

International Advances in Economic Research

VOLUME 4, NUMBER 1

FEBRUARY 1998

REPRINT

Income Distribution and the Economy: Evidence from the Vector Autoregression Model

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Using the vector autoregression model, this research explores the impact of income concentration on GDP. The estimated results of the model and its impulse response confirm earlier studies which used different methodology or different data sets indicating that a higher concentration of income adversely affect GDP in the short run, although the effect turns positive in the long run. (JEL D31)

Introduction

In recent years income inequality, as measured by the Gini coefficient (GC) and reported by the U.S. government, has increased.¹ The index for 1960-94 had an upward trend which is statistically significant.² Other measures of income inequality confirm this trend.³

The income concentration reflects a higher income growth of the upper class, a higher poverty rate, and the shrinkage of the middle class. Between 1967 and 1974, both the number of Americans living in poverty and the rate of poverty declined.⁴ However, between 1974 and 1992 both of these measures rose. In 1992, the number of poor people rose for the third year in a row to 36.9 million or 14.5 percent of the population. In that year, poverty rates persisted slightly above 20 percent for people under 18 and for those above 64. In 1992, the index increased sharply. The average income of the top 5 percent of Americans (those who make an average of \$145,000 a year) rose by \$3,500. In the income gap between highly educated workers and high school dropouts or workers with only high school degrees, the so-called educational premium increased.

According to census data, inequality in 1992 has risen much more among families than among individual workers. The rise is due primarily to increases in two categories of families concentrated at the top and bottom of the income distribution. At the bottom, the increase is significant in two-earner, married couples and families headed by one person with no spouse present. One-head families are concentrated closer to the bottom of the income distribution than two-earner, married-couple families because they have fewer workers (by definition) and because one-head family workers average fewer work hours and earn less per hour. Furthermore, a significant demographic surge in divorce, out-of-wedlock births, families headed by a single woman, reforms of transfer policies (for example, tightening Aid to Families with Dependent Children, initiated by the

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Reagan administration in 1981), and a decline in the real wages of low-skilled workers contributed to the increases in the poverty rate and to income inequality.⁵

Over the last 50 years, economists have argued about inequality of income distribution and arrive at opposing views. Kuznets [1955] argued that income inequality increases in the early stages of economic development but later reverses itself toward more equality when the labor force moves from more traditional activities, such as agriculture, to a more productive industrial sector. Kuznets considered income distribution as an endogenous variable depending on the behavior of the economic development process. This implies that redistribution policies are not justifiable on economic grounds, although they can be justified on the basis of equity considerations. Kuznets' theory is consistent with the empirical data of the 1960s, which suggest that inequality declines during periods of economic boom as the benefits of expansion trickle down to the entire income distribution. However, most of the 1980s were marked by economic growth that coincided with a surge in income inequality.

A second view argues that redistribution through excessive social spending is harmful to the economy because it impairs incentives to work and invest. Furthermore, the beneficiaries of social spending are converted from productive workers into nonproductive consumers. Thus, according to this view, income distribution policies will result in slowdown in economic growth.⁶

Recently, Peresson and Tabellini [1994] used cross-country data to discover a positive connection between income equality and long-run economic growth. In another study for the East Asian countries, Birdsall et al. [1995] discovered similar results. These findings are based on the intuitive notion that inequality is harmful for a country's political circumstances and stability, leading to frequent changes in executive powers (in democracies) and a number of coups and assassinations per year (in nondemocracies), events that are likely to negatively affect investment and economic growth.

Using annual data and two different methodologies, Shaaf [1996] investigated the effect of income inequality on the performance of the U.S. economy. In one approach, he applied an artificial intelligence model called Neural Network and, in a second approach, he used a reduced-form econometric equation similar to that of the St. Louis model. The findings of the study using both approaches suggested that a higher concentration of income has an adverse effect on the performance of the U.S. economy in the short run, but a positive impact in the long run.

The effect of income inequality on the economy has lasting effects on tax and spending policies, budget deficits, social policy, and the role of government in redistribution policy. Using the vector autoregression (VAR) model as a third method, the purpose of this study is to reinvestigate the effect of income inequality on gross domestic product (GDP). Using U.S. annual data, the findings of the VAR model confirm those of the neural network and the reduced-form econometric models. That is, a higher income concentration will moderate the expansion of the economy in the short run but will enhance expansion in the long run. The findings of this study are all based on the results of the VAR model, which excludes, at least partially, individual supply-side factors influencing the economy. The organization of this paper is as follows. The methodology

of the VAR model and its uses are explained along with a presentation of the empirical findings of the model and the conclusion.

Methodology of the Study

Although still controversial, VAR models have become popular among economists as tools of forecasting since the work of Sims [1980a,b]. They have relatively simple dynamic specifications. The form of each random variable is expressed as a linear function of past values of itself, past values of other variables, and nonrandom components, such as constant terms or times. For this inquiry, the first-difference and growth versions of the VAR scheme are employed.

The models incorporate the traditional role of monetary and fiscal actions and also the GC as a measure of income concentration on GDP. The first-difference version of the scheme is presented as:

$$\Delta Y_t = K_\Delta + a_{\Delta t} YR_t + \sum_{i=1}^4 b_{\Delta i} \Delta Y_{t-i} + \sum_{i=1}^4 c_{\Delta i} \Delta M_{t-i} + \sum_{i=1}^4 d_{\Delta i} \Delta G_{t-i} + \sum_{i=1}^4 e_{\Delta i} \Delta GC_{t-i} + U_{\Delta t}, \quad (1)$$

and its growth version is presented as:

$$\Gamma Y_t = K_\Gamma + \sum_{i=1}^4 b_{\Gamma i} \Gamma Y_{t-i} + \sum_{i=1}^4 c_{\Gamma i} \Gamma M_{t-i} + \sum_{i=1}^4 d_{\Gamma i} \Gamma G_{t-i} + \sum_{i=1}^4 e_{\Gamma i} \Gamma GC_{t-i} + U_{\Gamma t}, \quad (2)$$

where: Y = high employment GDP; YR = time trend; M = M1 and M2 money supply; G = federal government expenditures; GC = Gini coefficient; K = constant; U = disturbance term; Δ represents the first-difference; and K_Δ , $a_{\Delta t}$, $b_{\Delta i}$, $c_{\Delta i}$, $d_{\Delta i}$, $e_{\Delta i}$, and $U_{\Delta t}$ are the parameters of (1).⁷ Similarly, Γ represents the rate of growth and K_Γ , $a_{\Gamma t}$, $b_{\Gamma i}$, $c_{\Gamma i}$, $d_{\Gamma i}$, $e_{\Gamma i}$, and $U_{\Gamma t}$ are the parameters of (2).

According to (1), current changes in GDP (Δ GDP) depend on changes in its past, past changes in monetary and fiscal policy actions, and changes of income concentration in the economy. Notice that in addition to the intercept (K_Δ), this equation has a time trend, YR . Because the first-difference data of the GDP had an upward time trend, it was necessary to add this variable to the equation to transform the GDP data into stationary form.

Similarly, according to (2), current growth of GDP (Γ GDP) depends on its past growth, the past growth of monetary and fiscal policy variables, and the growth of income concentration in the economy. Since the growth data for the GDP did not have a trend, and thus were stationary, the time trend variable was not necessary in (2). It is assumed that the innovations to the GC are unrelated to innovations to the other independent variables in both (1) and (2). Both equations have one to four lags: $i = 1$; $i = 1$ to 2; $i = 1$ to 3; and $i = 1$ to 4.

Also, to learn more about the dynamic properties of income concentration, the estimated VAR models of this study are used to generate impulse response of the model

to one period standard deviation shock in the GC. The impulse response measure represents the strength of the causal relationship between the GC and GDP.

Empirical Findings

Estimated Results

Using 1960-90 data with the M1 money supply, the parameters of (1) are estimated and shown in Table 1.⁸ The estimated signs of a one-year lag of the GC are all negative for $i = 1$, $i = 1$ to 2, $i = 1$ to 3, and $i = 1$ to 4. Similarly, using data for the same period with the M2 money supply, the parameters of (1) are estimated and shown in Table 2. The signs of a one-year lag of the GC for all four versions are again negative.

Thus, the findings with both M1 and M2 money supply suggest an adverse effect of income concentration on GDP in the short run. These results are consistent with the short-run Keynesian line and more contemporary findings for cross-country data by Peresson and Tabellini [1994] and Birdsall et al. [1995].

However, the estimated signs of two- and three-year lags of the GC in the equations all turned positive with either M1 or M2 money supply data (Tables 1 and 2). Those of the four-year lags also turned positive. This implies that in the long run a higher income concentration could contribute to economic expansion. These results are in line with long-run economic growth theory and with the findings of Okun [1975]. The estimated trend (YR) for all four lag structures, with either the M1 or M2 money supply, have positive signs as expected.

Likewise, using 1960-90 data, Tables 3 and 4 show the estimated results of the VAR model growth version (in (2)) with M1 and M2 money supply data and for $i = 1$, $i = 1$ to 2, $i = 1$ to 3, and $i = 1$ to 4. Repeatedly, the estimated coefficients of the one-year lag of the GC for all four lag structures are negative with both M1 and M2 money supply. Hence, the results of the VAR model growth versions, like those of the first-difference version, confirm the adverse effect of income concentration on the growth of GDP in the short run.

Nevertheless, the coefficients of two-, three-, and four-year lags of the GC for M1 money supply are all positive. The findings of those of the M2 money supply (Table 4) suggest that the negative effect of income concentration lasts longer than one year for the three-year lag model. In sum, the results of the VAR model growth version, with both M1 and M2, imply that the impact of a higher growth of income concentration on the growth of GDP is negative in the short run but positive in the long run.⁹

TABLE 1
Estimated Results of the First-Difference Version
of the VAR Model with M1 Money Supply

Variable	1 Lag		2 Lags		3 Lags		4 Lags	
	Coef	t-Value	Coef	t-Value	Coef	t-Value	Coef	t-Value
K_{Δ}	-25887.00	-4.20	-26778.00	-3.00	-19281.00	-1.40	-33293.00	-1.40
YR	13.20	4.20	13.70	2.90	9.80	1.40	17.00	1.40
$\Delta GDP(-1)$	-.2E-02	-0.01	.02	0.10	0.02	0.09	-0.15	-0.42
$\Delta GDP(-2)$			-.19	-0.70	-0.14	-.50	0.09	0.26
$\Delta GDP(-3)$					-0.44	1.57	0.50	1.40
$\Delta GDP(-4)$							0.28	0.44
$\Delta M(-1)$	-0.40	-0.70	-.17	-0.20	-2.00	-0.30	-0.50	-0.37
$\Delta M(-2)$.28	0.36	-0.90	-0.95	-1.50	-0.88
$\Delta M(-3)$					0.20	0.22	-0.86	-0.50
$\Delta M(-4)$							-1.58	-1.20
$\Delta G(-1)$	-0.10	-0.20	.72	0.66	0.80	0.70	-0.39	-0.22
$\Delta G(-2)$			-.93	-0.94	-257.00	-1.90	-2.10	-1.30
$\Delta G(-3)$					1.70	1.60	-0.08	-0.04
$\Delta G(-4)$							1.30	0.93
$\Delta GC(-1)$	-1491.00	-0.78	-9.10	-0.40	-1026.00	-0.30	-2940.00	-0.62
$\Delta GC(-2)$			2868.00	1.30	1764.00	0.60	-118.00	-0.02
$\Delta GC(-3)$					1095.00	0.40	-198.00	-0.05
$\Delta GC(-4)$							426.00	0.15
R^2		0.85		0.86		0.90		0.91
Adj. R^2		0.81		0.79		0.80		0.74
DW		1.91		1.80		2.10		1.75
F-Statistic		0.44		0.58		0.92		0.70
St. Er Reg		49.10		51.00		50.00		56.10

TABLE 2
Estimated Results of the First-Difference Version
of the VAR Model with M2 Money Supply

Variable	1 Lag		2 Lags		3 Lags		4 Lags	
	Coef	t-Value	Coef	t-Value	Coef	t-Value	Coef	t-Value
K_{Δ}	-21478.00	-3.40	-24021.00	-2.80	-15060.00	-1.30	-25385.00	-1.60
YR	11.00	-3.40	12.20	2.80	7.70	1.30	12.90	1.60
$\Delta GDP(-1)$	0.04	-1.40	-0.05	-0.20	0.04	0.20	-0.09	-0.30
$\Delta GDP(-2)$			-0.10	-0.50	-0.10	-0.40	0.51	1.20
$\Delta GDP(-3)$					0.30	0.93	0.77	1.90
$\Delta GDP(-4)$							0.31	0.78
$\Delta M(-1)$	0.20	0.80	0.39	0.90	0.40	0.93	0.85	1.40
$\Delta M(-2)$			0.21	0.67	-0.07	-0.20	0.18	0.35
$\Delta M(-3)$					0.08	0.20	-0.37	-0.64
$\Delta M(-4)$							-1.49	-2.10
$\Delta G(-1)$	-0.30	-0.40	0.74	0.78	1.10	1.00	-0.55	-0.40
$\Delta G(-2)$			-1.70	-1.70	-2.97	-2.40	-3.57	-2.40
$\Delta G(-3)$					1.60	1.30	-0.52	-0.30
$\Delta G(-4)$							1.40	0.96
$\Delta GC(-1)$	-1750.00	-0.91	-764.00	-0.30	-1403.00	-0.40	-5869.00	-1.40
$\Delta GC(-2)$			1731.90	0.80	730.00	0.20	-3295.00	-0.69
$\Delta GC(-3)$					321.00	0.10	-1434.00	-0.42
$\Delta GC(-4)$							726.00	0.27
R^2		0.85		0.87		0.89		0.93
Adj. R^2		0.81		0.81		0.80		0.79
DW		2.00		1.70		2.02		1.58
F-Statistic		0.46		0.82		0.91		1.07
St. Er Reg		49.00		49.50		50.00		49.90

TABLE 3
Estimated Results of the Growth Version
of the VAR Model with M1 Money Supply

Variable	1 Lag		2 Lags		3 Lags		4 Lags	
	Coef	t-Value	Coef	t-Value	Coef	t-Value	Coef	t-Value
K_F	3.60	2.20	4.40	2.20	3.70	1.35	9.20	2.30
$\Gamma GDP(-1)$	0.30	1.70	0.30	1.30	0.29	1.09	0.19	0.73
$\Gamma GDP(-2)$			0.20	0.80	0.16	0.50	0.11	0.38
$\Gamma GDP(-3)$					0.13	0.42	0.10	0.29
$\Gamma GDP(-4)$							0.14	0.38
$\Gamma M(-1)$	0.20	1.18	-0.36	-0.02	.6E-2	0.03	-0.16	-0.63
$\Gamma M(-2)$			-0.06	-0.37	-0.08	-0.34	-0.28	-1.06
$\Gamma M(-3)$					-0.05	-0.25	-0.04	-0.17
$\Gamma M(-4)$							-0.36	-1.50
$\Gamma G(-1)$	0.14	1.10	0.25	0.16	0.03	0.15	0.04	0.20
$\Gamma G(-2)$.8E-2	0.06	-0.07	-0.33	0.02	0.08
$\Gamma G(-3)$					0.11	0.64	-0.12	-0.60
$\Gamma G(-4)$							0.05	0.28
$\Gamma GC(-1)$	-0.20	-0.70	-0.14	-0.35	-0.22	-0.42	-0.10	-0.15
$\Gamma GC(-2)$			0.50	1.30	0.36	0.72	1.40	1.90
$\Gamma GC(-3)$					0.05	0.09	0.35	0.60
$\Gamma GC(-4)$							0.03	0.06
R^2		0.28		0.27		0.31		0.55
Adj. R^2		0.17		-0.02		-0.25		-0.17
DW		1.98		1.90		1.90		1.50
F-Statistic		0.99		0.41		0.20		0.65
St. Er Reg		2.42		2.48		2.78		2.60

TABLE 4
Estimated Results of the Growth Version
of the VAR Model with M2 Money Supply

Variable	1 Lag		2 Lags		3 Lags		4 Lags	
	Coef	t-Value	Coef	t-Value	Coef	t-Value	Coef	t-Value
K_T	1.40	0.86	0.24	0.13	-1.40	-0.58	0.01	.4E-2
$\Gamma GDP(-1)$	0.30	1.89	0.09	0.40	0.12	0.50	0.10	0.36
$\Gamma GDP(-2)$			0.36	1.80	0.33	1.20	0.34	1.00
$\Gamma GDP(-3)$					0.14	0.57	-0.57	-1.02
$\Gamma GDP(-4)$							0.26	0.90
$\Gamma M(-1)$	0.47	3.12	0.52	2.90	0.57	2.60	0.59	2.20
$\Gamma M(-2)$			0.20	1.10	0.19	0.71	0.18	0.50
$\Gamma M(-3)$					0.03	0.13	0.15	0.47
$\Gamma M(-4)$							-0.19	-0.60
$\Gamma G(-1)$	0.06	0.57	0.02	0.20	-0.01	-0.09	-0.01	-0.09
$\Gamma G(-2)$			-0.20	-1.50	-0.02	-1.40	-0.14	0.70
$\Gamma G(-3)$					0.08	0.51	-0.06	-0.28
$\Gamma G(-4)$							0.05	0.29
$\Gamma GC(-1)$	-0.29	-1.00	-0.50	-1.50	-0.70	-1.70	-1.09	-1.90
$\Gamma GC(-2)$			0.02	0.08	-0.20	-0.50	0.12	0.22
$\Gamma GC(-3)$					-0.10	-0.20	-0.16	-0.34
$\Gamma GC(-4)$							-0.04	-0.10
R^2		0.46		0.54		0.59		0.66
Adj. R^2		0.37		0.35		0.27		0.12
DW		2.30		1.90		1.90		1.70
F-Statistic		3.90		2.50		1.51		1.20
St. Er Reg		2.10		1.98		2.10		2.30

Impulse Response Results

Tables 5 and 6 present the results of the dynamic properties of the VAR model, using the impulse response of changes in GDP to one standard deviation shock change in the GC for $i = 1$, $i = 1$ to 2, $i = 1$ to 3, and $i = 1$ to 4 in (1), with both M1 and M2 money supply data. Accordingly for the one-year lag equation and M1 money supply data

(Table 5), one standard deviation shock in the GC decreases GDP by 1.491 million dollars in the next year, then bounces up and down in the following years. Similarly, for equations $i = 1$ to 2, $i = 1$ to 3, and $i = 1$ to 4, the shock would reduce GDP by 9, 1.026, and 2.940 million dollars, respectively, fluctuating in later years.

TABLE 5
Comparison of Impulse Response in Changes of GDP to a
Unit Shock Change in the Gini Coefficient (M1 Money Supply)

Steps	1 Lag	2 Lags	3 Lags	4 Lags	Mean Loss
1	0.00	0.00	0.00	0.00	
2	-1490.80	-9.12	-1025.98	-2940.08	
3	360.50	2798.85	2296.34	2483.03	
4	-88.20	-1429.91	-705.29	-1167.21	
5	142.70	-514.33	-599.86	-975.12	
6	17.70	357.59	-843.38	-2715.43	
7	5.95	-174.06	821.64	3564.21	
8	-15.99	259.32	782.50	101.97	
9	-8.83	-6.25	-888.13	-1685.97	
10	-2.85	-114.31	201.60	276.00	
Net Loss (Gain)	-269.96	1167.78	39.44	-3058.58	-530.33

TABLE 6
Comparison of Impulse Response in Change of GDP to a
Unit Shock Change in the Gini Coefficient (M2 Money Supply)

Steps	1 Lag	2 Lags	3 Lags	4 Lags	Mean Loss
1	0.00	0.00	0.00	0.00	
2	-1750.40	-764.00	-1403.20	-5868.80	
3	792.00	2729.40	2317.10	2517.70	

TABLE 6 (CONT.)

Steps	1 Lag	2 Lags	3 Lags	4 Lags	Mean Loss
4	-46.40	-959.00	-486.40	-4038.00	
5	-17.10	-653.60	-219.40	-4492.50	
6	-61.90	352.50	-139.90	137.70	
7	3.70	-109.10	1338.40	221.40	
8	4.20	228.30	807.00	2167.60	
9	2.10	75.50	-676.10	-5037.50	
10	-1.20	-174.40	-237.80	4909.20	
Net Loss (Gain)	-1075.00	725.60	1299.70	-9483.20	-2133.23

For the one-year lag equation with M2 money supply data (Table 6), one standard deviation shock in the GC decreases GDP by 1.750 million dollars in the next year, then fluctuates in the following years. Likewise, for equations $i = 1$ to 2, $i = 1$ to 3, and $i = 1$ to 4, the shock would reduce GDP by 764, 1.403, and 5.869 million dollars, respectively, then bounce up and down in later years. Hence, the effect of higher concentration of income on the changes of GDP with either the M1 or M2 money supply is negative in the next year, then turns positive the following year.

Measured and shown in Tables 5 and 6 are the 10-year net loss (gain) of one standard deviation shock of the GC to GDP for $i = 1$, $i = 1$ to 2, $i = 1$ to 3, and $i = 1$ to 4 with their means in both M1 and M2 money supply data. The equation with $i = 1$ had a GDP loss of 270 million and 1.075 million dollars for M1 and M2 money supply data, respectively. The equation with $i = 1$ to 2 lag structure had a net GDP gain of 1.168 million and 726 million dollars with M1 and M2 money supply data, respectively. The mean GDP losses of the four versions of the model were 530 million dollars with M1 money supply data and 2.133 million dollars with M2 money supply data.

Tables 7 and 8 present the dynamic properties of the estimated results of the VAR model growth version for $i = 1$, $i = 1$ to 2, $i = 1$ to 3, and $i = 1$ to 4 in (2) with M1 and M2 money supply data. The dynamic pattern of the growth versions is similar to those of the first-difference versions. That is, one standard deviation shock in the growth of the GC reduces the growth of GDP in the next year. Then, the growth of GDP bounces up and down with either M1 and M2 data.

Using M1 money supply data, with $i = 1$ to 2, $i = 1$ to 3, and $i = 1$ to 4, one standard deviation shock in the growth of the GC decreases GDP growth by 0.2, 0.1, 0.2, and 0.1 percent, respectively. Likewise, using M2 money supply data with $i = 1$ to

TABLE 7
Comparison of Impulse Response of Changes in Growth of GDP to a
Unit Shock Change in Growth of the Gini Coefficient (M1 Money Supply)

Steps	1 Lag	2 Lags	3 Lags	4 Lags	Mean Loss
1	0.00000	0.00000	0.00000	0.00000	
2	-0.21814	-0.13657	-0.21664	-0.10340	
3	0.11345	0.48533	0.33643	1.32943	
4	0.004799	-0.02102	-0.03675	-0.25823	
5	-0.00940	0.043417	-0.07476	-0.13928	
6	-0.00095	0.10747	-0.04690	-0.04023	
7	-0.00170	-0.01059	-0.01870	-0.20864	
8	-0.00148	0.029078	-0.03556	0.13425	
9	-0.00085	0.025636	0.009104	-0.13087	
10	-0.00055	0.001016	-.3E-05	-.37960	
Net Loss (Gain)	-0.11482	0.523767	-0.08381	0.96263	0.321943

TABLE 8
Comparison of Impulse Response of Changes in Growth of GDP to a
Unit Shock Change in Growth of the Gini Coefficient (M2 Money Supply)

Steps	1 Lag	2 Lags	3 Lags	4 Lags	Mean Loss
1	0.00000	0.00000	0.00000	0.00000	
2	-0.29180	-0.47447	-0.68561	-1.08783	
3	0.12722	0.044882	-0.26640	0.40370	
4	0.094882	-0.32615	-0.42016	-1.05612	
5	-0.01494	-0.16997	-0.58698	-0.71283	
6	-0.02215	-0.14707	-0.34776	-0.39817	
7	0.004736	-0.06676	-0.34427	-0.64407	
8	0.008738	-0.02652	-0.45246	-0.83850	

TABLE 8 (CONT.)

Steps	1 Lag	2 Lags	3 Lags	4 Lags	Mean Loss
9	0.001303	-0.02163	-0.25385	-1.08430	
10	-0.00114	-0.01763	-0.18878	-0.93265	
Net Loss (Gain)	-1.20532	-0.09315	-3.54627	-6.35077	-2.79888

2, $i = 1$ to 3, and $i = 1$ to 4, one standard deviation shock in the growth of the GC decreases GDP growth by 0.3, 0.5, 0.7, and 1.1 percent, respectively.

Similarly, Tables 5 and 6 measure and show the 10-year net loss (gain) of one standard deviation shock of the GC to GDP growth for $i = 1$, $i = 1$ to 2, $i = 1$ to 3, and $i = 1$ to 4 and their means with both M1 and M2 money supply data. The equation with $i = 1$ had a net loss of .11 and 1.2 percent for M1 and M2 money supply, respectively. The equation with $i = 1$ to 3 lag structure had a net loss of .08 and 6.35 percent for M1 and M2 money supply data, respectively. The equation with M1 money supply data had an estimated mean-growth gain of 0.32 percent and, with M2 money supply data, had an estimated mean-growth loss of 2.8 percent

In sum, the results of the impulse response function of the VAR model for both the first-difference and growth versions, using M1 and M2 money supply data, suggest that more income concentration had an adverse effect on GDP in the short run. However, its effect turned positive in the long run. Furthermore, the impact of more income concentration had a net loss for the whole period of 10 years with the first-difference version and the growth version with M2 money supply data.

Conclusion

In recent years, income distribution in the U.S. has become more concentrated, which, according to some recent cross-country and time-series studies, could harm economic growth. The purpose of this study was to reinvestigate the effect of higher income inequality on the performance of the economy, using a new methodology. Using the VAR model and 1960-94 data, the findings are consistent with earlier studies, suggesting that high income concentration has an adverse effect on the GDP in the short run, although its effect turns positive in the long run. The findings of the impulse response of the model gave similar conclusions. The contradictory findings by different scholars and for different countries may be due to differences in the economic structure, culture, and saving rates.

Footnotes

1. The GC is a ratio of the area between the 45-degree line and the Lorenz curve to the area between the 45-degree line and the axes. That is, it is the ratio of the deviation of actual distribution from equal distribution of income to equal distribution of income.
2. The GC was regressed on time (*YR*) for 1960-94 with 35 observations. The results of the equation, with t-ratios in parentheses, are:

$$GC = -3.06 + 0.00174 YR ,$$

(7.6) (8.55)

where: $R^2 = 0.69$ and adjusted $R^2 = 0.68$. The high magnitude of the t-ratio of *YR* shows that the upward trend of the GC is statistically significant.

3. For example, see Bradbury [1996], who used the income percentile ratios of: 90th/10th, 80th/20th, and their logarithm as measures of inequality (see also Allison [1978]).
4. The poverty threshold for one person in 1992 was \$7,143, and for a family of four, \$14,335.
5. Slesnick [1993] argued that annual income is often an imperfect measure of poverty. For example, an elderly family member may be income poor but asset rich and, thus, able to maintain a comfortable lifestyle. Slesnick suggested consumption as a much more accurate indicator of the economic well-being of families. Using consumption rather than income, he showed that poverty continuously declined during the 1980s.
6. For example, see Okun [1975].
7. Because this research focuses only on the impact of income concentration on GDP, other equations of the model and their results are irrelevant and are not reported.
8. Because the increase in the GC beginning in 1992 reflects conversion to computer-assisted data collection environment, the data are restricted from 1960 to 1990.
9. Because of the changes in the procedures and computation of the GC by the U.S. Census Bureau, it has been argued that, in some years in the study, the GCs were overestimated. To remedy this problem, the GCs were smoothed (by three- and four-year moving averages) and all the models were rerun with the smoothed data. The results were much similar to those of unsmoothed data.

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