Sumner H. Slichter.[a] I shall spend most of my time discussing several aspects of technological unemployment, but I wish to make a few preliminary remarks in regard to Professor Douglas' method of measuring the elasticity of demand.

The change which he proposes is a simple one and easy to understand. The elasticity of demand has ordinarily been conceived as a relationship between price changes and the quantity of the goods which is purchased. In place of the comparison between these two quantities, Professor Douglas proposes to examine the relationship between the exchange value (relative price) of a commodity and the relative quantity of the commodity that is purchased.

The usefulness of the proposed method of measuring the elasticity of demand depends upon whether it has greater prediction value than other methods. In other words, is there a more regular and consistent relationship between exchange values and relative quantities purchased than between prices and actual quantities purchased? This is a question which can be answered quite readily by computing elasticity in several ways. Consequently, I hope that Professor Douglas will compute elasticities by one or more of the other methods and compare the results with those produced by the method which he proposes.

My own conviction is that Professor Douglas' formula probably does not possess as great prediction value as do several other formulae. For this belief there are three principal reasons. In the first place, it would not be logical to expect a very constant relationship between the exchange value and the relative quantity of a commodity that is sold. Economists distinguish between competitive goods and complementary goods. Goods that directly compete with one another are, of course, competitive goods; goods that are used together are complementary goods. A change in the relative quantity of a good might be produced by changes in the output of (1) competitive goods or (2) complementary goods. And yet the effect upon the exchange value of the good would be exactly the opposite in the two cases.

A second reason for doubting the prediction value of the formula rests, not in the logic of its construction, but in the nature of the data which its use requires. It demands the use of many items for which no reliable figures are obtainable. Professor Douglas derives the exchange value by dividing an index of the price of the commodity by an index of the general price level. But no satisfactory index of the general price level exists—no index, for example, which includes such important items as rent, wages, or transportation rates. Having obtained two unreliable exchange values (one for each of the two years which are being compared) Professor Douglas divides one into the other. In order to compute the relative quantity of the commodity purchased, Professor Douglas must deflate the estimated national income for each year in the comparison. No satisfactory figure for the national income exists and the deflation must be accomplished by the use of the unsatisfactory index of the general price level. There are several additional divisions in which these necessarily unreliable results are divided into each other. In fact, an examination of the formula shows that there are no less than four divisions in which the uncertain general price level is the divisor, two in which the uncertain national income is the dividend, and three in which these unreliable results are divided into each other. This pyramiding of the division of one uncertain quantity into another uncertain quantity is likely to magnify errors. It is not surprising that for the last seven years Professor Douglas' results for the flexibility of the price of pork exhibit little regularity: -2.5; -5.7; -10.4; -5.0; +1.6; -14.9; -2.2.

In the third place, the prediction value of the method is restricted by the fact that it expresses elasticity in terms of exchange value rather than price. Exchange value is likely to be more difficult to forecast than price because it requires, in addition to a forecast of the price of the given commodity, a forecast of the general price level.

But let us pass on to a brief discussion of several aspects of the problem of technological unemployment. Is there more technological unemployment today than formerly? No one knows. In an attempt to answer the question, I have computed the unemployment rate for selected periods during the last thirty years, avoiding years of pronounced depression when the volume of cyclical unemployment was large. I have used the best estimates that are available, namely, those of Douglas for the period before 1920, and those of Givens and Wolman for the years subsequent to 1920. The average unemployment in manufacturing, transportation, building and mining for selected periods was as follows:

1900 to 1907 inclusive.....7.6 per cent
1909 to 1913 inclusive.....8.1 per cent
1916 to 1920 inclusive.....6.2 per cent
1923 to 1926 inclusive.....9.1 per cent

Apparently there has been a moderate secular increase in unemployment. But, in view of the approximate character of the estimates of unemployment, too much importance must not be attached to this apparent increase. Certainly the increase is scarcely sufficient to explain the great discussion which technological unemployment has provoked. This discussion has been due, I think, largely to the kind of people who are unemployed and the kind of unemployment which they have suffered. The men who have lost their jobs because of labor-saving methods and geographical shifts in industry have been men who have found it exceedingly difficult to obtain other work. They have been the older and the less desirable employes. Once crowded out, they have found it exceedingly difficult to obtain steady work again. The investigations of Lubin, Clague and Myers show this conclusively. Although the relative amount of unemployment has not been much greater than before the war, it has been more painful and serious to the individual.

Professor Douglas has suggested that displacement of labor is not likely to occur in industries which produce commodities that are elastic in demand. In some cases this may be true but in many (I suspect the majority) it is not. Why? For one reason, the labor-saving changes always precede the price changes. The price changes, even though they ultimately may be great, occur very gradually. A few plants in the industry put in a labor-saving method. They are not anxious to cut prices. They are anxious to keep the profit of the labor-saving method for themselves. They cut prices only enough to keep busy. In the meantime, however, they get rid of a number of men. Possibly that process goes on for a number of years. More and more plants put in the labor-saving device. Men are displaced. The price gradually goes down, but the price adjustment always lags behind the technological change. The men who have been released—the older and the less desirable men—are not necessarily taken back by the industry when it finally begins to absorb labor. The industry competes with every other industry to get the cream of the men in the labor market, and the employes who have been crowded out by labor-saving methods are not hired by any industry until younger and more desirable men are not available.

Another reason why serious technological unemployment may accompany an elastic demand is because technological changes alter the occupational demands of the industry. The introduction of the molding machine may destroy the demand of an industry for skilled molders. It may also reduce the price of the product, increase the sales, and lead the industry greatly to increase its force of machinists. But as far as the displaced molders are concerned, the demand for labor might just as well be in some entirely different industry—as it would be in case the demand for the product were inelastic rather than elastic.

Technological unemployment may be aggravated by the fact that the process of introducing labor-saving devices is often a cumulative one, especially in periods of falling prices. One industry is enabled by a labor-saving invention to cut the price of its product. Other industries, which make products that more or less compete, find their markets shrinking. In order to keep up their sales, they must cut their prices too. Consequently managers are stimulated to discover ways of increasing efficiency and cutting costs. This spreads from industry to industry. The result is that men may be displaced by labor-saving methods faster than they are absorbed by the growth of industry. This situation is less likely to occur in periods of rising prices because rising prices are a sort of subsidy to everyone in business. Consequently, when prices are advancing, managers do not feel such a compelling necessity to cut their costs. In a period of falling prices, however, the pressure on managements to preserve profits by cutting costs is doubly strong and the displacement of men is likely to exceed the power of industry to absorb them at existing wage rates. This, I believe, has been the situation in American industry during the last eight or nine years.

I wish to close with a constructive suggestion. There are about 200,000 manufacturers in the United States. It is an elementary principle of management and of politics that, in order to get

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