

Working Paper 74-3

AN EMPLOYMENT PRESSURE INDEX  
AS AN ALTERNATIVE MEASURE  
OF LABOR MARKET CONDITIONS\*

William E. Cullison

Presented at the 49th Annual Conference  
of the Western Economic Association,  
Las Vegas, Nevada, June 9-12, 1974.

The views expressed here are solely those of  
the author and do not necessarily reflect the  
views of the Federal Reserve Bank of Richmond.

AN EMPLOYMENT PRESSURE INDEX AS AN ALTERNATIVE  
MEASURE OF LABOR MARKET CONDITIONS\*

William E. Cullison  
Federal Reserve Bank of Richmond

Much attention has been devoted to the peculiar behavior of the unemployment rate from 1969 to 1973. In past recessions, the unemployment rate reached definite turning points and showed fairly consistent recovery shortly thereafter. Its behavior during the 1970 recession and the subsequent recovery, however, was noticeably different. The unemployment rate rose to around 6 percent in November 1970 and remained very close to that level until June 1972, setting a record for the longest peak in the history of the series. Moreover, through the summer and fall of 1973, when other economic indicators had been signaling that recovery was well under way and that the economy was approaching full capacity, the unemployment rate continued to indicate a relatively slack labor market.

Geoffrey Moore, former Commissioner of the Bureau of Labor Statistics, has suggested (1973) that the unemployment rate may be overemphasized as a target variable for economic policy. After analyzing several labor market indicators, Moore concluded that "...the evidence indicates that in recent months we have been closer to full employment than the unemployment rate by itself suggests." (1973). Moore had advocated earlier that employment data should be given at least as much attention as unemployment data in analyzing

---

\*The author wishes to thank the Bureau of Labor Statistics for providing data; the Federal Reserve Bank of Richmond for its support; and Geoffrey Moore of the NBER, and the Economic Staff of the Federal Reserve Bank of Richmond for helpful comments. The analysis and conclusions of this paper are those of the author and not of the Federal Reserve System.

labor market statistics. He suggested that the employment data were superior to the unemployment figures, not only because of problems in defining involuntary unemployment, but also because the employment series contains relatively less sampling error (1972).

This paper presents a new data series that relates employment data to an historical standard. The new series is referred to as an employment pressure index (EPI); its purpose is to transform raw employment figures into a series that can be used to measure labor market conditions. Since the EPI does not rely upon either unemployment or civilian labor force data, it is not affected by the definitional problems inherent in the unemployment statistics. The new series is compared with the unemployment rate as a labor market indicator.

Figure 1 shows the EPI (defined below) plotted with the unemployment rate for all civilian workers. A 5 percent<sup>1</sup> unemployment rate (inverted) is equated to an EPI of 100. There is clearly a high degree of overall correspondence between the two series from 1955 through 1969. Since then, however, the two series have begun to diverge. This recent disparity is discussed at length.

#### The Employment Pressure Index

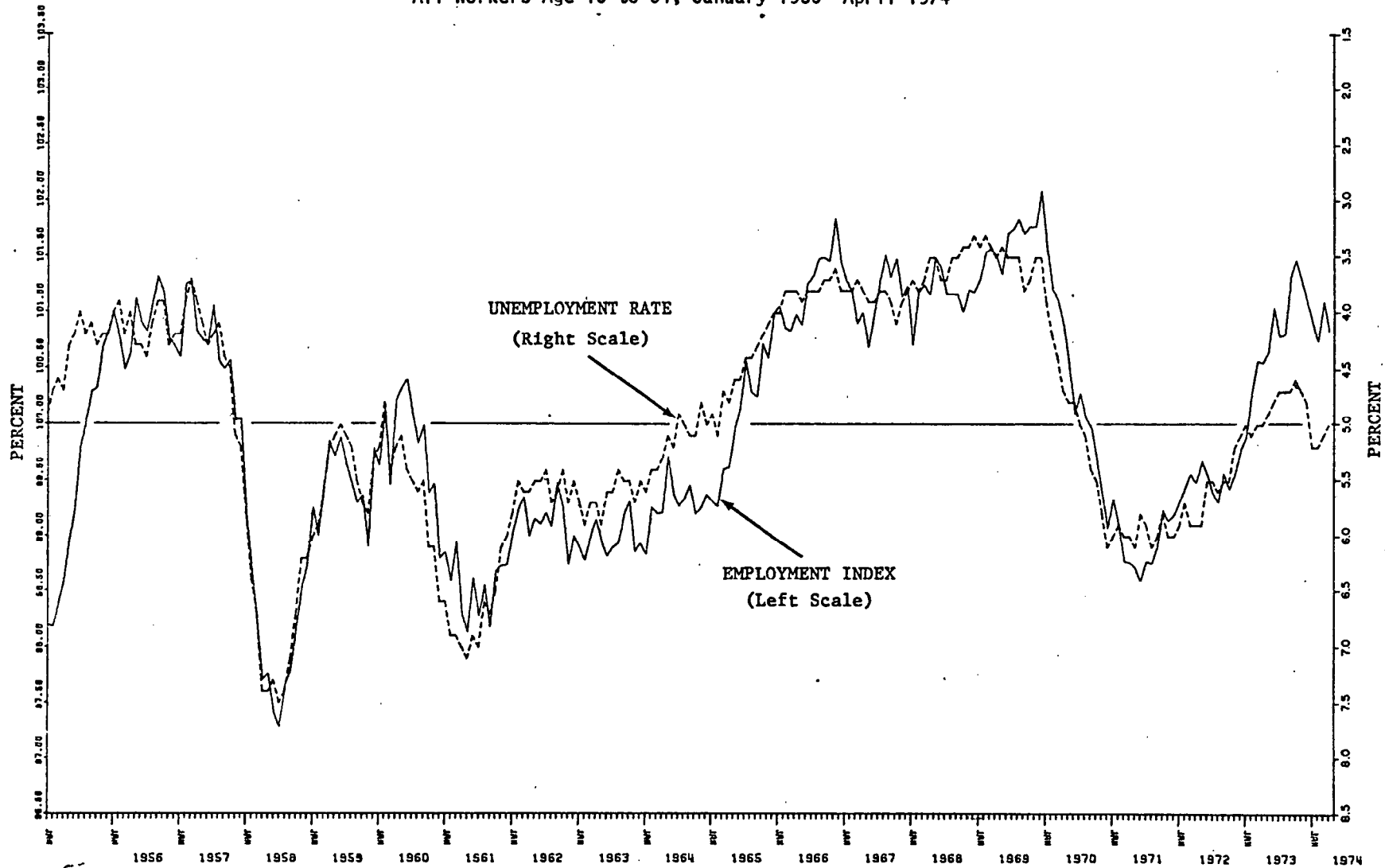
The employment pressure index was derived by dividing actual employment figures by a population-adjusted trend value. Theoretically, the index measures excess demand or supply, assuming actual employment as a proxy for labor demand and that the trend measures long-term labor supply.

---

<sup>1</sup>The average from 1955 to 1973.

FIGURE 1.—EMPLOYMENT PRESSURE INDEX AND UNEMPLOYMENT RATE (INVERTED)

All Workers Age 16 to 64, January 1955--April 1974



The trend is derived by (1) regressing population and a time trend on employment; (2) generating trend data from the regression equations; and (3) summing across subgroups to obtain the trend for total employment. Figure 2 shows the summary trend plotted against actual employment from 1955 to 1973.

The estimating equations for the employment trend are:

$$E_i^* = a_i + b_i(T) + c_i(T)^2 + d_i(P_i),$$

where  $E_i^*$  = computed employment in the  $i^{\text{th}}$  employment group,<sup>2</sup>  $T$  = time (January 1954 = 1), and  $P_i$  = U. S. civilian resident population in the  $i^{\text{th}}$  group. The employment pressure index plotted in Figure 1 is thus defined as  $E' / (\sum_{i=1}^{16} E_i^*)$ , where  $E'$  is total employment.

In developing the EPI, some adjustments in the basic technique were made to account for changes in armed forces personnel. Since the physical and mental abilities of armed forces recruits and draftees made them more likely to have been employed than the average member of their age-race-sex population group, changes in armed forces personnel affected employment more than proportionally in some groups. The data for males 20-24 and 25-34, therefore, were adjusted by regressing armed forces personnel on the difference between the EPI and the unemployment rate (inverted) of the group, and then adjusting the employment trend for variation explained by the regression. The  $R^2$ 's for those regressions were 0.64 and 0.13 respectively.

#### The Differences Between the Employment Pressure Index and the Unemployment Rate

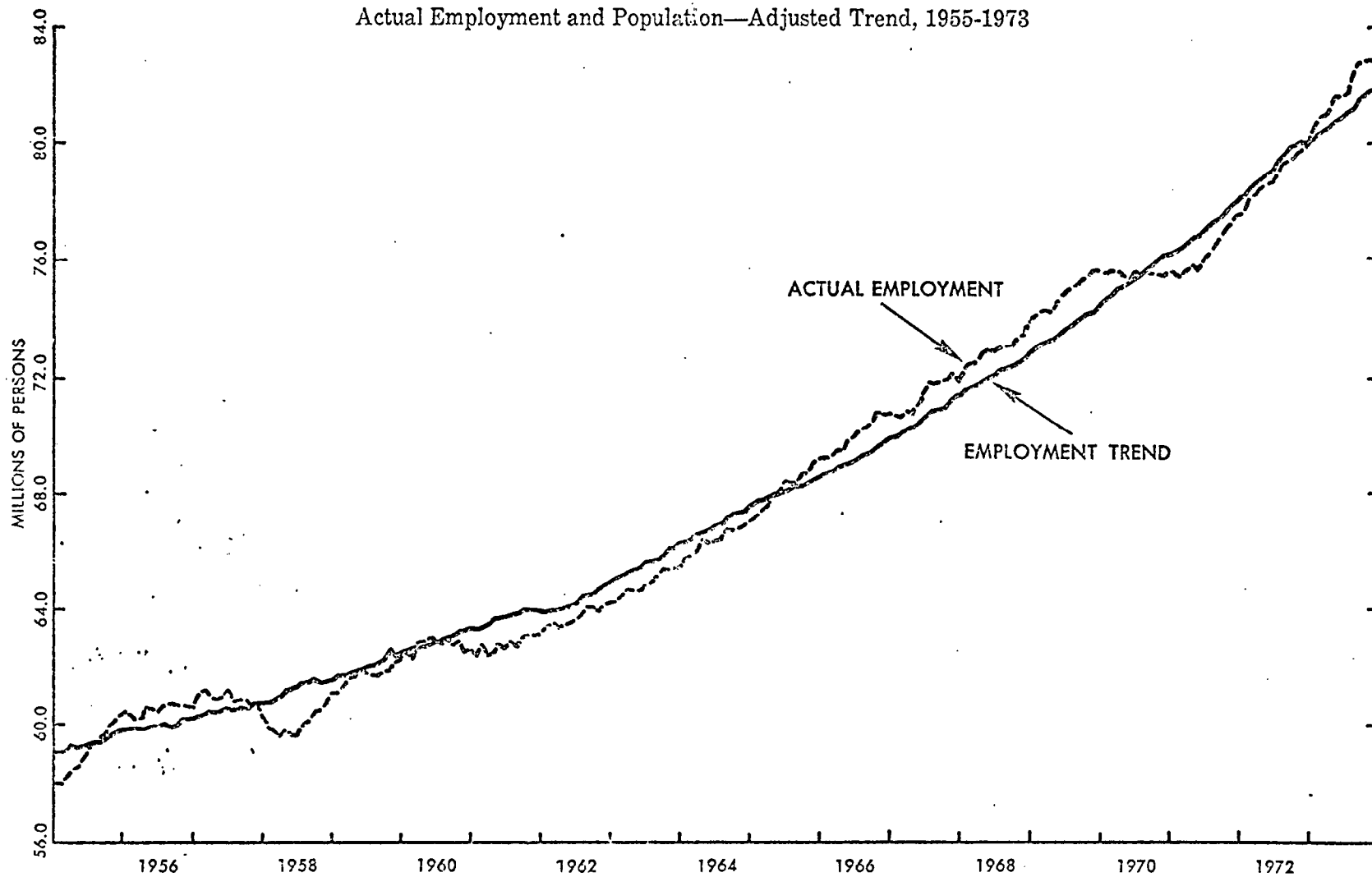
The differences between the employment pressure index and the unemployment rate are classified into two categories: (1) differences

---

<sup>2</sup>There were 16 groups, by sex, race, and age (16-19, 20-24, 25-34, and 35-64). A table is available from the author upon request detailing the regression results.

Figure 2.—Total Employed Persons, Age 16 to 64

Actual Employment and Population—Adjusted Trend, 1955-1973



attributable to "discouraged workers" and (2) differences attributable to other factors.

### The "Discouraged Worker" Effect

One reason for developing an employment-based measure to analyze labor market conditions is to eliminate the so-called "discouraged worker" effect. The measured unemployment rate, it has been argued, has been seriously affected during economic contractions and recoveries by the exit and re-entry of discouraged workers from the labor force.

During the 1969-1970 recession, when the unemployment rate leveled off at around 6 percent, the EPI continued to fall, reaching a definite lower turning point in June 1971. It has shown a persistent recovery since that time. By contrast, the unemployment rate remained at around 6 percent for almost 1-1/2 years and was continuing to indicate relatively slack labor markets as late as fall 1973. At least for the 1969-1972 time period, a strongly operative discouraged worker effect could have explained the seemingly erratic behavior of the unemployment rate; for if workers dropped out of the labor force in 1970 and early 1971 and re-entered in late 1971 and 1972, the peak in the unemployment rate and the subsequent recovery could have been disguised.

Alfred Tella (1964 and 1965) and others have estimated the discouraged worker effect. Tella used trend variables to estimate participation rates for various age-sex breakdowns. He was then able to estimate a potential full employment labor force, which, when compared with the actual data, enabled him to estimate the number of discouraged workers.

Tella found that the discouraged worker phenomenon affected females more strongly than it did males. Since females are less likely to be breadwinners than males, this finding is consistent with a priori judgment. In

fact, a priori reasoning could lead a step further. Since white females are less likely to be breadwinners than nonwhite females, they should be more strongly subject to the discouraged worker effect than nonwhites. The female participation rate for the civilian labor force in 1960 was 33.4 percent. In 1969, it was 37.8 percent. Much of this increased female participation was in the white female group. The changing composition of the civilian labor force between 1960 and 1969 thus may have lent itself to a stronger discouraged worker effect. Moreover, as can be seen from a comparison of Figures 3 and 4, there is a greater difference between the EPI and the unemployment rate for females than for males.

The 1970 recession, which fell relatively heavily on highly skilled and highly educated white-collar workers, may have produced a stronger discouraged worker effect for males as well since highly skilled workers, having relatively more job information than the average worker, may be more inclined to postpone their job search when prospects look meager.

These hypotheses provide plausible explanations of some divergency between the EPI and the unemployment rate, but the evidence weighs against discouraged workers as the root cause of the differences. According to the Labor Department's estimates of discouraged workers, their numbers have been quite small relative to the total number of unemployed workers. The BLS survey put the average number of discouraged workers at 574,000 in 1969 and 774,000 in 1971. By contrast, the total number of unemployed workers averaged almost 5 million. Thus, if the Labor Department data are accurate, only a small part of the divergence between the unemployment rate and the EPI could be explained by changes in the numbers of discouraged workers. However, as Paul Flaim of the BLS has noted: "Given the subjective and elusive nature of 'discouragement,' the extent of its possible overstatement and understatement cannot be measured." (1973).



FIGURE 3.—EMPLOYMENT PRESSURE INDEX AND UNEMPLOYMENT RATE (INVERTED)

Males Age 16 to 64, January 1955--April 1974

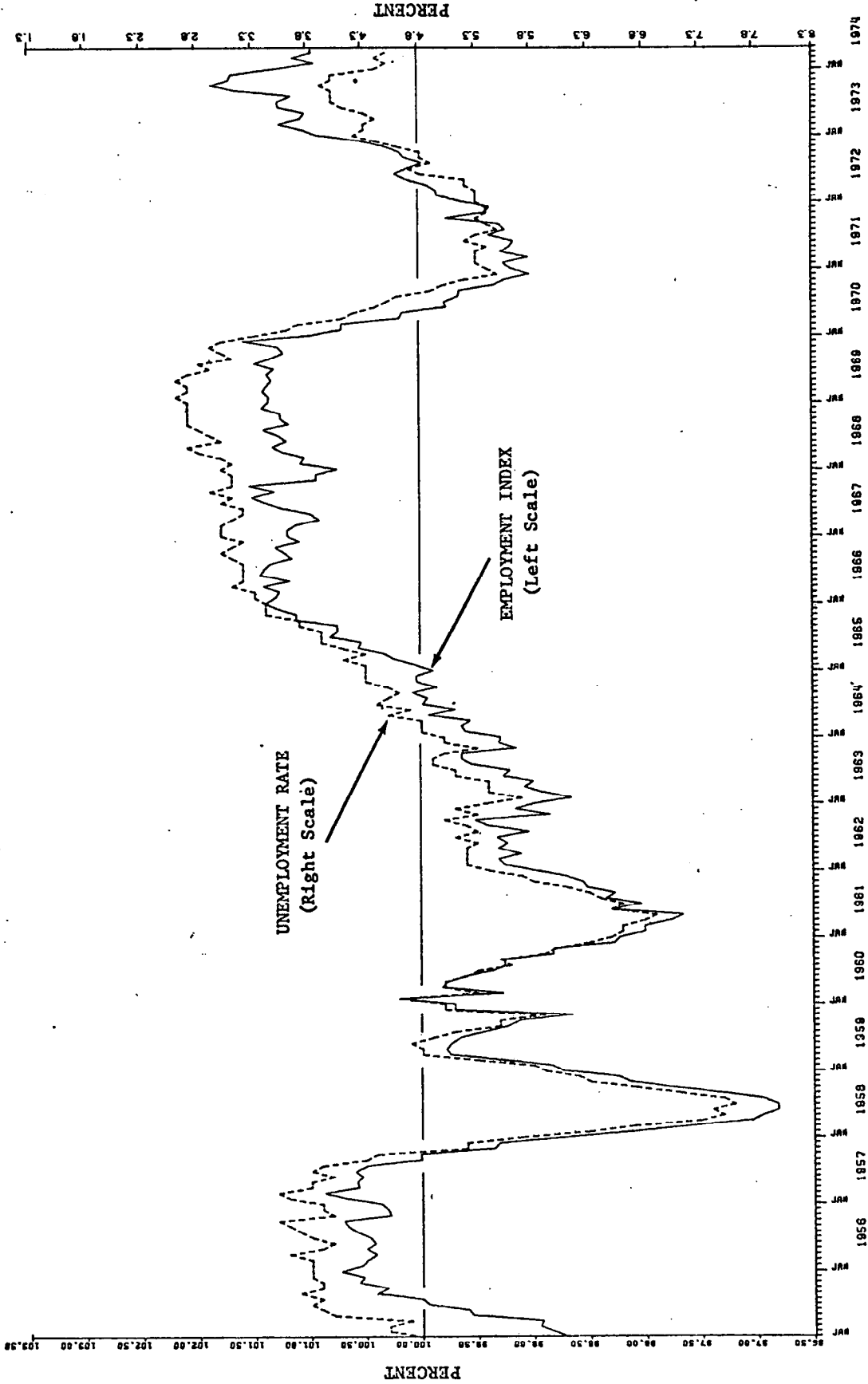
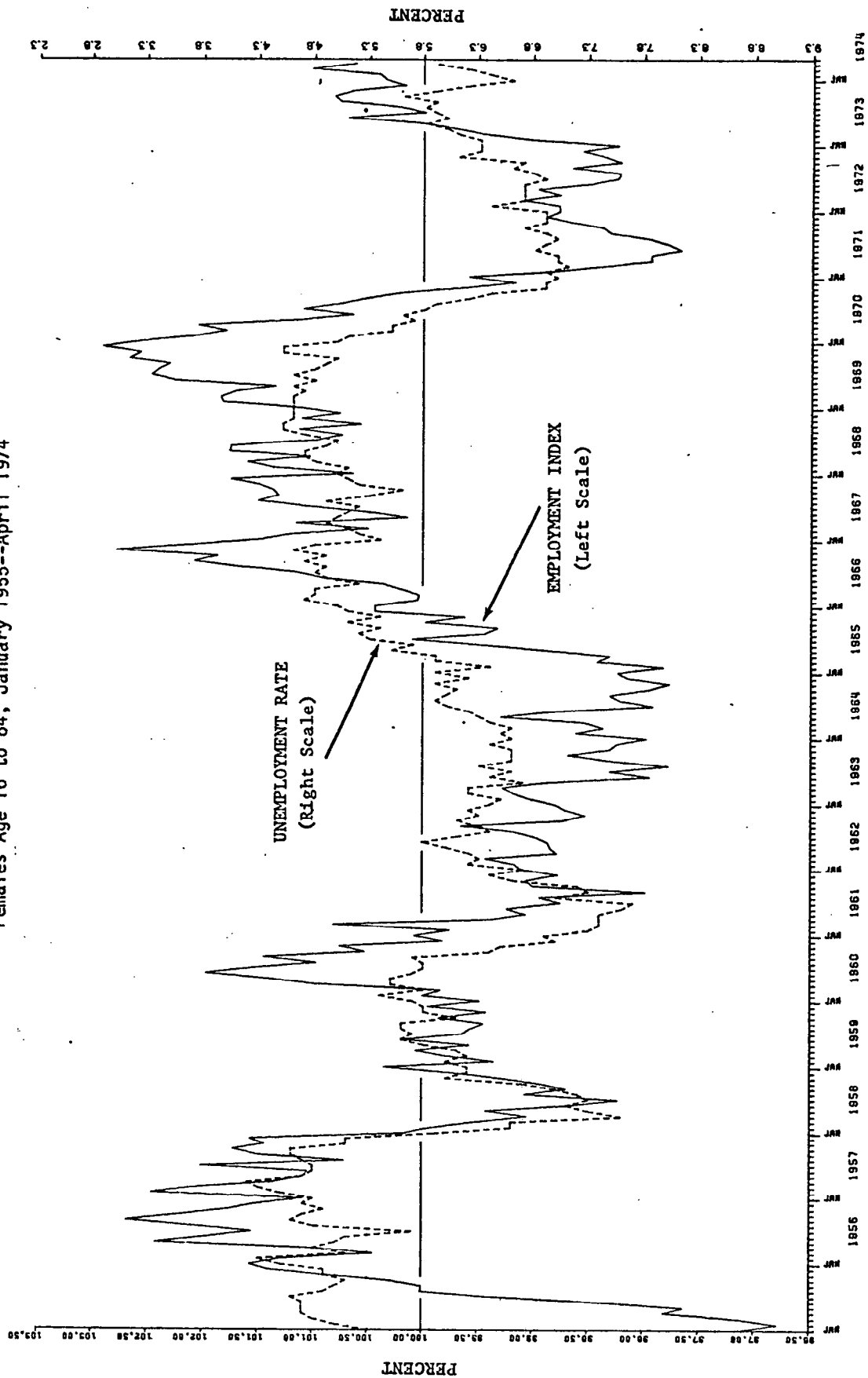


FIGURE 4.—EMPLOYMENT PRESSURE INDEX AND UNEMPLOYMENT RATE (INVERTED)

Females Age 16 to 64, January 1955--April 1974



Tella's estimates, derived indirectly by methods that are similar to those used in estimating the employment trend values for the EPI, have been consistently higher than those of the Labor Department. Unfortunately, his estimates would not provide an independent test of the EPI.

Preliminary findings, however, suggest that the discouraged worker effect cannot completely explain the recent divergence. For example, the EPI had matched the 1967-1968 levels, equivalent to an unemployment rate of 4 percent, by June 1973. The measured unemployment rate, however, was around 4.8 percent. The EPI for males moved above 101.0 in early 1973, and it was indicating extraordinary labor market pressure by September (101.9). The male unemployment rate, however, was 4.2 percent during January 1973 and 4.0 percent in September, equivalent to an EPI of only 100.8. Such large discrepancies, particularly when the economy was near full capacity, makes the discouraged worker explanation seem implausible.

#### Other Differences Between the EPI and the Unemployment Rate

The difference between the EPI and the unemployment rate for females may be partially attributable to biases in the EPI trend equations stemming from the rapidly rising female participation rates in the late sixties. On the other hand, rapidly rising participation rates also make difficult the interpretation of female unemployment, since a larger percentage may have been frictional and not of concern for aggregate economic policy.

As shown in Figure 3, the EPI for males fluctuated between 101.0 and 101.5 during the 1967-1969 time period, while the male unemployment rate fell from around 3.5 percent to almost 2.5 percent. Thus, the two series, usually quite similar, were considerably different during that interval. The EPI and the unemployment rate at full employment, however, may diverge

for technical reasons. As firms approach full capacity, there is some limit to the number of workers that they can absorb per time period. The EPI would indicate that the limit for male workers was around 1.5 percent more than trend in 1967-1969. The unemployment rate, of course, would continue to fall whenever  $EPI > 100.0$  because long-term labor supply is included in the trend.

Finally, some of the divergence in 1972 and 1973 can probably be explained by a variation of the additional worker effect. Secondary breadwinners can enter the labor force to supplement the family income during recoveries as well as during downturns. During periods in which prices are increasing rapidly, as in 1972-1973, such an additional worker effect may be quite strong. If so, unemployment will not drop as rapidly as might be predicted from the increase in employment.

### Conclusions

This article has presented a new index, based solely on employment data, and has used it to evaluate alleged deficiencies in the published unemployment statistics. The new series, an employment pressure index, generally corroborates until recently the accuracy of the male unemployment rate series. For females, however, some discrepancies cannot be reconciled without additional information, and they may be attributable to bias in both series. Recent behavior of the unemployment rate and the EPI, however, seems to indicate that the latter is presently the more sensitive coincident indicator.

Consistent with the preponderance of signals of the growing pressure of aggregate demand on economic capacity, the EPI showed increased tightness in labor markets throughout the first half of 1973. By the summer

of 1973, the EPI had regained the high employment levels of 1967-1968. In contrast, the unemployment rate gave a different and seemingly less accurate picture. The explanation of the recent divergence between the EPI and the unemployment rate is therefore of importance for purposes of economic policy, for if the unemployment rate measures something different from what it used to measure, the working definition of full employment should be modified. It appears, therefore, that although regular publication of the EPI series would involve periodic revisions (the trend equations should not be extrapolated far beyond the data from which they are estimated), publication of them would provide important additional information on labor market conditions.

SELECT BIBLIOGRAPHY

1. Bowen and Finegan. "Labor Force Participation and Unemployment," Employment Policy and the Labor Market (Berkeley and Los Angeles: University of California Press, 1965).
2. Thomas Dernburg and Kenneth Strand. "Hidden Unemployment 1953-1962: A Quantitative Analysis by Age and Sex," American Economic Review, Vol. LVI, No. 1, March 1966.
3. Flaim, Paul. "Discouraged Workers and Changes in Unemployment," Monthly Labor Review, March 1973.
4. Moore, Geoffrey. Wall Street Journal, Feb. 3, 1972.
5. Moore, Geoffrey. How Full is Full Employment (Washington: American Enterprise Substitute for Public Policy Research, 1973).
6. Perry, George. "Changing Labor Markets and Inflation," Brookings Papers on Economic Activity, III, 1970.
7. Tella, A. J. "Labor Force Sensitivity to Employment by Age, Sex," Industrial Relations, Vol. 4, No. 2, Feb. 1965.
8. A. J. Tella and P. A. Tinsely. "The Labor Market and Potential Output of the Federal Reserve--MIT Econometric Model: A Preliminary Report," Staff Economic Studies, No. 45.
9. W. J. Simler and A. J. Tella. "Labor Reserves and the Phillips Curve," Review of Economics and Statistics, Vol. 50, Feb. 1968.
10. Tella, A. J. "The Relation of Labor Force to Employment," Industrial and Labor Relations Review, Vol. 17, April 1964.