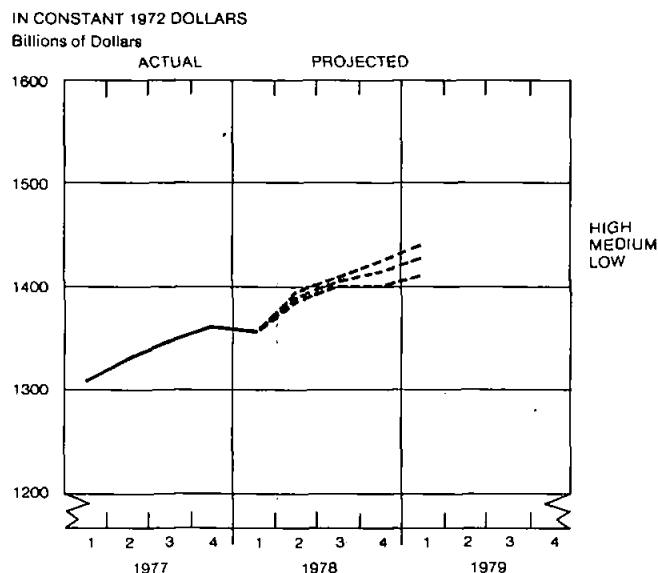
Actual and projected; seasonally adjusted
quarterly data at annual rates

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Sources: Actual data, U.S. Department of Commerce; projected data, ASA-NBER Panel of Forecasters.

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Frequently Used Abbreviations:

ASA	American Statistical Association
BEA	Bureau of Economic Analysis, U.S. Department of Commerce
NBER	National Bureau of Economic Research
SRC	Survey Research Center
197x:y	yth quarter of 197x

A Forecast From An Econometric Model and Its Estimated Uncertainty

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Yale University

As readers of *Economic Outlook USA* are undoubtedly aware, forecasts from econometric models are not always accurate. Although it is well known that forecasts are uncertain, estimates of the size of this uncertainty are rarely presented. One usually has at best only the recent past history of forecasting accuracy to use as a guide in deciding how much confidence to place on the current forecast from the model. In a recent study¹ I have proposed a method for estimating the uncertainty of an econometric-model forecast, and the primary purpose of this article is to present an estimate of the uncertainty of a particular forecast using this method. It is hoped that the results presented here will provide the reader with a better understanding of the likely size of the uncertainty of econometric-model forecasts and will encourage other model builders to present similar results in the future.

The Forecast

At the time of this writing (April 24, 1978), preliminary data for 1978:1 are available, and based on these data, I have made a forecast using my econometric model² for the 1978:2-1981:4 period. The results of this forecast for selected variables are presented in Table 1. The assumptions that were made about monetary and fiscal policy for this forecast are the following. With respect to monetary policy, the behavior of the Fed is explained within the model, and so no assumption needs to be made about monetary policy prior to the basic forecast. In other words, monetary policy is endogenous in the model. With respect to fiscal policy, two basic assumptions were made. The first assumption is that there will be no change in the current tax laws except for a rescinding of the increase in the social security tax rate scheduled for 1981:1. In particular, no tax cut in late 1978 or early 1979 is assumed. The second assumption is that the values of the federal government expenditure variables that are exogenous in the model will be equal to or close to the current budgeted expenditure numbers. The current budget estimates for the 1978:2-1979:3 period are presented in Table 6, p. 26, in the February 1978 issue of

¹See R. C. Fair, "Estimating the Expected Predictive Accuracy of Econometric Models," Cowles Foundation Discussion Paper No. 480, January 17, 1978. The results in this Discussion Paper have been updated for purposes of the present article, including the estimates of the degree of misspecification of the model. The results in Table 2 of the present article thus differ somewhat from the results in Table 1 in the Discussion Paper.

²This model is described in R. C. Fair, *A Model of Macroeconomic Activity: Volume II: The Empirical Model*, Ballinger Publishing Co., 1976. The model has been changed slightly and updated since this book was published. The main change that has been made to the original model is the addition of an equation explaining the behavior of the Federal Reserve. This addition is discussed in R. C. Fair, "The Sensitivity of Fiscal Policy Effects to Assumptions about the Behavior of the Federal Reserve," *Econometrica*, 1978. The updated version of the model consists of 97 equations, 29 of which are stochastic, and has 188 unknown coefficients to estimate. The complete list of the equations of this version is contained in R. C. Fair, "The Fair Model as of April 15, 1978," mimeo.

the *Survey of Current Business*; longer run estimates are presented in Table C-2 in the December 1977 Congressional Budget Office publication, "Five-Year Budget Projections: Fiscal Years 1979-1983." The present forecast should thus be interpreted as showing the economic consequences of making no changes in the current tax laws and budgeted expenditure values.

The results in Table 1 are self-explanatory. The growth rate of real GNP is predicted to be slightly over 4 percent during the rest of 1978 and then slightly under 4 percent for the 1979-1981 period. The unemployment rate remains roughly constant at slightly over 6 percent, and the rate of inflation is about 5.5 percent throughout the period. The bill rate rises by about a percentage point during the period, and the rate of growth of the money supply levels out at about 8 percent. The federal deficit falls from about 60 billion dollars in 1978 to a small surplus by the end of 1981. Finally, the U.S. balance of payments on current account (net foreign investment) is in substantial deficit throughout the period.

In summary, this forecast shows a flat economy in terms of a variable like the unemployment rate. Real growth is sufficient to prevent the unemployment rate from rising very much, but it is not enough to cause the unemployment rate to fall from what is historically a high level. The projected rate of inflation of about 5.5 percent is also high by historical standards; this is one of the main factors behind the prediction that the Fed will allow the bill rate to remain fairly high throughout the period.

The Uncertainty Estimates

The method that I have proposed accounts for the four main sources of uncertainty of an econometric-model forecast. Uncertainty in this context arises from (1) the error terms in the model, (2) the fact that only *estimates* of the coefficients of the model are available as opposed to their true values, (3) the fact that the future values of the exogenous variables are generally not known and so must themselves be forecast prior to the basic forecast, and (4) the fact that the model may be misspecified. The method is based on successive re-estimation and stochastic simulation of the model. It provides, in addition to an estimate of the uncertainty of a model's forecast from each of the four sources, a *quantitative* estimate of the degree of misspecification of the model with respect to each variable and length of forecast.

Table 2 shows the results of applying this method to five of the variables in the above forecast. Consider first the estimated uncertainty of the real GNP forecasts. The estimated standard error of the eight-quarter-ahead forecast of real GNP taking into account all four sources of uncertainty is 2.27 percent. Based on the eight-quarter-ahead forecast of real GNP of 1468.6 billion dollars in Table 1, this is an error of 33.3 billion dollars. Of this 2.27 percent, 1.34 is due to the error terms in the model, 0.35 to the coefficient estimates, 0.39 to the exogenous-variable forecasts, and 0.19 to the misspecification of the model. For the four-quarter-ahead forecast of real GNP, the estimated standard error is 1.96 percent, of which 0.33 is due to the misspecification of the model.

**Table 1. FORECAST RESULTS FOR SELECTED VARIABLES
(Mean Values)**

Quarter	Real GNP Level %	GNP Deflator Level %	Unemploy- ment Rate	Bill Rate	Money Supply Level %	Federal Surplus or Deficit	S&L ^b Surplus or Deficit	Personal Saving Rate	Net Foreign Investment	Before Tax Profits
1978 I ^a	1356.5 -1.3	146.73 7.4	6.2	6.4	365.4 6.2	-54.6	33.9	7.2	-35.7	167.5
1978 II	1374.3 5.4	148.61 5.2	6.4	6.7	373.1 8.8	-60.1	29.5	6.7	-37.7	171.3
1978 III	1389.4 4.5	150.51 5.2	6.5	6.8	380.9 8.7	-58.5	30.8	6.4	-38.8	177.4
1978 IV	1402.6 3.9	152.68 5.9	6.5	6.9	388.9 8.7	-59.6	30.5	6.5	-38.6	182.3
1979 I	1416.4 4.0	154.65 5.3	6.5	7.0	396.9 8.5	-46.3	29.0	6.0	-38.8	182.6
1979 II	1428.8 3.6	156.61 5.2	6.5	7.1	404.8 8.3	-39.8	27.3	5.8	-39.0	184.0
1979 III	1441.1 3.5	158.56 5.1	6.6	7.2	412.9 8.2	-38.3	24.6	5.9	-39.1	184.9
1979 IV	1454.9 3.9	160.88 6.0	6.6	7.2	421.0 8.2	-36.4	23.4	5.8	-39.2	188.9
1980 I	1468.6 3.9	162.97 5.3	6.5	7.3	429.4 8.3	-30.7	20.9	5.7	-39.2	192.4
1980 II	1481.8 3.7	165.07 5.3	6.5	7.3	437.8 8.1	-25.1	18.8	5.6	-39.2	194.3
1980 III	1495.8 3.9	167.23 5.4	6.5	7.4	446.5 8.1	-18.8	16.5	5.4	-38.5	196.6
1980 IV	1508.8 3.6	169.72 6.1	6.4	7.5	455.3 8.2	-14.7	14.6	5.4	-38.5	198.3
1981 I	1521.2 3.4	171.95 5.4	6.4	7.6	464.1 8.0	-8.6	11.2	5.3	-37.8	198.8
1981 II	1534.2 3.5	174.23 5.4	6.4	7.6	473.2 8.1	-1.1	7.9	5.2	-37.0	200.2
1981 III	1546.6 3.3	176.55 5.4	6.3	7.7	482.2 7.8	5.8	5.0	5.0	-36.0	199.0
1981 IV	1559.3 3.4	179.19 6.1	6.3	7.8	491.7 8.2	11.0	1.8	5.0	-35.5	200.7

^a Actual data.

^b State and local governments.

Additional notes: % = percentage change at an annual rate.

All flow data are at an annual rate.

Federal and state & local government budgets are on a national income accounts basis.

See the references in footnote 2 for further definition of the variables.

The personal saving rate here is not the same as that published in the *Survey of Current Business*.

Turning next to the estimated uncertainty of the forecasts of the GNP deflator, the estimated standard error for the eight-quarter-ahead forecast of the GNP deflator is 3.48 percent, of which about half (1.86) is due to the misspecification of the model. The corresponding values for the four-quarter-ahead forecast are 1.87 and 0.83, respectively.

The estimate of the misspecification of a model with respect to a given variable and length of forecast can be either positive or negative, and in either case the model is estimated to be misspecified. Only zero estimates correspond to no misspecification. For the unemployment rate the misspecification estimates are in fact negative. The estimated standard error for the eight-quarter-ahead forecast of the unemployment rate is, for example, 0.71, of which -0.60 is due to the misspecification of the model.

The forecast of the money supply is estimated to be more uncertain (in percent terms) than is the forecast of either real GNP or the GNP deflator. The estimated standard error for the eight-quarter-ahead forecast of the money supply is 7.50 percent, of which 4.05 is due to the misspecification of the model. Based on the eight-quarter-ahead forecast of the money supply of 429.4 billion dollars in Table 1, this is an error of 32.2 billion dollars.

The results in Table 2 can be used either in their own right to help one in deciding how much confidence to place on the model's forecast or to compare to similar results from other models. Were other model builders to carry out the necessary calculations, analysts would clearly have a useful way to compare the estimated prediction accuracy of alternative models.³ Lacking any similar results for other models at the present time, I have instead calculated results like those in Table 2 for a simple autoregressive model in which each variable is regressed on a constant, a linear time trend, and its first eight lagged values. At the least, this model serves as a useful benchmark.

The autoregressive model contains more uncertainty than the Fair model for all variables in Table 2 except the money supply. The estimated standard errors of the autoregressive

³These procedures cannot be used directly to estimate errors in subjectively-adjusted models. In the Discussion Paper referred to in footnote 1, however, a procedure is suggested for estimating the uncertainty of forecasts from subjectively-adjusted models. This procedure is based on more restrictive assumptions than the one used here, but it would permit the calculation of results comparable to those in Table 2 for subjectively-adjusted models.

model for the eight-quarter-ahead forecasts are 4.74 percent for real GNP, 6.20 percent for the GNP deflator, 2.19 percentage points for the unemployment rate, 1.83 percentage points for the bill rate, and 3.70 percent for the money supply. The corresponding estimates of the degree of misspecification of the model are 2.15, 3.72, 0.79, 0.64, and 1.77. The Fair model is thus considerably more accurate than the autoregressive model with respect to real GNP, the GNP deflator, and the unemployment rate; both are about the same with respect

to the bill rate; and mine is considerably less accurate with respect to the money supply.

To conclude, although the results in Table 2 are clearly tentative, they do at least provide a general impression of the model's accuracy. In future work it will be of interest to see how these results compare to those of other models and to see if the estimated standard errors fall over time as more data become available and (presumably) more is learned about the true structure of the economy.

Table 2. ESTIMATED STANDARD ERRORS OF FORECASTS FOR SELECTED VARIABLES

U*	1978			1979				1980				1981			
	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Real GNP (percent of forecast mean)															
a	0.65	0.88	1.03	1.15	1.25	1.30	1.35	1.34	1.36	1.40	1.43	1.44	1.47	1.46	1.43
b	0.67	0.95	1.19	1.38	1.49	1.59	1.66	1.69	1.77	1.81	1.82	1.84	1.88	1.88	1.94
c	0.74	1.09	1.37	1.63	1.76	1.94	2.04	2.08	2.15	2.18	2.22	2.30	2.34	2.36	2.43
d	0.80	1.23	1.54	1.96	2.27	2.51	2.48	2.27							
e	(0.06)	(0.14)	(0.17)	(0.33)	(0.51)	(0.58)	(0.44)	(0.19)							
GNP Deflator (percent of forecast mean)															
a	0.28	0.35	0.42	0.47	0.51	0.55	0.59	0.61	0.64	0.65	0.65	0.65	0.66	0.67	0.68
b	0.31	0.47	0.58	0.71	0.83	0.92	1.02	1.10	1.19	1.28	1.37	1.44	1.50	1.57	1.63
c	0.44	0.67	0.84	1.04	1.21	1.36	1.49	1.62	1.75	1.88	1.98	2.09	2.23	2.35	2.43
d	0.53	0.93	1.37	1.87	2.33	2.74	3.15	3.48							
e	(0.09)	(0.26)	(0.53)	(0.83)	(1.12)	(1.38)	(1.66)	(1.86)							
Unemployment Rate (units of percentage points)															
a	0.27	0.45	0.57	0.64	0.71	0.77	0.80	0.82	0.82	0.85	0.90	0.92	0.93	0.96	0.97
b	0.36	0.58	0.76	0.92	1.03	1.12	1.16	1.23	1.28	1.34	1.38	1.42	1.50	1.56	1.62
c	0.36	0.60	0.80	0.95	1.08	1.17	1.24	1.31	1.35	1.41	1.47	1.50	1.55	1.59	1.64
d	0.35	0.60	0.77	0.82	0.85	0.83	0.77	0.71							
e	(-0.01)	(0.00)	(-0.03)	(-0.13)	(-0.23)	(-0.34)	(-0.47)	(-0.60)							
Bill Rate (units of percentage points)															
a	0.45	0.67	0.78	0.84	0.91	0.93	0.97	0.98	0.97	0.98	0.98	0.97	0.97	1.01	1.03
b	0.48	0.71	0.86	1.01	1.08	1.14	1.21	1.25	1.28	1.32	1.32	1.35	1.37	1.37	1.42
c	0.49	0.72	0.92	1.06	1.16	1.25	1.31	1.37	1.44	1.51	1.53	1.54	1.56	1.58	1.61
d	0.61	0.96	1.08	1.17	1.31	1.47	1.56	1.72							
e	(0.12)	(0.24)	(0.16)	(0.11)	(0.15)	(0.22)	(0.25)	(0.35)							
Money Supply (percent of forecast mean)															
a	0.83	1.09	1.29	1.47	1.62	1.76	1.84	1.92	1.98	2.03	2.11	2.13	2.17	2.19	2.23
b	0.91	1.31	1.63	1.87	2.13	2.36	2.56	2.79	2.96	3.16	3.35	3.55	3.72	3.94	4.15
c	0.91	1.33	1.69	1.98	2.34	2.68	3.06	3.45	3.79	4.14	4.51	4.88	5.28	5.63	5.97
d	1.39	2.16	2.95	3.75	4.62	5.50	6.49	7.50							
e	(0.48)	(0.83)	(1.26)	(1.77)	(2.28)	(2.82)	(3.43)	(4.05)							

*Sources of uncertainty:

a=that due to the error terms.

b=that due to the error terms and coefficient estimates.

c=that due to the error terms, coefficient estimates, and exogenous-variable forecasts.

d=that due to the error terms, coefficient estimates, exogenous-variable forecasts, and the possible misspecification of the model.

e=estimate of the degree of misspecification of the model (e=d-c).

Note: d row estimates are available only for the first 8 quarters.

How Well Do Economists Forecast Growth, Recessions, and Inflation?

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In the 1970s there has been a veritable explosion of forecasting activity and econometric modeling, yet the speedup of inflation and the onset and severity of the 1973-75 recession caught economists and policymakers generally by surprise. Indeed, the sources, impact, and longer-term consequences of these events are still not adequately understood. Progress in the evaluation of the methods and results of forecasting is essential for much needed improvements in macroeconomic analysis and policies. Much has already been learned about the accuracy and properties of the forecasts, but further efforts must be made to explain the errors and learn how they may be reduced. The purpose of this article is to summarize some of the early results of work in progress, which is part of the National Bureau of Economic Research (NBER) program of studies in forecasting behavior and performance.¹

The Record of Annual Forecasts

In the early post-World War II period, most forecasts were made near the end of the calendar year for the next year and most referred to GNP in current dollars. The period of transition from the war economy witnessed the largest errors on record in the GNP forecasts. Expectations of a business slump stubbornly persisted, resulting in predictions that GNP would decline in 1947 and again in 1948, whereas the actual changes turned out to be large rises. When a recession finally came late in 1948, it proved shorter than many had expected. The widespread failure of forecasts during these years is largely attributable to the use of estimates based on data and relationships for the 1930s and false analogies with the early post-World War I period.

The available evidence is quite fragmentary for the late 1940s and early 1950s but increasingly rich for the later years. Table 1 sums up the measures of forecasting performance for 1953-76 and subperiods in terms of comparisons between the predicted and the actual percentage changes. Percent changes are used rather than levels or absolute changes because they tend to be more stable and comparable over time, less affected by data revisions, more interesting to analysts and policy makers, and more amenable to the measurement of certain dimensions of the quality of prediction.

The predicted changes in current-dollar GNP underestimate on the average the actual changes, but by margins of less than one percentage point, as shown by the mean errors (ME) in column 2, all but one of which are negative. Taken without regard to sign, the errors in the years 1953-62 tend to exceed those in 1963-68, and the latter tend to exceed those in 1969-76. This is implied by comparisons of the mean absolute errors (MAE, column 1) for comparable sets of forecasts in the different periods covered, and it suggests some improvement over time in these forecasts. The MAE average 1.2, 1.0, and 0.8 percentage points for 1953-76, 1963-76, and 1969-76, respectively. Correlations between the predicted and the actual changes are likewise generally consistent with the inference

of a moderate increase in forecasting efficiency (col. 3). The forecasts are in all cases considerably more accurate than the trend extrapolation model which projects the average percentage change of the four previous years (lines 10-12). In fact, the MAE of the GNP forecasts average about half the MAE of the extrapolations for the longer periods, and less than that for the recent years 1969-76. While the r^2 coefficients for the forecasts vary from 0.6 to nearly 0.9, those for the extrapolations are not significantly different from zero.

Forecasts of changes in *constant-dollar (real) GNP* have MAE varying from 0.9 to 1.6 and averaging 1.2 percentage points (col. 4). The corresponding error measures for the trend extrapolation model are twice as large in 1963-76, three times as large in 1969-76. These forecasts overestimate the actual changes on the average, again by fractions of one percentage point (see the positive ME in col. 5). In earlier post-World War II years underestimates of real growth prevailed. Here too, the correlations with the actual changes are all reasonably high and positive for the forecasts proper, particularly for the most recent period, whereas they are extremely low or negative for the extrapolations (col. 6).

Forecasts of changes in the *implicit price deflator (IPD)* show MAE of 1 to 1.4 percentage points, not much better than simple last-change extrapolations (col. 7).² The forecasts underestimate strongly the average inflation rates, much more so in fact than the naive extrapolative model does (col. 8). They capture much of the variation in the year-to-year percent changes in IPD, but the forecasts of GNP in current and constant dollars are in most cases better in this respect (compare the r^2 coefficients in column 9 with their counterparts in columns 3 and 6). This is most definitely so relative to the extrapolations, which are much more efficient in predicting IPD than in predicting GNP (lines 11-12).

The comparability of the different forecasts is severely restricted because of variation in the size of the models, complexity of the methods, informational requirements, precise dates of issue (relative earliness), etc. These factors influence the accuracy, usefulness, and costs of the forecasts, but their effects cannot be fully explained and allowed for. Nevertheless, it is correct and relevant to observe that the average error and correlation measures do not show large, consistent differences among the forecast sets under study. This is in agreement with earlier findings, and also with the results obtained for quarterly forecasts which are summarized below. Thus all evidence known to us suggests that the search for a consistently superior forecaster is about as promising as the search for the philosophers' stone.

The Record of Quarterly Multiperiod Forecasts

In the 1970s forecasts from several new sources became available, and they provide abundant and detailed information referring to overlapping sequences of quarters, not simply to

¹More comprehensive reports on this study will be published in the near future in *The American Economic Review* and *The Journal of Business*.

²Projections of the last change are in this case more accurate than those of the average change, which is the reverse of the situation for GNP in both current and constant dollars.

**Table 1. SUMMARY MEASURES OF ERROR IN ANNUAL FORECASTS
OF PERCENTAGE CHANGES IN GNP, REAL GNP, AND
THE IMPLICIT PRICE DEFLATOR, 1953-76**

Line	Period	GNP			Real GNP			IPD		
		MAE (1)	ME (2)	r ² (3)	MAE (4)	ME (5)	r ² (6)	MAE (7)	ME (8)	r ² (9)
		Selected Private Forecasts ^a								
1	1953-76	1.2	-0.7	.79						
2	1963-76	0.9	-0.6	.78						
3	1969-76	0.6	-0.4	.86	1.0	0.7	.94	1.3	-0.9	.53
		Economic Report of the President ^b								
4	1963-76	0.9	-0.2	.75	1.0	0.4	.78	1.0	-0.5	.76
5	1969-76	0.8	0.2	.83	1.2	0.8	.86	1.4	-0.6	.58
		Michigan Model ^c								
6	1963-76	1.3	-0.5	.60	1.5	0.2	.60	1.0	-0.6	.68
7	1969-76	1.0	-0.1	.75	1.6	0.8	.71	1.4	-0.9	.45
		Wharton Model ^d								
8	1963-76	0.8	-0.3	.69						
9	1969-76	0.9	-0.2	.67	0.9	0.5	.94	1.4	-0.6	.60
		Extrapolations ^e								
10	1953-76	2.3	-0.1	.05						
11	1963-76	1.8	-0.6	.08	2.5	0.3	.03 ^f	1.3	-0.3	.50
12	1969-76	2.0	-0.5	.00	3.6	0.7	.32 ^f	2.0	-0.2	.17

NOTE: MAE=mean absolute error, ME=mean error (both in percentage points). An individual error is defined as difference, predicted change minus actual change.

r²=squared correlation between predicted and actual change. The actual changes used are those based on the first official estimates following the year for which the forecast was made.

^a Columns 1-3: Average of forecasts from nine sources: Livingston survey, *Fortune* magazine, Harris Trust and Savings Bank, IBM Economic Research Department, National Securities and Research Corporation, Conference Board Economic Forum, R. W. Paterson (University of Missouri), Prudential Insurance Co., UCLA Business Forecasting Project.

^b Forecasts by the Council of Economic Advisers (CEA) as stated in the *Economic Report*; the entries in columns 4-9 are based in part on verified inferences from statements in the *Report*.

^c Source: Research Seminar in Quantitative Economics (RSQE) of the University of Michigan. Based on several working models.

^d Source: *Wharton Economic Newsletter*, Econometric Forecasting Unit, Wharton School of Finance and Commerce, University of Pennsylvania. Based on several versions of Wharton models.

^e Columns 1-6: Assumes that next year's percentage change will be the same as the average percentage change in the four previous years.

Columns 7-9: Assumes that next year's percentage change will be the same as that of the previous year.

^f r is negative.

a series of successive unit periods. The quarterly multiperiod forecasts are much more complex than the annual ones. Here we cover six sets of the former, four of which use formal macro-econometric models combined with judgmental adjustments and (often several alternative) assumptions about exogenous factors. The four are BEA (Commerce), Chase, DR1, and Wharton (see Table 2 for full source titles). In addition, two other forecast sets are included: GE, which uses a less formal model, and ASA-NBER, which consists of median predictions from quarterly surveys of professional forecasters (mainly business but also government, labor, and academic economists). Thus our selection is representative both of the large models in current use and the "consensus" of a cross-section of leading practitioners.

The analysis of these forecasts covers the first half of the current decade, a period which despite its shortness was unusually varied and marked by major disturbances and drastic changes in the economy's course. Four subperiods are distinguished:

- I. 1970:3-1973:1. End of the mild 1970 recession followed by an expansion that accelerated in 1972, with relatively stable inflation.
- II. 1973:1-1973:4. Slower real growth and a sharp inflation speedup.
- III. 1973:4-1975:1. Recession, severe in its last two quarters; first a further rise, then a downturn in the rate of inflation.
- IV. 1975:1-1975:4. Sharp upturn and initial recovery, with a further decline in inflation.

Table 2 sums up the forecasters' record for 1970-75 and the four subperiods, assigning the forecasts to each period according to their target quarters. To keep it manageable, only the overall mean absolute errors are shown, but these are reasonably representative, since here again similarities greatly outweigh the differences between the forecasters' performances.

As would be expected, the average MAE strongly tend to increase as the span of forecast lengthens from 1 to 8 quarters.

Table 2. MEAN AVERAGE ERRORS OF QUARTERLY MULTIPERIOD FORECASTS OF PERCENTAGE CHANGES IN GNP, REAL GNP, AND THE IMPLICIT PRICE DEFLATOR, 1970-75

Line	Period ^a	Span of Forecast, in Quarters							
		One	Two	Three	Four	Five	Six	Seven	Eight
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Gross National Product (GNP)									
1	I	.36	.66	.65	.79	1.18	1.66	2.47	3.16
2	II	.54	1.06	1.65	2.12	2.68	2.85	3.49	4.05
3	III	.60	1.30	1.84	2.11	2.15	2.46	2.67	3.14
4	IV	.73	1.97	3.10	3.84	4.42	4.30	3.49	2.22
5	Total	.46	.98	1.42	1.73	2.19	2.59	2.96	3.15
GNP in Constant Dollars									
6	I	.38	.84	1.08	1.32	1.64	1.69	2.04	2.26
7	II	.45	.60	.80	.83	1.23	1.65	2.17	2.43
8	III	.76	2.00	3.25	4.27	4.66	5.25	5.70	5.60
9	IV	.83	2.12	3.55	4.55	5.84	7.81	9.43	10.29
10	Total	.53	1.25	1.90	2.43	3.06	3.83	4.68	5.24
Implicit Price Deflator									
11	I	.36	.66	.85	.78	.89	1.05	1.26	1.27
12	II	.50	1.06	1.65	1.82	1.73	1.52	1.54	1.85
13	III	.58	1.53	2.98	4.61	6.08	7.06	7.78	8.23
14	IV	.27	.65	1.21	2.04	3.13	4.85	7.29	9.59
15	Total	.43	.99	1.62	2.23	2.88	3.64	4.67	5.70

NOTE: The figures are averages of mean absolute errors (MAE) in percentage points. They include quarterly forecasts for spans of 1 to 8 quarters ahead from the following four sources: Chase Econometric Associates, Inc.; Data Resources, Inc.; General Electric Company; and Wharton Econometric Forecasting Associates, Inc. For spans of 1 to 5 quarters ahead, they also include quarterly forecasts from the following two sources: American Statistical Association and National Bureau of Economic Research; Bureau of Economic Analysis, U.S. Department of Commerce.

For the definition of forecast error, see note to Table 1. The actual changes are based on first estimates for the preceding year, using data prior to the 1976 benchmark revision of the national income accounts.

^a Period I: 1970:3-1973:1; II: 1973:1-1973:4; III: 1973:4-1975:1; IV: 1975:1-1975:4; Total: 1970:3-1975:4.

The dispersion of the MAE about these averages for the individual forecast sets also increases with the span, but irregularly and only in absolute, not relative terms.³

The errors of the longest GNP forecasts are nearly 7 times as large as those of the shortest ones (Table 2, line 5), which means that here the MAE increase somewhat less than in proportion to the extension of the span. This is consistent with earlier findings on the typical relationship between the length and the accuracy of quarterly multiperiod forecasts. For real GNP, however, the errors cumulate considerably faster, rising approximately tenfold between one-quarter and 8-quarter spans. And for IPD the cumulation is more rapid still, with the MAE for the longest forecasts exceeding that for the shortest more than 13 times (line 15).

The unusually large build-up of errors in predicting real growth and inflation can be traced to the forecasts for the recession phase III and, even more, the recovery phase IV (see lines 8-9 and 13-14). The recession gave rise to large errors as the declines in real GNP were repeatedly missed and, when finally recognized, underestimated.⁴ The long forecasts for the 1975 recovery were afflicted by even larger average errors of a similar cyclical nature. The inflation errors in subperiods

III and IV were dominated by very large underestimates. The errors in the nominal GNP forecasts are much smaller throughout, owing to offsets between the real growth predictions with positive mean errors and the inflation errors with negative mean errors.

Concluding Observations

1. The end of year forecasts of annual percentage changes in GNP earn good marks for overall accuracy. Moreover, they are found to have improved in recent periods compared with the earlier years after World War II, particularly relative to extrapolative benchmark models.

2. The real growth forecasts and, even more so, the inflation forecasts are poorer. The former suffer from large turning-point errors, the latter from large underestimation errors. For output, overestimates refer primarily to times of low growth, underestimates to times of high growth. Forecasts of price change have much in common with projections of the last observed rate of inflation, and so they tend to lag behind the actual rate.

³That is, the standard deviations in percentage points tend to rise but the coefficients of variation (ratios of s.d. to the averages) do not. The latter range from .05 to .11 for GNP, from .05 to .13 for real GNP, and from .10 to .16 for IPD (referring to the 1970-75 forecasts over different spans).

⁴In quarterly multiperiod forecasting, turning points are more frequent and more difficult to predict than in annual forecasting, but the errors associated with them matter much more yet: here, missing a turn often means that a whole chain of predictions for the subsequent observations is badly off.

3. The errors in predicting real growth are negatively correlated with the errors in predicting inflation, which helps to explain the greater accuracy of the nominal GNP forecasts. In recent times, confronted with the unprecedented concurrence of accelerating price rises and slowing or declining output, forecasters (optimistically, and probably also from a lingering faith in a simple Phillips tradeoff) kept underestimating inflation and overestimating growth. But earlier, in times of relatively stable prices, offsetting errors often resulted from the opposite combination of forecasts of too much inflation and too little growth.

4. The relatively favorable record of annual GNP predictions does not imply that forecasters can perform well the more difficult task of predicting quarterly changes in GNP

within the year ahead or even beyond it. Forecasts for the year as a whole can be satisfactory when based on a good record for the first two quarters; they tend to be more accurate than forecasts with longer spans. An examination of the recent multiperiod predictions shows that the errors for real GNP and IPD cumulated rapidly beyond the spans of 2 to 4 quarters. Previous studies have shown the cumulation to be as a rule less than proportional to the increase in the span, but in this period the build-up of errors was much greater than usual. No doubt, in less turbulent times the longer forecasts can be considerably more accurate, but this fair-weather argument is not very persuasive or helpful. At the present time, the predictive value of detailed forecasts reaching out further than a few quarters ahead must be rather heavily discounted.

Rising Pessimism Among Consumers

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Storm on the Horizon

Recent changes in consumer attitudes and expectations point toward prospective trends in the economy that are unfavorable. Pessimistic economic expectations are now more widespread among consumers than optimistic expectations, leaving continued economic expansion in 1978 more reliant on stimulus from areas other than consumer spending. Mounting survey evidence of a sustained downturn in consumer sentiment include these findings:

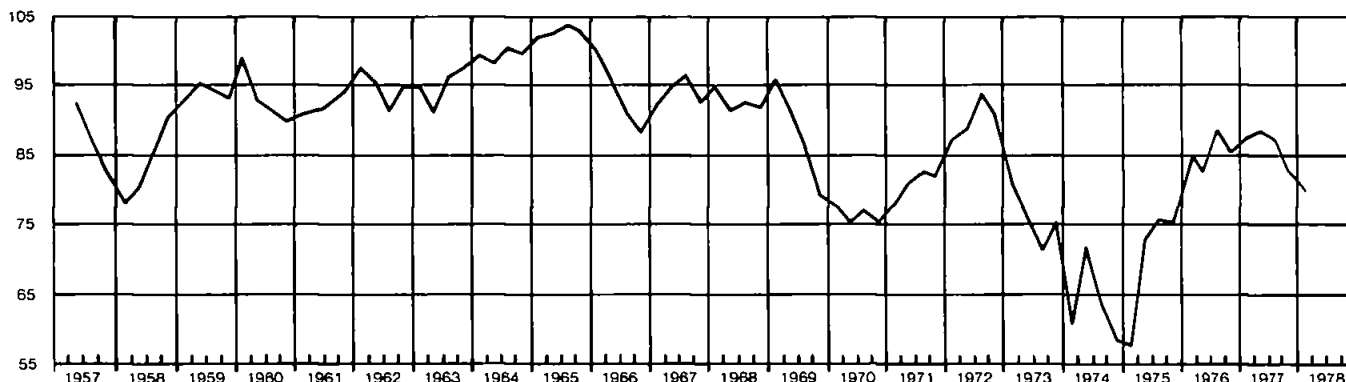
- In March 1978, the Index of Consumer Sentiment was 78.8, fully 10 Index points below the peak value recorded in May 1977—lower than at any time in the last 2 years (see the chart below).
- During the past year, consumers have increasingly reported hearing unfavorable news of changes in business conditions. The March 1978 survey recorded the fewest

number of favorable news items (13 percent) and the greatest frequency of unfavorable items (53 percent) since the recession years of 1974-75.

- For the first time since the 1974-75 recession period, proportionately more respondents now expect bad times in the economy as a whole during the next 12 months than good times (46 percent versus 37 percent).
- Throughout 1977 and early 1978, expected changes in interest rates, prices, and unemployment became increasingly pessimistic.
- The March survey recorded almost twice as many respondents who expected bad times rather than good times in the economy generally during the next 5 years (49 percent versus 26 percent). This represents a substantial increase in pessimism from February 1977, when almost equal proportions expected good and bad times (34 percent versus 31 percent).

INDEX OF CONSUMER SENTIMENT

February 1966 = 100



When asked why they expected business conditions to be better or worse, respondents' spontaneous references to the expected impact of government economic policies have shifted dramatically over the past year. In February 1978, only one-in-twenty respondents spontaneously mentioned favorable economic impacts associated with government policy or the Carter administration, down sharply from the one-in-four who made such references to the incoming Carter administration in February 1977. A significant but smaller change was also noted in spontaneous unfavorable references to government economic policy, which increased from 3 percent in February 1977 to 8 percent in February 1978.

Confidence in the government's economic policy to combat inflation and unemployment now stands at its lowest level since President Carter entered office. Just 10 percent rated the government as doing a good job in its efforts to combat these two problems in March 1978 (down from 22 percent in February 1977), and 28 percent rated the government as doing a poor job (up from 16 percent in February 1977). This sinking confidence in government is of particular significance, since people who judged economic policy as poor were consistently more pessimistic, especially about longer range economic trends, than people who spoke of good economic policies.

Advance Buying

In the face of rising pessimism concerning the business outlook, buying attitudes have remained favorable in the March 1978 survey, and at near record levels. Buy-in-advance reactions to expected price increases have promoted favorable buying attitudes and have acted to buoy consumer spending despite rising pessimism.

- Attitudes toward buying conditions for large household durables, automobiles and houses all improved in the March survey over early 1978 readings.
- Attitudes toward buying conditions for automobiles registered a new peak cyclical value in the March 1978 survey, with 55 percent reporting it was a good time to buy cars.
- The recent improvement in buying attitudes can be attributed to increasing buy-in-advance sentiment. In March 1978, 34 percent of all respondents felt it was a good time to buy a car because prices were only going higher in the future, compared with 25 percent who voiced a similar view in February 1977.
- Buy-in-advance psychology has been facilitated by the maintenance of favorable trends in personal financial progress. In March 1978, 35 percent of all respondents reported that they were worse off financially. This overall distribution of responses remained unchanged from the February 1977 reading.

Although buy-in-advance psychology, facilitated by relatively favorable assessments of past financial progress, has provided a potent source of recent strength in consumer demand, it is inevitably a source of future weakness. Buy-in-advance reactions cannot continue indefinitely unless the expectation of inflation accelerates, and even then it must ultimately come to an end. Moreover, as buy-in-advance psychology begins to recede, it can produce sharp declines in sales, since past purchases were made in advance of current needs.

In addition, expected changes in personal finances are now less favorable and thus less accommodating to buy-in-advance price rationales. In March 1978, expected changes in personal finances during the next year were significantly below year-ago values, with 25 percent of all respondents reporting that they expected to be better off financially, down from 33 percent who held this same view in February 1977. This deterioration in expectations could well serve as the trigger for a general shift away from buying in advance of rising prices to saving in response to rising uncertainty.

Early Patterns of Decline

The chart below shows the patterns of decline traced by the Index of Consumer Sentiment in four separate periods since 1965. The recent decline is similar but smaller than the one recorded prior to the 1974-75 recession: as shown in the table, the ICS declined by 12 percent during the first 9 months following the May 1977 peak, more than half the decline recorded in the 9 months following the August 1972 peak values. The most recent decline closely resembles the pattern in the 9 months following the 1965 peak, when the Index declined by 11 percent. Because of subsequent developments in the economy and in economic policy, a full-scale recession was averted at that time, but consumer sales declined and the economy as a whole experienced a protracted growth recession.

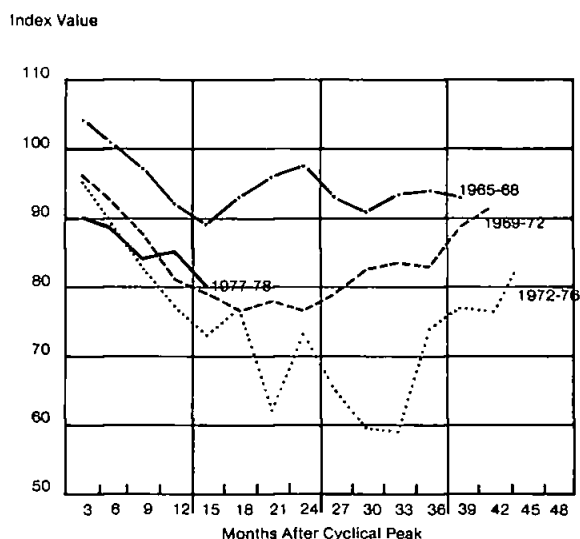
These data also highlight the recent sharp declines in business expectations compared with the more moderate declines in personal financial attitudes and buying conditions. During the past 9 months business expectations, both short- and long-term, declined by approximately 20 percent from their May 1977 values. In comparison, the recorded declines in personal financial attitudes and market conditions for durables registered declines closer to 7 percent. It should be noted, however, that this divergence in the rate of decline is similar to that observed in the early stages of the last recession period.

Divergence in Expectations and Measures of Current Conditions

The recent divergent movements among attitudes and expectations are highlighted in a chart in the data appendix. The five component questions of the Index of Consumer Sentiment were subdivided into evaluations of current conditions (personal financial situation compared to a year ago and buying attitudes toward durable goods), and expectations of future conditions (personal financial situation in a year, 12-month and 5-year business outlook).

During the 1960s these component groups closely tracked each other in both direction and extent of change. Beginning in the 1970s, however, a clear divergence in their time profiles occurred. Prior to reaching its all-time peak value in 1965, the

INDEX OF CONSUMER SENTIMENT TRENDS DURING FOUR PERIODS



Note: Starting points were 1965:4, 1969:1, 1972:3, 1977:2.

CHANGE IN INDEX OF CONSUMER SENTIMENT AND COMPONENTS DURING THREE PERIODS

Index Components	Percent Decline Over 9 Months		
	11/65- 8/66	8/72- 5/73	5/77- 3/78
Current financial situation compared with that a year ago	11	11	7
Expected financial situation in a year compared with current	10	12	7
Evaluation of current buying conditions for household durables	6	14	6
Expected business conditions during next 12 months	13	40	23
Expected business conditions during next 5 years	17	35	16
Index (weighted average of components)	11	19	12

expectation component group recorded a higher level of optimism than the component group reflecting evaluations of current buying conditions. Since then, expectations for improvement have consistently deteriorated relative to evaluations of current economic conditions.

Since 1965, interestingly enough, changes in favorable buying attitudes have also shown a greater correspondence to buy-in-advance factors than to the opinion that prices were low or good buys available. The dominance of buy-in-advance price motivations closely parallels the initial divergence of current buying attitudes from expectations for improvement. Unlike any previous period, evaluations of current economic conditions—especially buying attitudes—continued to improve in

1977 and 1978 even after expectations began to deteriorate. Thus buy-in-advance motives have acted to forestall sharp declines in consumer spending to a greater extent than in the past.

Summary Outlook

The March 1978 survey indicates rising pessimism among consumers, concentrated in expectations about business conditions. Continued concern over inflation and unemployment, together with declining confidence in government economic policy, has led consumers during the past year to adopt a more pessimistic view of future business prospects. This shift toward pessimistic business expectations was widespread among population subgroups. Bad economic news was heard and recalled four times as frequently as good news in March 1978, and nearly a majority expect periods of widespread unemployment and recession during the next 5 years. Although some of the recent sharp decline may reflect the temporary impact of the coal strike, the most recent data continue and reinforce the declining pattern evident for nearly a year.

At the same time, favorable current buying attitudes have been fostered through buy-in-advance reactions to expected price increases. Although favorable buying attitudes have acted to bolster consumer confidence during the past year, this represents a weak and volatile foundation. Favorable buying attitudes may decline rapidly if inflationary pressures continue to build and consumers shift their concern from buying in advance of rising prices to saving in response to rising uncertainty.

While the overall decline in consumer sentiment is similar to that observed in the past prior to general economic recessions, the sustained divergence among attitudes and expectations may significantly affect the traditional lead-time. Heightened volatility in attitudes, which has led to sharp temporary reversals in consumer attitudes during the last period of decline and recovery, can be expected to occur. Thus the emerging pessimistic trend will quite likely be subject to a pattern of short temporary reversals. Nonetheless, the emerging downward trend has taken root, and recent findings suggest that the economy is highly vulnerable to a recession.

A New Economic Era

George Katona
Burkhard Strumpel

By 1970 or thereabouts the Western industrial nations entered a new economic era — one that is closely hinged to changing consumer attitudes. The quarter century after World War II

Note: This article is drawn from the authors' recently published book of the same title (*A New Economic Era*, Elsevier, New York, 1978). Katona retired a few years ago from his positions as Research Coordinator of the Institute for Social Research and Professor of Economics and of Psychology at The University of Michigan. He remains resident economist at ISR. Strumpel, formerly Program Director of the Survey Research Center, last year accepted a position as Professor of Economics at the Free University of Berlin.

was a period of rapid growth, unprecedented in economic history. People's expectations, aspirations, and desires for more consumer goods, better jobs, and greater income security were largely fulfilled. In the course of the 1970s, however, the economy became a cause for concern rather than a source of satisfaction. More rapid inflation, greater unemployment, slower growth — all of these became the trademarks of the new era.

Is it justified to attribute lasting significance to these changes? Or are we dealing here with nothing more than cyclical fluctuations and the one-time impact of the oil crisis, so that we should expect the problems of 1973-1977 to disappear in a few years?

Why the 1970s Are Different

The 1970s have brought substantial changes in public attitudes, beliefs, and values from earlier postwar years — and those changes have a vital impact upon the performance of the American economy. Attitude changes in recent years have been reflected in many different ways:

- Not only has inflation become rapid in the 1970s, but confidence and trust in the ability of government, big business, and experts in general to slow down inflation have been severely weakened.

- Not only has unemployment grown greatly, but the employment situation has worsened because of changes in the work ethic, as confidence in the success of hard work has declined and as a great many people have been unable to make their jobs fit their felt needs.

- Not only have the seventies brought adverse changes in the availability and price of energy and industrial raw materials, but concern has grown about the impact of industrialization upon the quality of life and the environment.

- Earlier we tried to avoid inflation; today we ask only whether inflation will be rapid or slow.

- Earlier we hoped for full employment; today we ask only whether unemployment will be large or small.

- Earlier we took growth and progress for granted; today we struggle to keep our standard of living.

Understanding the 1970s

The net result of all these changes is that the certainty and assurance which prevailed in the early postwar years has given way in the 1970s to public disorientation and confusion. Earlier economic developments were easily comprehended. During World War II full employment was understood to result from the production of war materials. In the 1950s and 1960s, the production of the many goods and services needed and wanted by consumers was thought to make the wheels turn and put money into people's pockets.

Things changed dramatically, however, in the 1970s. Surveys in the mid-seventies revealed that many people, even among those with extensive education and good positions in business, threw their hands up in frustration when asked about the origin of the most important developments of the day. This was true first of all of inflation. Why do prices go up? Why are they going up much more now than at earlier times? What should be done to slow price increases down? A common answer to all these questions was: "Nobody knows."

The second great problem was the instability of the economy. Domestic automobile production fell in the course of little more than a year from 10.5 million cars to less than 6 million. Very many people, not only the automobile workers in Detroit, were aware of the great decline in car production (without knowing the figures, of course) and were unable to explain how it came about. "People are not buying cars" or "Gas prices have gone up too much," survey respondents answered in 1974-1975, but

they themselves appeared to feel that their explanation was incomplete or insufficient to account for the extent of layoffs and unemployment. Then after another year had passed and gas prices had risen still further, automobile production rose again to a rate of almost 10 million — and still failed to satisfy demand! Why economic conditions and prospects appeared hopeless one year, while a year or two later they seemed to be rosy, could not be understood, and the news media offered no answers.

In the 1970s, the public also received no help from scholars in trying to understand the most important economic developments. Economists were most successful in the 1960s, when it was widely believed that the application of their teachings had served to make the business cycle obsolete. But in 1973 the leading economists failed to predict the great recession, and in 1974 they gave contradictory answers regarding its origin and prospects. Thus consumers as well as businessmen remained at sea. The understanding and assurance that in earlier years had produced stable behavior were missing. Lack of understanding of what is going on makes people feel uncertain and helpless and thus leads to volatile attitudes.

Future Economic Trends

It is now clear from survey data that because of public disorientation, we have entered a period of great volatility in consumer sentiments — and hence, in consumer spending patterns. When the same question about personal financial or general economic expectations is asked twice from the same sample, the second time several months after the first time, it has been generally assumed, and was confirmed in the 1950s and 1960s, that there would be a fairly high correlation between the two answers by the same people. In 1975-1977, however, there was practically no correlation: knowing the first answer of an individual gave no clue whatsoever to his or her answer in a subsequent interview. Within six months a substantial proportion shifted toward greater optimism, and another substantial proportion toward greater pessimism. New experimental measures of uncertainty, constructed during the last year, suggest that uncertainty has been more pronounced during the last few years than during the 1950s and 1960s.

Logically, there are three possible courses for the economy to take in coming years. The first would be further growth and the spread of affluence, that is, the restoration of earlier trends rather than the continuation of a new era. A second possibility would be the decline of affluence. A third and frequently mentioned possibility would be stagnation.

But based on our studies, we do not think that any of the three possibilities describes what the next decade will bring. Instead, we expect a series of rapid fluctuations, periods of recovery alternating with recessions in fairly quick succession. Ups and downs in the economy brought about by optimism or even dejection appear more probable than either stagnation, overall decline, or further growth.

Employee Owned Firms

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Socialist and capitalist systems presumably differ from one another in the way their economic enterprises are owned and controlled. Socialism implies ownership by the state or by society as a whole; capitalism implies ownership by "private" persons. Capitalist ideology, however, does not preclude ownership of an enterprise by its employees. In fact, examples of ownership of firms by employees can be found throughout the history of the United States, although firms that are *wholly* owned by employees (including nonmanagerial workers) are very rare. One survey reported that 389 firms in which a large proportion of the stock was directly owned by employees were established in the United States between 1791 and 1940.¹ The number of firms with at least *some* degree of employee ownership is probably much larger, and there is evidence that this number has grown in recent years.²

Employee ownership can take two forms: direct, in which employees own shares in the company as would ordinary shareholders in a joint-stock company; or "beneficial," in which employees own shares through a trust, as illustrated by the Employee Stock Ownership Trust (ESOT). The Employee Retirement and Income Security Act of 1975 (ERISA) stipulates that the holdings of a firm's ESOT must be invested "primarily" in the stock of that firm — unlike the holdings of the usual profit sharing trust, which may be diversified, or of a pension trust, which must be diversified. Contributions to the ESOT are governed by an Employee Stock Ownership Plan (ESOP), which may leave the method of contribution entirely to the discretion of a single party or parties or which may specify one of several methods of contribution. The central requirement, however, is that the ESOT invest "primarily" in employer securities, and that disbursements from the ESOT be made in employer securities. Dividends that may be declared are not usually distributed immediately to employees but rather are held in trust. Nonetheless, the financial well-being of the "beneficiaries" of stock in the ESOT is tied to the success of the company.

We report in this article data concerning firms in which employees own shares through an ESOT as well as firms that are directly owned by employees. The data, collected in 98 firms, concern the size and sales volume of the firms, the percent of employees who participate in the ownership plan, the percent of equity owned by non-managerial as well as by managerial persons, and aspects of control of the firm by employees. We also measured the attitudes of managers toward the ownership plan and their judgment about the effect of the plan on productivity and profit. In thirty of the companies we were able to obtain actual data about profit, and we therefore analyzed for this subset of companies the relationship between profit and some of the above aspects of ownership.

Note: This discussion is taken in part from an article which will appear in the *Monthly Labor Review*.

¹Jones, D., *The Economics and Industrial Relations of Producer Cooperatives in the United States, 1790-1940*, undated.

²*Employee Ownership*, Survey Research Center, Institute for Social Research, The University of Michigan, September 23, 1977. Bonaccorso, M.J., Cranmer, S.M., Greenhut, D.G., Hoffman, D., Isbrandtsen, N., *Survey of Employee Stock Ownership Plans* (unpublished master's thesis, University of California), Los Angeles, Graduate School of Management, December 1977.

Ownership Characteristics

We were able to conduct telephone interviews with officials of 132 companies thought to have some degree of employee ownership; 98 actually were found to satisfy this criterion. Sixty-eight of these firms have ESOPs and 30 have direct ownership. Their median size is approximately 350 employees, but the firms differ a good deal from one another, with 17 percent having fewer than 100 employees and 25 percent having 1,000 or more employees. Almost half of the firms had sales during the year prior to the survey of at least \$25,000,000.

Table 1 indicates that in about three quarters of the firms employees as a whole own at least half of the equity and that ownership by employees of the *entire* equity is more likely to occur in the ESOP than in the directly owned firms. The proportion of equity owned by nonmanagerial employees (generally defined as nonsalaried) is of course considerably less, with only a quarter holding at least half the equity. But nonmanagerial workers are more likely to hold a substantial proportion of their firm's equity if they participated in a direct ownership plan.

Table 2 provides information about the amount of equity owned by nonmanagerial workers in firms of different size. Substantial ownership by such workers occurs predominantly in firms of moderate size rather than in the very small or the very large ones. For example, nonmanagerial workers own at least half of the equity in 42 percent of the firms having between 100 and 249 employees. By way of contrast, workers own this much equity in only 12 percent of the firms with under 100 employees and in 16 percent of the firms with 1,000 or more employees.

Ownership and Control

Ownership is essentially a set of rights which, in legal terminology, are "right to *corpus*" and "right to control." Right to *corpus* permits the owner to sell the property that he or she

Table 1.
DISTRIBUTION OF PERCENT TOTAL EQUITY OWNED
BY ALL EMPLOYEES AND
NONMANAGERIAL EMPLOYEES*

Percent Total Equity Owned by Employees	Type of Ownership				All Firms	
	ESOP		Direct			
Less than 10	4%	50%	4%	16%	4%	40%
10-49.9	18	43	18	20	18	36
50-99.9	28	7	59	64	38	24
100	50	0	19	0	40	0
	100%	100%	100%	100%	100%	100%
	(60)**	(58)**	(27)	(25)	(87)	(83)

*Eleven firms did not provide sufficient data to determine the percent of equity owned internally; 15 did not provide data to determine the percent of equity owned by nonmanagerial workers. They are omitted from the table.

**Number of cases.

Table 2.
DISTRIBUTION OF PERCENT TOTAL EQUITY
OWNED BY NONMANAGERIAL WORKERS
IN FIRMS OF DIFFERENT SIZE

Percent Total Equity Owned by Workers	Size (Number of Employees)				All Firms
	4-99	100-249	250-299	1000+	
Less than 3	31%	24%	22%	31%	27%
3-9.9	13	15	19	16	13
10-49.9	44	29	37	37	36
50 or more	12	42	22	16	24
	100%	100%	100%	100%	100%
	(17)*	(23)	(33)	(25)	(98)

*Number of cases.

owns and is usually associated with a claim to all the profits generated by the property. Owners in an ESOT share in the capital gains and losses of their stock and are entitled to dispose of their stock once it has been distributed to them. These rights, however, unlike the rights in directly owned firms, do not generally include the right of employee owners to vote their stock. We obtained data concerning voting rights and other possible means through which employees might exercise some control in their firm. In general there are substantial differences between ESOP and directly owned firms in these measures of employee influence over company decisions. For example, 36 percent of the respondents in companies with ESOPs report that worker representatives sit on the board of directors, while 77 percent of the companies with direct ownership report the presence of workers on the board. Similarly, 51 percent of the respondents in companies with ESOPs compared to 77 percent in companies with direct ownership indicate that employees influence "important" decisions in the company. In some of the companies, according to our respondents, this influence extends to such decisions as whether or not to make major capital acquisitions.

Employee Ownership and Profitability

Thirty of the companies provided data about profit, and we rely on this subset of companies for an analysis of profitability. We employ the ratio of pre-tax net profits to sales as a basis for gauging profitability. Furthermore, the ratio for each firm is divided by the ratio in 1976 for the industry as a whole to which the firm belongs. This final ratio is the primary measure of pre-tax profitability of a firm. We made one further adjustment, however, for five firms in our subset: because these firms are directly and wholly owned by employees, the firms follow the practice of distributing a part of their "profit" to employees in the form of wages. This allocation of funds has the effect of depressing the conventional statement of profit, although it has the corresponding advantage of reducing the base upon which tax on profits is computed. The firms justify this adjustment as a cost to the firms of the additional effort and productivity that presumably characterize them. Nonetheless, these monies should be considered part of the profit of the firm for purposes of comparison with the other firms in our set. We therefore took the wage differential between the owner-workers of the firms in question and non-owner-workers (who perform essentially the same jobs as the owners and who receive the union wage rate) as a basis for calculating the amount of money that was diverted from profits to wages. This differential was added to the formally stated profit figure for each of the five firms in question and this final value is taken as the basis for computing the profitability of these firms. While this adjustment

seems appropriate as a way of maintaining comparability among firms that employ different accounting procedures, we have also retained, for purpose of analysis, the unadjusted statement of profit.

The average adjusted profit ratio for the firms in our subset is 1.7; the unadjusted ratio is 1.5. In either case, these values, which are greater than 1.0, indicate that the profitability of the firms in our subset is greater than that of comparably sized firms in their respective industries — although we are not able to claim statistical significance for these figures since the variance in profitability among firms is relatively large and the number of cases is small. It is also possible that our "sample" of firms may be select with respect to profitability. We take these figures as suggestive, nonetheless, that employee ownership, in one form or another, may be associated with the profitability of a firm.

A regression analysis, in which each of the two indices of profitability (adjusted and unadjusted) is predicted by several aspects of employee ownership, helps to evaluate this inference. The predictors include:

1. the form of employee ownership, whether direct or through an ESOT,
2. the percent of employees who participate in the plan,
3. the percent of company equity owned by employees (by managers and other workers),
4. the percent of company equity owned by the non-managerial workers themselves,
5. whether employees have representatives on the board of directors, and
6. whether employee stockholders have voting rights.

As shown in Table 3, these predictors jointly explain a substantial amount of the variance in "adjusted" profitability, but only one of the predictors, the amount of equity owned by non-managerial workers, proves statistically significant ($p < .02$); the more equity the workers own, the more profitable the firm, other things being equal ($\beta = 1.02$).³

³"Beta" refers to a standard regression coefficient and is a measure of the strength and direction of a relationship net of effects of other predictors included in the regression.

Table 3.
REGRESSION COEFFICIENTS FOR THE PREDICTORS
OF "ADJUSTED" AND "UNADJUSTED"
PROFITABILITY*

Predictor	Adjusted Profitability	Unadjusted Profitability
ESOT (=0) vs. direct ownership (=1)	-.22	-.34
Percent employees participating in plan	-.30	-.31
Percent equity owned internally	-.31	-.19
Percent equity owned by non- managerial workers	1.02**	.78
Worker representativeness on board of directors (no=0; yes=1)	-.18	-.18
Voting by employee stockholders (no=0; yes=1)	-.05	-.24
Multiple R for regression	.72	.47

*Data necessary to calculate the adjusted profitability ratio were unavailable in five firms, and five firms did not provide information for all the predictors in the regression. The number of cases in the adjusted and unadjusted regressions were thus 20 and 25, respectively.

**Statistically significant ($p < .02$)

Prediction of the unadjusted profitability index is not as good as the prediction of the adjusted index, the multiple correlation being only .47, and none of the predictors meet the usual criterion of significance. The pattern of results, however, is similar to that for the analysis of the adjusted profitability index, and the one predictor that approaches a marginal level of statistical significance in the analysis is the percent of equity owned by the workers ($\beta = .78, p = .11$).

The negative signs associated with several of the variables in Table 3 do not imply (or they would not imply even if they were statistically significant) that these characteristics are associated with low profitability; they imply (or would imply) such a negative association only under the conditions of the regression analysis where, for example, the amount of equity owned by the workers is controlled statistically. In fact, because firms where nonmanagerial workers hold a high percent of the equity are likely also to be directly owned, direct ownership, like the amount of worker ownership itself, is positively associated with profitability. Simple correlations indicate that the presence of employees on the firm's board of directors and the ability of employees to vote their shares in the firm are also positively associated with profitability, though not significantly so.

Managers' Estimates of the Effect of Employee Ownership

In a previous study, we found substantial sentiment on the part of managers as well as of workers in favor of the employee ownership plan in a firm that had recently adopted such a plan.⁴ According to members of that firm, employee ownership contributed substantially to the satisfaction of all employees as well as to the motivation of workers and ultimately to the productivity and profitability of the company. Typical worker comments about changes in the work environment were recorded as part of that study:

You have everyone more united . . . and you have a better outlook on coming to work. It seems as if you're working for yourself. You just don't come in and put in your eight hours. It's kind of a psychological thing. You work like any other job but it's a psychological thing where you are working for yourself like you're in a business for yourself.

The guys are more conscientious about their work. They feel they got to put out a much better product now because that's what's going to make more business for us. They do a little better work now than they did before.

Everybody is not so willing to throw a part away anymore which was one of the first signs they cared about the company. Scrap is held to a minimum. A ten minute break is now a 15 minute break where it used to be a half hour or 45 minute break. They're a little more conscious of a lot of small things.

Records of the firm also indicated that grievances and waste (in the form of expendable tools) declined and that productivity and profitability increased during a period immediately following the introduction of the plan (although profitability was higher during one period a number of years earlier).

In the present analysis, a management representative in each firm was asked two questions about the effect of employee ownership on productivity and profit. "Do you think that employee ownership affects profits? Does it increase profits,

decrease them, or have no effect?" A similar question was asked concerning productivity. The average response to these questions, 2.6 on a three-point scale, indicates substantial support for employee ownership in the judgment of these managers. Furthermore, the analyses presented in the previous section, which suggest that the employee owned firms are above average in profitability for their respective industries, lend some credence to the claim of these managers. But the managers who are more likely to credit employee ownership for high levels of profit are not necessarily in the more profitable firms of our subset.

Table 4 shows the results of a regression analysis designed to determine which aspects of ownership are associated with the judgment by managers that employee ownership has a positive effect on profit and productivity. Managers in firms in which workers own a high proportion of the equity are no more likely to ascribe positive effects to employee ownership than are managers in firms in which workers own a small proportion of the equity — even though this aspect of employee ownership appears to be the more important correlate of profitability in our analysis. On the other hand, employee ownership is more likely to be reported to have positive effects on profit where such ownership is direct, rather than through an ESOT ($\beta = .46, p = .06$) and where workers do not have representatives on the board ($\beta = -.22, p = .10$).

These results do not explain profit and productivity so much as they explain the attitude of managers concerning the possible impact of employee ownership on profit and productivity, and there is some indication that the existence of employee representatives on the board may sometimes be associated with negative attitudes on the part of managers. Other things being equal, managers appear to draw a less positive picture in firms that have worker representatives on the board than in firms that do not have such representatives. For example, each managerial respondent was asked whether employee ownership affected the attitudes of workers toward their job. The average response was .84 on a scale from 0 to 1, where "1" means that work attitudes are better and "0" that they are worse as a result of the ownership plan. But, according to another regression analysis, this judgment by managers may be less positive where workers have representatives on the board of directors than where they do not. A beta of -.39, which is associated with a provision in the plan for such representation, is the only one in the regression that proves statistically significant ($p < .01$).

Table 4.
REGRESSION COEFFICIENTS FOR THE PREDICTORS
OF MANAGERS' ESTIMATE OF THE EFFECT OF
EMPLOYEE OWNERSHIP ON PRODUCTIVITY
AND PROFIT*

Predictor	Coefficient
ESOT (=0) vs. direct ownership (=1)	.46**
Percent employees participating in plan	.12
Percent equity owned by employees	-.12
Percent equity owned by nonmanagerial workers	-.06
Worker representativeness on board of directors (no=0; yes=1)	-.22**
Voting by employee stockholders (no=0; yes=1)	-.07
Multiple R for regression	.35

*71 cases

**Statistically significant ($p = .06, .10$ respectively)

⁴An Employee Owned Firm. Survey Research Center, Institute for Social Research, The University of Michigan, January 17, 1977.

A regression analysis of managers' general feeling of satisfaction with the plan also shows a negative beta score associated with employee representation on the board, although the beta in this case is not significant statistically. Two variables, however, do prove significant. Managers are more satisfied with the plan where ownership is direct rather than through an ESOT ($\beta = .69, p < .01$) and where the percent of employees who participate in the plan is relatively large ($\beta = .28, p < .05$). It seems reasonable that managers should think well of the plan where participation is widespread. On the other hand, we have seen that widespread ownership *per se* is not associated with profitability; such ownership may very well mean that many employees own only a very small fraction of the equity — and it is the amount of equity owned by workers that appears to be the most important correlate of profitability.

Firms in which workers own a relatively large proportion of the equity are likely to have representatives of the employees on the board, and the employee owners in these firms are also likely to have voting rights. It is not surprising therefore that managers judge the influence of employees to be relatively high in firms where the percent of equity owned by workers is relatively great, where employees have representatives on the board, and where employee-owners have voting rights. (Question asked of managers: "Do employees have any direct input into any important decisions besides through a union?") But employee influence as perceived by managers, like the participation of employees on the board itself, does not elicit a favorable reaction from managers.

Conclusions

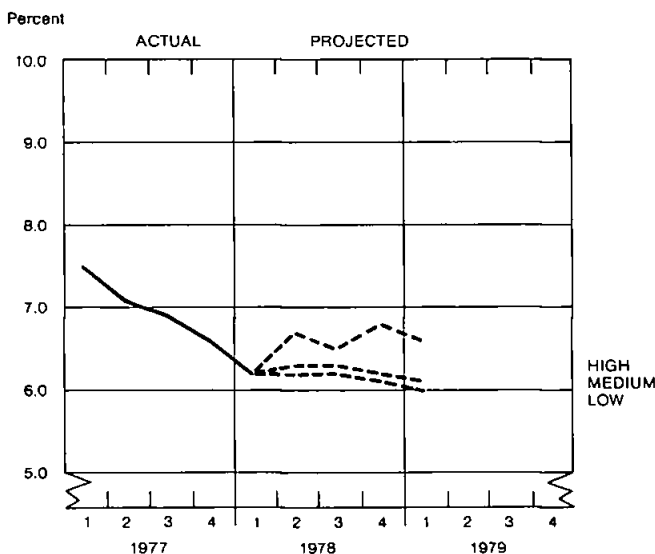
Some degree of employee ownership of firms is not uncommon in this country, although examples in which non-managerial employees own a substantial part of the equity of the company are rare. Nonetheless, data about such companies offer preliminary evidence concerning the possible impact of employee ownership on the economic performance of firms and on the attitudes of employees. We are therefore led on the basis of these data to the following tentative conclusions:

First, the industrial relations climate in employee owned firms appears to be good, in the judgment of managerial respondents. Second, managerial respondents in these firms see employee ownership as having a positive effect on productivity and profit in the firm. Third, the employee owned firms that we have studied do appear to be profitable — perhaps more profitable than comparable, conventionally owned firms. Fourth, the single most important correlate of profitability among the aspects of ownership that we have studied is the percent of the company's equity owned by the workers themselves. Fifth, while the influence that workers have in the firm, as judged by managers, is a function of the amount of equity that the workers own, managers' evaluation of the ownership plan is not affected in a positive way by either the amount of equity held by the workers or the amount of influence exercised by the workers. Managers appear to be more favorably disposed toward the plan where participation in ownership is widespread among employees, even though widespread participation may involve only a small fraction of the company's equity.

We offer the above conclusions as tentative. The firms for which we have measures of profit may be select, and our analyses are based on correlations that illustrate association among variables; they do not prove causation. The results of these analyses, however, are sufficiently encouraging to justify a detailed longitudinal (historical) study of a number of firms over a period of years. Such a study should include measures of the attitudes and motivations of all employees within the firms as well as measures of the performance of the firms. If employee ownership does have an effect on the economic performance of a firm, as the data of this study do tentatively suggest, the explanation is likely to lie at least partly in the effect of ownership on the employees themselves. We would do well, therefore, to understand more about the implications of ownership for the behavior of employees on the job as well as for the quality of their working life with the enterprise.⁵

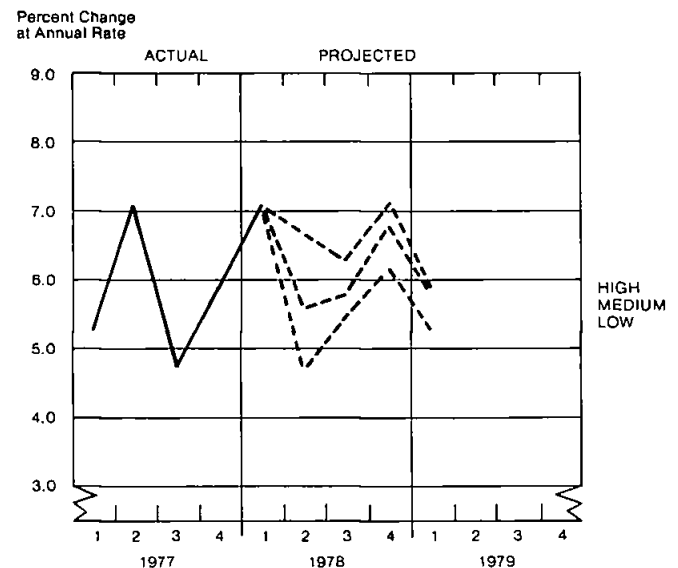
⁵For a study of the reactions of managers and workers in Yugoslav, Israeli kibbutz, American, Austrian and Italian factories that differ in their system of ownership see Tannenbaum, A.S., Kavcic, B., Rosner, M., Vianello, M., and Wieser, G., *Hierarchy in Organizations*, San Francisco, 1974, Jossey-Bass, Inc.

UNEMPLOYMENT RATE



Sources: Actual data, U.S. Department of Commerce; projected data, ASA-NBER Panel of Forecasters.

GNP IMPLICIT PRICE DEFLATOR



Sources: Actual data, U.S. Department of Commerce; projected data, ASA-NBER Panel of Forecasters.

New Evidence on Earnings Differences Between the Races and Sexes

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The average earnings of white men are considerably higher than those of black men and women of both races. Attempts to account for these differences with productivity-related factors such as educational attainment and age have not been very successful. Researchers consistently find that most race and sex-biased pay differences appear to be unrelated to these skill measures. But some economists have been reluctant to attribute large, unexplained differentials to discrimination. Instead, they developed a more sophisticated skills explanation, especially for sex differences in earnings.

Patterns of On-the-Job Training

At the heart of this explanation is the idea that women have fewer job skills than men because women rather than men assume the bulk of home and child responsibilities. One consequence of this is that women develop quite different patterns of investment in on-the-job training. Supposedly men remain in the labor force continuously once they begin full-time work, leaving only for military service, additional training, or health reasons. Women not only spend less time overall in the labor market than men, but also are less likely to work continuously. They intersperse periods of paid market work with periods of labor force withdrawal for family responsibilities, particularly child rearing. These labor force withdrawals influence wages in three ways: women accumulate less total work experience, job tenure, and seniority than men; their human capital may actually depreciate during periods of labor force withdrawal; and women who plan to leave the labor force for family duties may defer on-the-job training until they re-enter the labor market. Home responsibilities may also affect the behavior of working women since they must balance the demands of work and family. These demands may force women to accept lower paying jobs that have compatible work schedules or are closer to home, or to have high absenteeism rates in order to care for their children when they are ill. All these suppositions could not be tested very well with existing data sets.

Differences Among Age Cohorts

There is another explanation for the earnings gap between white and black men: analyses of cross-sectional data supposedly tend to overstate life-cycle earning differences between blacks and whites because of so-called "vintage" effects. The lower relative earnings of older black workers may be due to large differences in the quality of the education received by blacks and whites or to the severe labor market discrimination which older blacks faced when they first entered the labor market. Evidence shows that differences in school quality have narrowed recently and that labor market discrimination against young black workers may have diminished. If so, discriminatory differences in the lifetime earnings faced by young blacks will tend to be overstated by cross-sectional results.

Note: The research reported in this paper was supported by the U.S. Departments of Labor and Health, Education, and Welfare. A more complete discussion will appear in *Five Thousand American Families—Patterns of Economic Progress*, Volume VI, forthcoming.

Evidence from a Longitudinal Study

Recent data from the Panel Study of Income Dynamics (a national representative sample of almost 6000 families followed since 1968) allow a much more precise look at the causes of pay differences, especially those between men and women. In 1976, a questionnaire was administered to household "heads"* and some 3,000 wives. The analysis reported here is focused on the 5,225 household heads and wives who were in the labor force in 1975.

The questionnaire was designed to address four hypotheses regarding pay differentials by race and sex. The first is that white men are paid more than black men and women of both races because white men receive more on-the-job training. While this hypothesis is widely believed, evidence to test it has been indirect. The Panel Study data, in contrast, contain responses to a set of direct questions on the training content of jobs. The last three hypotheses are that women earn less than men because they lose skills when they withdraw from the labor force to have and raise children, that they have higher absenteeism than men due to illness of other family members (especially children), and that they impose restrictions on job locations and work hours that are compatible with their household responsibilities.

We found, however, that even though white men differed from black men and from white and black women in most of the ways predicted by the conventional wisdom, these differences are *not* able to account for even *half* of the wage gap between white men and women of both races and account for less than three-fifths of the gap between white and black men. In sum, we find that the wage advantages enjoyed by white men cannot be explained solely, or, in the case of women, even primarily by their superior qualifications or greater attachment to the labor force.

Measures of Work Skills

We will begin summarizing our procedures by describing our various "skill" measures. They fall into three categories: "Work History," "Indicators of Labor Force Attachment," and "Formal Education."

An individual's work history since leaving school was split into four segments: years out of the labor force since leaving school, years of work experience prior to working for one's present employer, tenure with the present employer prior to holding one's present position, and tenure in one's present position. Tenure in one's present position was subdivided into training completed in present position and post-training tenure. A sixth variable measured the proportion of all years worked that were full time.

As expected, men and women differed considerably both in the amount of time they worked and in the continuity of their work experience. Compared to white men, the average white woman had 3 years less labor force experience before her present employer, had 3 years less present employer tenure, had spent 5 more years out of the labor force, and was much more likely to have worked part time. Differences are similar but smaller

*Defined as the husband in married couples.

when we compare white men to black women. In addition, white men have completed more than twice as much training as have black men, white women, and black women.

We used four measures of attachment to the labor force in our analysis: absenteeism due to one's own illness, absenteeism due to illness of others, self-imposed restrictions on work hours and location, and plans to quit work.

The average time lost from work in 1975 was small for all race-sex groups, but women and black men did lose more time than white men. On the average, white men missed 4 hours of work in 1975 because someone else in the family was sick, compared to 8 hours for black men, 12 hours for white women and 26 hours for black women. White men lost 36 hours of work because of their own illness compared to 43 for white women, 58 for black women, and 50 for black men. Women were much more likely than men to have imposed limitations on the location of their jobs or hours they would work; only about 14 percent of men reported limiting themselves in this way compared to 34 percent of white women and 22 percent of black women. Fewer than one-tenth of all workers planned to quit work in the near future, but most of them were women.

Differences in formal education were greatest between white and black men. White women were most similar to white men, while black women had completed somewhat less education than white women.

Clearly the four groups of workers differ considerably in a number of ways that may affect productivity. But it does *not* necessarily follow that these differences "explain" all of the earnings advantages enjoyed by white men. Differential work experience and labor force attachment will explain the gap only if they themselves have substantial effects on earnings. If, for example, workers who lost time from work to take care of other family members are *not* paid less than workers who miss no work, then the fact that women, on average, tend to miss somewhat more work for this reason will *not* explain why they earn less than men.

Effects on Wages

We estimated the effects on wages of the education, training, work history and labor force attachment measures using multiple regression, calculating separately by race and sex. Two striking results emerged from the regressions. First, the relationships between the various independent variables and wages were remarkably uniform across the four subgroups. And second, differences in attachment to the labor force did not lead to appreciable differences in pay.

Previous work on pay differences between the sexes and races has found considerable differences in the sizes of the coefficients, for example, that the payoffs to an additional year of general work experience are higher for white men than for the other race-sex groups. But our data allowed us to break up work history into different segments. Although *amounts* of time spent in the various segments did differ by race and sex, the proportional *payoff* to an additional year spent in any *particular* segment was quite similar for the four groups. A year of completed training, for instance, raised wages by 5 to 8 percent while a year of pre-employer experience raised wages 1 to 3 percent. Since white men had spent relatively more time in the more valuable work segments, especially the training segment, they benefitted more from overall work experience.

The regression produced small and generally insignificant coefficients on the "Years Out of the Labor Force" variable and thus did not support the notion that work skills depreciate during periods of labor force withdrawal. The only negative and significant coefficient was for white women, and its size suggests that wages fall by only one-half of one percent for each year out of the labor force.

While the education and work history measures generally had significant effects on wages, the attachment measures usually did not. Absenteeism due to the illness of others in the family and self-imposed limits on job choice or location had virtually no effect on the wages of any of the four subgroups of workers. Those planning to stop work in the next few years earned less, with the amount varying somewhat across the four subgroups. In general, however, attachment measures did not explain wage differences very well.

Accounting for Earnings Differences

If we combine the information on differences in the *amounts* of education, work experience, and work commitment across the race-sex subgroups with the estimated *effects* of these factors on earnings, we can see how well they account for earnings differences between white men and the other groups of workers. Our procedure is to multiply the difference between white men and each of the other groups in the average values for each independent variable by its estimated effect (which comes from the wage rate regression equation for white men) and then to express the product as a fraction of the total differences in wages. As an example, we found that white men average nearly 13 years of formal education while black men average about 11 years. The regression results for white men suggested that this two-year difference is "worth" about 6 percent per year, or about 12 percent altogether. Since the mean wages of white men are about 30 percent higher than those of black men, the differences in educational attainment account for about 12/30, or 40 percent, of the total earnings gap between black and white men.

The results of calculating this ratio for each of the predictor variables are summarized in the table. The "38 percent" entry for the education variable in the first column of the table comes from the calculation on educational differences between white and black men, as just described. The final rows of the table show the fraction of the wage differences that can and cannot be accounted for by our set of 11 explanatory variables. In sum, differences in educational attainment are most important for black men; differences in work history matter most for women; and training differences are somewhat important for all groups. An equally important finding is that a very large part of wage differences *cannot* be explained by our long list of productivity-related factors.

Differences in the patterns of work history and in training accounted for a considerable portion of the wage gap between white men and white and black women, largely because women acquired less tenure, completed less training, and were more likely to work part time. Differences in the proportion of full time work accounted for 8 percent of the wage gap between white men and *white* women and 4 percent of the wage gap between white men and *black* women. Differences in completed training explained 11 percent of the wage gap between white men and white women, 8 percent between white men and black women, and 15 percent between white men and black men. Differences in other tenure components accounted for 14 and 7 percent of the wage gaps between white men and white and black women, respectively.

Surprisingly, the large average differences in years spent out of the labor force since school completion (which ranged from 3.5 to 5.2 years) explained very little of the wage gap between white men and white and black women. It appears that women are paid less than white men for some reason other than depreciating or obsolete skills due to prolonged periods of labor force withdrawal.

Black and white men had very similar work history patterns—with one exception. White men had completed twice as much training in their current positions as had black men, and this

**FRACTIONS OF THE WAGE GAP BETWEEN
WHITE MEN AND OTHER GROUPS OF WORKERS
"EXPLAINED" BY VARIOUS FACTORS**
(All Working Household Heads and Wives, Aged 18-64)

Factors	Black Men	White Women	Black Women
<i>Work History</i>	18%	39%	22%
Years out of labor force since completing school	0	6	3
Years of work experience before present employer	2	3	1
Years with current employer prior to current position	5	12	7
Years of training completed on current job	15	11	8
Years of post-training tenure on current job	-4	-1	-1
Proportion of total working years that were full time	0	8	4
<i>Indicators of Labor Force Attachment</i>	-3	3	-1
Hours of work missed due to illness of others in 1976	-1	-1	-2
Hours of work missed due to own illness in 1975	-1	0	-1
Placed limits on job hours or location	0	2	1
Plans to stop work for nontraining reasons	-1	2	1
<i>Formal Education (in years)</i>	<u>38</u>	<u>2</u>	<u>11</u>
<i>Total Explained</i>	<u>53</u>	<u>44</u>	<u>32</u>
<i>Total Unexplained</i>	<u>47</u>	<u>56</u>	<u>68</u>
	100%	100%	100%

difference alone accounted for 15 percent of the wage gap between white and black men.

That training accounts for a considerable proportion of the wage gaps between white men and the other three groups is a prediction of both a "skills" and a discrimination explanation

of wage differentials. The crucial question is whether average differences in training result from voluntary choice by workers or from the discriminatory hiring and promotion practices of employers. If women and minority workers are crowded into jobs with few training opportunities, it is more appropriate to attribute training-based wage differences to discrimination.

Contrary to our initial expectations, the group of attachment variables explained very little of the earnings advantages of white men, largely because attachment, as measured in this study, had a negligible impact on wages. For instance, workers who were frequently absent from work or who had imposed limitations on work hours or job location earned no less or only slightly less than similarly qualified workers who attended work regularly and imposed no such limitations. Workers who planned to quit work in the near future earned less than workers who had no such plans, but so few workers of either sex planned to quit work that male/female differences in such plans explained, at most, 2 percent of the wage gap between them.

We have seen that the educational attainment levels of white men exceeds that of black men and that education has a strong, positive effect on earnings. So it should not be surprising that the differences in the quantity of education accounts for a substantial fraction of the wage gap between white and black men. Measures of differences in the *quality* of education would no doubt increase its explanatory power, but we do not have them in our data. Black women have somewhat more education, on average, than black men, and differences in educational attainment account for 11 percent of the wage differential between white men and black women.

Summary and Conclusions

In sum, we have found that white men differed from black men and from white and black women in ways predicted by the conventional wisdom or stereotypes. But even after adjusting wages for these large average differences in qualifications, white men still earn substantially more than black men, white women, or black women. Average qualification differences explained less than one-third of the wage gap between white men and black women, less than half of the wage gap between white men and white women, and less than three-fifths of the wage gap between white and black men. These are substantial but hardly overwhelming amounts given the extensive number of qualification measures included in our data, and they lead us to conclude that the earnings advantages enjoyed by white men cannot be entirely or even primarily attributed to the superiority of their qualifications.

Note to Readers

With this issue OUTLOOK becomes larger and, we hope, more useful to our readers. A standard feature of the new look is the data appendix, to appear on the last four pages of each issue. The appendix contains a mixture of national economic and consumer attitude data, most presented in graphic form for efficient reading. Future issues will vary in length between 20 and 24 pages, depending on the number and length of feature articles.

Substantial increases in our costs, coupled with OUTLOOK's expanded size, force us to announce a change in price, our first since beginning publication in 1974. Regular subscriptions are now \$21 per year; academic subscriptions (available only to *individuals* associated with recognized academic institutions) are \$9.50 per year.

Actual and Projected Economic Indicators

seasonally adjusted

SERIES FORECAST BY THE ASA-NBER PANEL																
ECONOMIC INDICATOR	Quarterly Data												Annual Data			
	ACTUAL						PROJECTED									
	1976			1977				1978				1979	Actual		Proj.	
	2nd	3rd	4th	1st	2nd	3rd	4th	1st p	2nd	3rd	4th	1st	1976	1977	1978	
GROSS NATIONAL PRODUCT	1692	1727	1755	1811	1870	1916	1962	1993	2067	2118	2169	2220	1706	1890	2087	
GNP IMPLICIT PRICE DEFLATOR (index, 1972=100)	133.1	134.6	136.3	138.1	140.5	142.2	144.2	146.7	148.5	150.6	153.1	155.3	133.9	141.3	149.7	
GNP IN CONSTANT DOLLARS (billions 1972 \$)	1271	1284	1287	1311	1331	1347	1360	1358	1389	1403	1414	1428	1275	1337	1391	
INDUSTRIAL PRODUCTION (index, 1967=100)	129.4	130.9	131.6	133.6	137.0	138.4	139.3	139.5	143	145	147	148	129.8	137.1	143.6	
UNEMPLOYMENT RATE (quarterly measure, percent)	7.50	7.73	7.77	7.47	7.10	6.90	6.63	6.20	6.3	6.3	6.2	6.1	7.68	7.02	6.2	
CORPORATE PROFITS AFTER TAXES	93.1	94.0	90.9	97.2	104.3	103.6	105.0	108.9	110.9	112.0	116.5	117.4	92.1	102.5	112.1	
EXPENDITURES FOR NEW PLANT and EQUIPMENT	118.1	122.6	125.2	130.2	134.2	140.4	138.1	146.3	149.8	153.6	157.0	160.0	120.5	137.0	151.7	
NEW PRIVATE HOUSING UNITS STARTED (millions)	1.460	1.570	1.722	1.745	1.937	2.041	2.146	1.732	2.00	1.90	1.82	1.80	1.533	1.967	1.863	
CHANGE IN BUSINESS INVENTORIES	18.3	21.5	-0.9	13.8	21.7	23.6	13.5	16.5	19.0	17.4	17.1	17.7	13.3	18.2	17.5	
CONSUMER DURABLE EXPENDITURES	156.7	159.3	166.3	177.0	178.6	177.6	186.0	184.0	192.0	195.2	198.8	202.5	158.9	179.8	192.5	
NATIONAL DEFENSE PURCHASES	86.0	86.4	88.4	89.7	93.4	95.6	98.5	99.2	102.0	103.4	106.2	107.7	86.8	94.3	102.7	
SERIES FROM THE GROSS NATIONAL PRODUCT ACCOUNTS																
ECONOMIC INDICATOR	Quarterly Data												Annual Data			
	1975			1976				1977				1978				
	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st p	1975	1976	1977	
GROSS NATIONAL PRODUCT	1497	1565	1601	1651	1692	1727	1755	1811	1870	1916	1962	1993	1529	1706	1890	
PERSONAL CONSUMPTION EXPENDITURES	965.9	995.1	1024	1056	1078	1102	1139	1172	1194	1219	1260	1284	980.4	1094	1211	
DURABLE GOODS	127.8	136.7	144.3	153.3	156.7	159.3	166.3	177.0	178.6	177.6	186.0	184.0	132.9	158.9	179.8	
NONDURABLE GOODS	406.4	415.0	421.9	430.4	437.1	444.7	458.8	466.6	474.4	481.8	499.9	505.8	409.3	442.7	480.7	
SERVICES	431.7	443.4	457.9	472.4	484.6	498.2	513.9	528.8	541.1	559.5	573.7	594.3	438.2	492.3	550.8	
GROSS PRIVATE DOMESTIC INVESTMENT	171.2	205.4	204.7	231.3	244.4	254.3	243.4	271.8	294.9	303.6	306.7	314.4	189.1	243.3	294.2	
NONRESIDENTIAL	147.7	148.2	150.7	155.4	159.8	164.9	167.6	177.0	182.4	187.5	193.5	197.7	149.1	161.9	185.1	
RESIDENTIAL STRUCTURES	48.6	52.3	57.6	61.4	66.3	67.8	76.7	81.0	90.8	92.5	99.7	100.2	51.4	68.1	91.0	
CHANGE IN BUS. INVENTORIES	-25.1	4.9	-3.6	14.5	18.3	21.5	-0.9	13.8	21.7	23.6	13.5	16.5	-11.4	13.3	18.1	
NET EXPORTS	24.3	20.8	20.8	10.2	10.2	7.9	3.0	-8.2	-9.7	-7.5	-18.2	-22.6	20.3	7.8	-10.9	
GOVERNMENT PURCHASES	335.2	343.5	351.0	353.6	358.9	363.0	370.0	374.9	390.6	400.9	413.8	417.1	338.9	361.4	395.1	
GNP IMPLICIT PRICE DEFLATOR (index, 1972=100)	126.0	128.2	130.2	131.5	133.1	134.6	136.3	138.1	140.5	142.2	144.2	146.7	127.1	133.9	141.3	
GNP IN CONSTANT DOLLARS (billions 1972 \$)	1188	1221	1230	1256	1271	1284	1287	1311	1331	1347	1360	1358	1202	1275	1337	

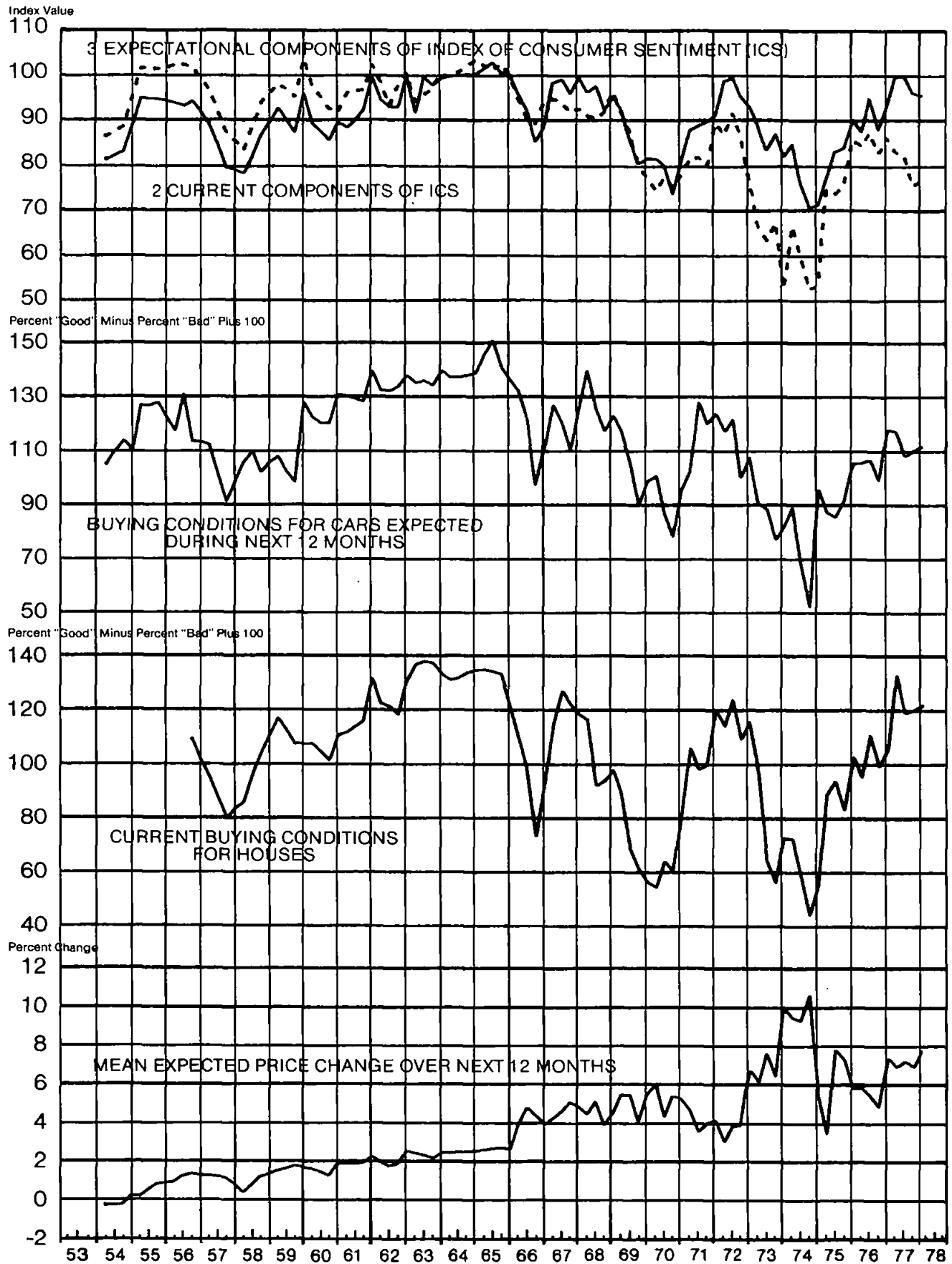
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Note: All data are at annual rates and in billions of current dollars unless otherwise indicated.

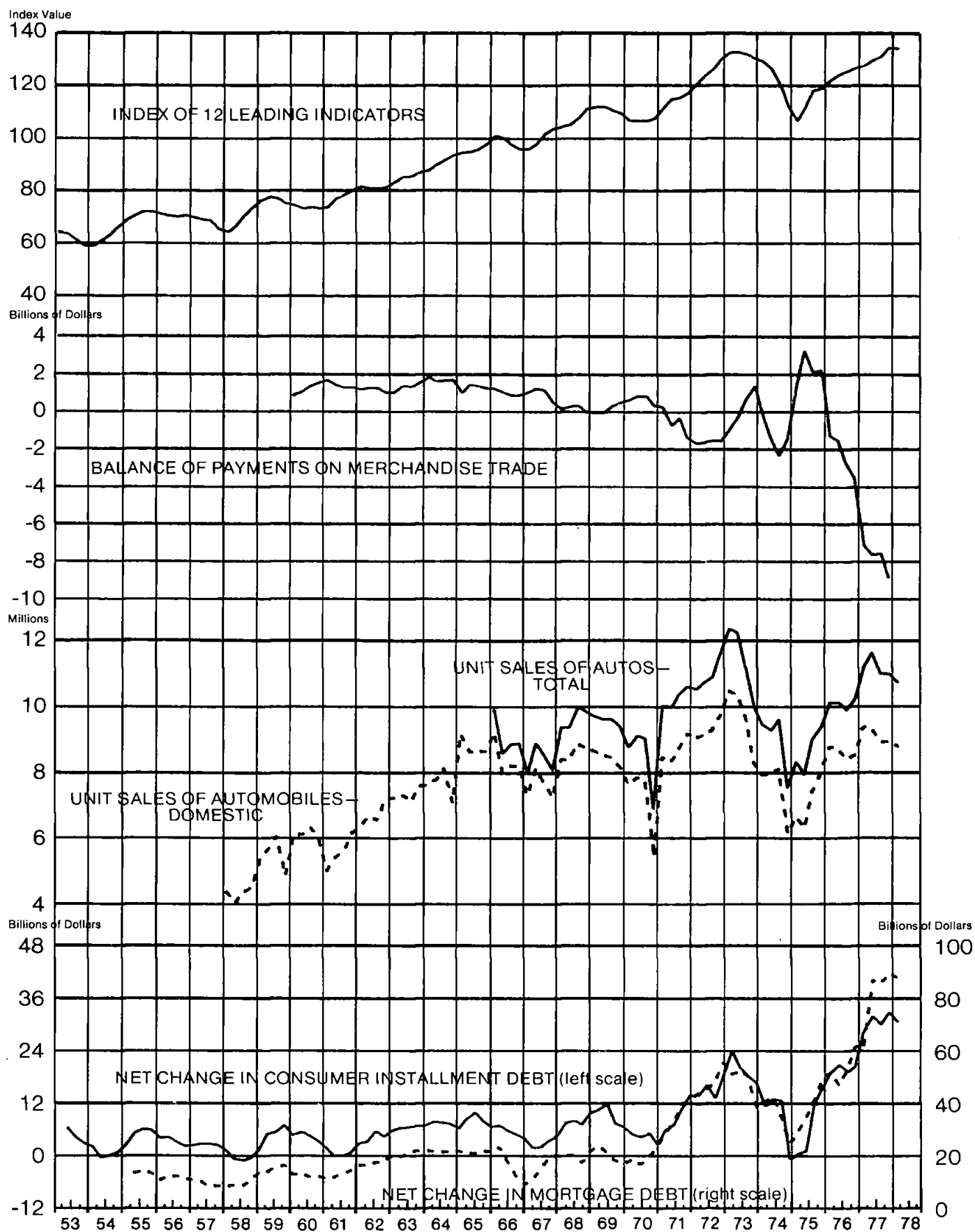
Sources: Projections—American Statistical Association-National Bureau of Economic Research panel of forecasters.
(Note: forecasts were released in February 1978.)

Actual Data: Departments of Commerce and Labor, Board of Governors of the Federal Reserve System.

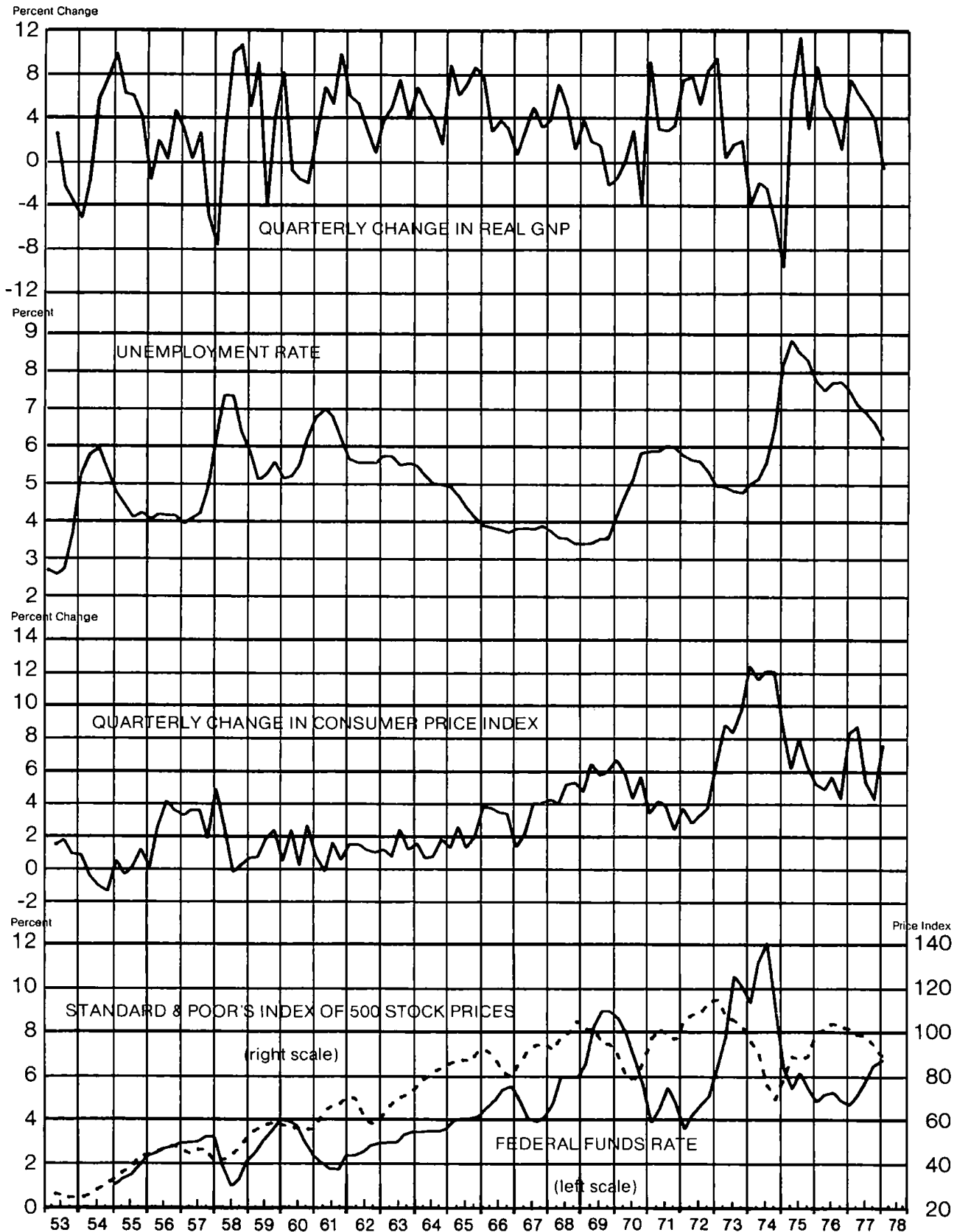
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