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Potential Labour Surplus

A new attempt to relate excess capacity in the labour market to wage and price changes

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In this paper we question the validity of the traditional unemployment rate as an appropriate proxy for excess capacity in the labour market. We offer in its place an alternative measure, the Potential Labour Surplus, which appears to rehabilitate the simple Phillips curve and the inflation-unemployment trade-off. This measure is then tested on the basis of North American labour market data.

Professor Phillips, in his well known study,[2] made a significant contribution to the analysis of wage movements. By the simple Phillips curve we refer to his estimation of the inverse relationship between money wage changes and the level of unemployment, which he investigated on the basis of data for the United Kingdom for the period 1861 to 1957. The implication of that original investigation, and of the numerous studies which followed it, was that the rate of increase in a country's money wages could be slowed down only at the undesirable cost of higher levels of unemployment. Phillips's original statistical investigation concerned itself only with this wage-unemployment trade-off, but the trade-off analysis has been extended to the sometimes observed inverse relationship between price changes and the level of unemployment,[3] i.e. the inflation-unemployment trade-off.

The policy implications of an inflation-unemployment trade-off are, of course, unpleasant. Stimulating the over-all demand in an economy will not lead to greatly increased production if some of the currently unemployed are relatively unskilled or voluntarily out of work. Demand stimulation by policy-

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[2] A. W. Phillips: " The relation between unemployment and the rate of change of money wage rates in the United Kingdom, 1861-1957 ", in *Economica* (London), Nov. 1958, pp. 283-299.

[3] This usually meant adopting some type of mark-up pricing assumption to tie up the change in wages to the change in prices.

makers will therefore lead to greater inflation, but not necessarily to significantly less unemployment. Significantly lower levels of unemployment can only be achieved by greater and greater rates of inflation. In such a situation trading off more inflation for less unemployment can leave the policy-maker in an awkward position.

This position has been complicated in recent years by a growing instability of the trade-off between wage or price changes and unemployment. The trade-off appears to have worsened since the mid-1960s and in fact seems to be non-existent today.[1] The message we get is quite clear: the Phillips curve, as currently measured, seems to be rather unstable over moderately long periods. However, in the following pages we will argue that, since the unemployment rate as traditionally measured is not an appropriate measure of excess capacity in the labour market, the statistical results which purport to support the contention about unstable Phillips curves are questionable.

The analysis and policy implications of the wage change-unemployment and inflation-unemployment trade-offs have, to date, been most relevant to the developed market economies.[2] In the discussion that follows we will be concerned only with those economies, and our empirical work will centre on the use of definitions and data first from the United States and then from the Canadian labour markets.

The Phillips curve called into question

Publications dealing with the Phillips curve have ranged from books to short notes in learned journals, and there are several excellent survey articles of the voluminous literature that has resulted.[3] Most early writings appeared to support the existence and stability of the trade-off between unemployment and wage or price changes. However, in the last decade, the same trade-off curves were challenged on both theoretical and empirical grounds. For example,

> The actual behavior of the American economy from the end of the Korean price controls to the middle sixties seemed generally to confirm the trade-off view. That is to say, there seemed to be a reasonably reliable relation between the tautness of the economy and the behavior of wages and the price level, after the various other market forces had been taken into account. . . . But thereafter something seemed to go haywire. There has been, more or less ever since, a tendency for wages and prices to rise faster than those previously reliable relationships would have predicted.[4]

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[1] By a worsening of the trade-off is usually meant, for example, that any given level of unemployment is accompanied by a higher level of inflation than was previously the case.

[2] For a discussion of the limitations of the applicability of the Phillips-type analyses to less developed countries see A. Butler and P. Della Valle: " 'Surprise' inflation, economic growth and employment ", in *International Labour Review*, Dec. 1971, pp. 489-504.

[3] See especially K. W. Rothschild: " The Phillips curve and all that ", in *Scottish Journal of Political Economy* (Edinburgh), Nov. 1971, pp. 245-280; also D. W. Laidler and J. M. Parkin: " Inflation: a survey ", in *Economic Journal* (London), Dec. 1975, pp. 741-809.

[4] R. M. Solow: " The intelligent citizen's guide to inflation ", in *Public Interest* (New York), Winter 1975, pp. 56-57.

Or, " The annual data make clear that evidence obtained solely from data of the last twenty years offers weak support for any proposition about short-run Phillips curves. "[1]

The explanations of the new instability are in abundant supply. This is no place to deal with them, since there are almost as many explanations as there are economists to propound them. One detects however a few mainstreams of thought.

Some economists attribute the shift in the trade-off curves to changes in the age-sex composition of the labour force; others to the increased monopoly power of trade unions and/or large corporations; still other economists circumvent the problem by denying the existence of the trade-off in anything but the short run. A great deal has been written on the role of expectations and their influence on both wage and price changes.

Numerous econometric models have been built, and techniques employed, incorporating an array of variables which initially tried to improve, and later to revive, the trade-off curves in question. While most of the models have contributed valuable insights into the problem, the fact of the matter is that they have not been very successful in accounting for the relationship between the rate of change in wages (prices) and unemployment over the last decade or so.

In our view the lack of a statistical relationship during this period is not due to any obvious theoretical errors flawing the recent models. We believe that the trade-off between changes in wages (prices) and unemployment went " haywire " because the *measure* used as a proxy for the imbalance of demand and supply in the labour market was not appropriate. Quite simply, the unemployment rate as traditionally measured is not a good proxy for the excess supply of those workers who are willing and able to work. A number of people share this view and some, in their efforts to improve the explanatory power of their models, have reworked and adjusted the traditionally reported unemployment figures.[2] Alternatively, some authors have simply replaced unemployment with other explanatory variables.

Several studies have pointed to the shortcomings of the unemployment measure so widely used today.[3] We cannot elaborate on such shortcomings in this paper, but a few of the criticisms that are of particular relevance to the United States and Canadian labour force surveys warrant repetition.[4]

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[1] K. Brunner and A. Meltzer: " The Phillips curve ", in Karl Brunner and Allan Meltzer (eds.): *The Phillips curve and labor markets* (Amsterdam, North-Holland Publishing Company, 1976), p. 7.

[2] See for example G. L. Perry: " Changing labor markets and inflation ", in *Brooking Papers on Economic Activity* (Washington), No. 3, 1970, pp. 411-441.

[3] For a recent discussion of the problems involved in the concepts of employment and unemployment see Jean Mouly: " Employment: a concept in need of renovation ", in *International Labour Review*, July-Aug. 1977, pp. 1-7.

[4] We should stress the point that the household sample survey technique referred to here is not the most common method of gathering information on employment and unemployment. Most governments rely on administrative statistics. Nor do we wish to imply in our

The definition is arbitrary.[1] Official government surveys, in the US for example, count as unemployed those persons not working during the survey week who have made specific efforts to find a job within the past four weeks and who are available for work. When do we make specific efforts to find jobs and when do we not? Why within the past four weeks? And how are we judged to be supposedly available for work?

Changes in any of the survey criteria would result in an unemployment figure that would differ from the figure currently reported. It follows, then, that the definition of the labour force is also arbitrary. Persons who do not meet the specific survey requirements are excluded from the labour force, although they may very much consider themselves part of it. Furthermore, what do we do with retired persons or housewives who again do not qualify as members of the labour force? Both these groups, it should be noted, will include persons of above-average skill levels who therefore might obtain employment sooner than some of the persons who have made specific efforts to find a job within the past four weeks. The arbitrary nature of measured unemployment varies among different groups within the labour force. Prime working-age males, with high participation rates, suffer less from definitional shortcomings than, for example, females of child-bearing age. Nevertheless, in all cases the problem exists, only the extent differs.

Any attempt to quantify those who are willing and able to work faces the problem of isolating hidden unemployment, i.e. those people who remain outside the " traditional " labour force through volition or definitional disqualification. Attempts at measuring hidden unemployment, even if we accept the traditional definition of the labour force, are further hindered by the controversy about the behaviour of secondary workers in the course of the business cycle.[2]

Potential Labour Surplus

We feel that the problems inherent in any measurement of unemployment can be circumvented by classifying people of working age and over as being either employed or potentially employable. The labour market can be viewed as a long queue, where persons who are potentially employable line up in accordance with their qualifications and experience. The employed tend to be those near the front and the unemployed near the end of the queue. Hence,

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discussion that there is anything wrong with the way the US and Canadian Governments gather their data. In fact just the opposite is true, since both governments have made serious efforts to refine and improve their unemployment statistics.

[1] The arbitrary element in defining unemployment as well as other labour force concepts is, of course, necessary, since some criteria must be established by any government so that measurements can be made. On this point see Mouly, op. cit., p. 2, and ILO: *International recommendations on labour statistics* (Geneva, 1976).

[2] See for example J. Mincer: " Labor-force participation and unemployment: a review of recent evidence ", in R. A. Gordon and M. S. Gordon (eds.): *Prosperity and unemployment* (New York, London and Sydney, John Wiley and Sons, 1966).

towards the end of the queue we have persons with low skills, little experience and those who are not really interested in obtaining jobs for whatever reasons. Instead of arbitrarily cutting off one section of the queue, we include in the labour force all persons who are of working age and over, whether they are employed, unemployed or excluded from the labour force as traditionally defined.

We define Potential Labour Surplus (PLS) as

$$\text{PLS} = \frac{\text{Potential labour force} - \text{Employment}}{\text{Potential labour force}}$$

where the potential labour force equals the total civilian non-institutional population that is of working age.[1]

We interpret the Potential Labour Surplus variable as another measure of unemployment, since it indicates in a very broad way the percentage of people who are not employed but might possibly take employment. The PLS figure includes, in addition to those currently counted as unemployed, those persons who remain outside the traditional labour force.

We realise that this broad definition of unemployment includes persons who may never, under any conditions, entertain the idea of being employed. For example, it will include some retired persons, some housewives with children, some of the physically or mentally handicapped, some high school and university students, and some individuals who find the very idea of working for a living repugnant.

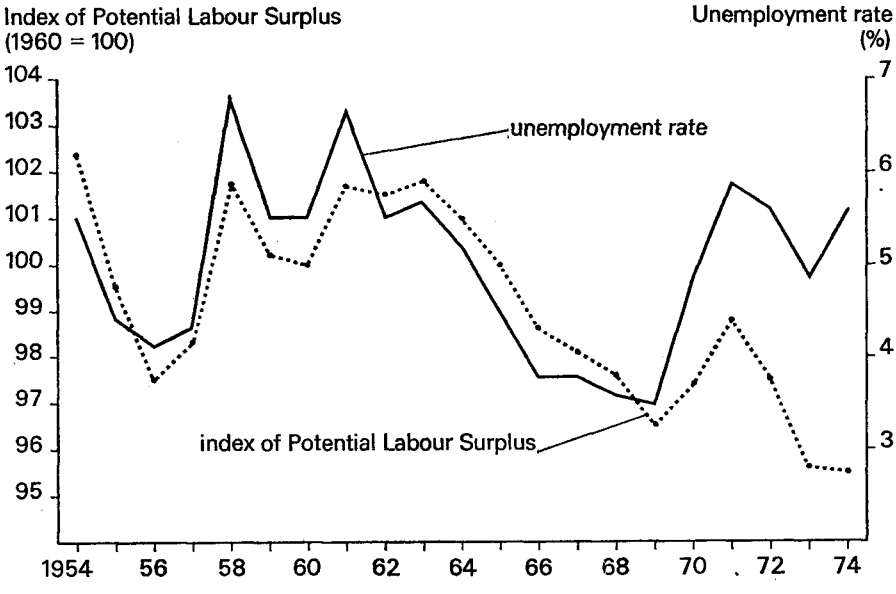
Obviously, the presence of such persons in the potential labour force reduces the accuracy of the PLS variable as a measure of the excess supply in the labour market. What is most important, however, is that the use of the PLS variable allows us to capture those unemployed persons who, under the present definition, are not so reported.

Our purpose here is not to develop a refined measure of the excess labour supply, but to demonstrate how the total impact of excess supply might affect changes in wages or prices. In order to use the PLS variable as a guide in policy decisions, one might refine its measurement so as to exclude certain hard-core unemployables. As a matter of interest, our statistical tests for the United States were undertaken both with and without people aged 65 and older. Since the results were similar in both cases, we included those over 65 in our reported results so that our measure of PLS would not exclude any potentially re-employable retired people.

The exact numerical value of PLS is not important since it is the change in its level that will give us an indicator of the state of the labour market at different times. It is for this reason that we use an index rather than the actual

[1] In our empirical tests for the United States, for example, we use the Bureau of Labor Statistics definition of " working age ", which includes all persons aged 16 years and over. In our Canadian tests we use Statistics Canada data which include persons aged 14 years and over. The lower limit of the definition of " working age " will of course vary from country to country.

Figure 1. Unemployment rate and index of Potential Labour Surplus, United States, 1954-74



Sources: See Appendix 1 below.

percentage rate. The actual level of PLS is, of course, ridiculously high when compared with the traditional unemployment rate. For example, in the United States the average value of PLS for the period 1954-74 was 44.66 per cent, while the average unemployment rate for the same period was 5.0 per cent.

Figure 1 presents curves for the level of the traditional unemployment rate U and our index of PLS using US labour market data for the years 1954-74.

We observe that the two series often move together, but there have been periods when the divergence between them was considerable. The last five years have been of particular concern to those who measured the trade-off curves using the traditional unemployment rate. It is over this period that we note an increasing divergence between the two series. This indicates that the traditional unemployment rate has increasingly overestimated the number of people " willing and able " to work in recent times.

Potential Labour Surplus and wage and price changes

We now turn to some simple statistical tests to compare the performance of the standard unemployment rate variable and the PLS variable in the naive

version of the trade-off relationship for wage and price changes. As indicated earlier, the tests were performed, using annual data, for the period 1954-74.[1] We obtained the following results for the United States:

$$(1)\ CW_{US} = 7.17 - 0.526\ U \qquad R^2 = 0.09$$
$$(0.384)$$

$$(2)\ CW_{US} = 76.50 - 1.611\ PLS \qquad R^2 = 0.84$$
$$(0.164)$$

$$(3)\ CP_{US} = 4.62 - 0.340\ U \qquad R^2 = 0.01$$
$$(0.640)$$

$$(4)\ CP_{US} = 100.21 - 2.178\ PLS \qquad R^2 = 0.60$$
$$(0.412)$$

where CW is the annual percentage change in wages, and CP is the annual percentage change in the Consumer Price Index; U is the traditional unemployment rate, and PLS is the measure of Potential Labour Surplus. Standard errors are given in brackets.

It is obvious from these simple tests that the traditional unemployment rate (equations (1) and (3)) fails to explain the movement of either money wage rates or prices.

The coefficients for the PLS variable in equations (2) and (4), on the other hand, are highly significant, have the expected sign, and explain a considerable proportion of the annual percentage changes in both wages and prices.

The results of these simple tests lead to two obvious conclusions: firstly, the PLS variable is a considerably superior measure of excess supply pressures in the labour market; and secondly, the trade-off curves might be given a new lease of life if they were more accurately measured.

Since it is prudent to distrust simple answers to complex problems, we sought reassurance by performing the same kinds of tests with the Canadian data covering the same period. The wage and price variables are defined in the same way as those of the United States, except for a slight difference in the definition of the potential labour force which is referred to in the footnote on page 283. The following results were obtained:

$$(2a)\ CW_{CDN} = 94.28 - 1.843\ PLS \qquad R^2 = 0.84$$
$$(0.184)$$

$$(4a)\ CP_{CDN} = 79.59 - 1.594\ PLS \qquad R^2 = 0.80$$
$$(0.181)$$

The results for the equations using the traditional unemployment rate for Canada were as insignificant as those for the United States. On the other hand, the equations with the PLS variable ((2a) and (4a)) are at least as significant as those for the United States. In fact, the price change trade-off curve fares better in Canada.

[1] See appendices for data used.

Conclusion

The results given above suggest that the use of the Potential Labour Surplus concept could rehabilitate the trade-off curves as policy guiding instruments. By doing so, the concept helps to vindicate the Phillips-type analyses of the relationship between excess capacity in the labour market and wage or price changes. Future research might try to refine the quantification of Potential Labour Surplus in order to eliminate the " hard-core " unemployables from its definition. Measures of Potential Labour Surplus might also be incorporated into existing models of wage and price changes, in order to improve their performance.

Our task here was simply to reconcile the theoretical concept of excess supply in the labour market with the actual measurement of that supply. In terms of wage and price trade-off curves, Potential Labour Surplus seems to be a better indicator of the excess labour supply than the traditional unemployment rate. The persistent use of that traditional measure has handicapped the empirical results of existing wage and price models, as well as the policy recommendations which follow from their use.

Appendix 1. United States data, 1954-74

Year	Potential Labour Surplus (%)	Index of Potential Labour Surplus (1960 = 100)	Unemployment (%)	Change in money wages (%)	Change in Consumer Price Index (%)
1954	46.17	102.4	5.5	2.5	0.5
1955	44.85	99.5	4.4	3.6	0.4
1956	43.94	97.5	4.1	5.3	1.5
1957	44.32	98.3	4.3	5.0	3.6
1958	45.83	101.7	6.8	3.2	2.7
1959	45.17	100.2	5.5	3.6	0.8
1960	45.07	100.0	5.5	3.5	1.6
1961	45.82	101.7	6.7	2.4	1.0
1962	45.76	101.5	5.5	3.7	1.1
1963	45.86	101.8	5.7	2.7	1.2
1964	45.53	101.0	5.2	3.5	1.3
1965	45.05	100.0	4.5	3.8	1.7
1966	44.43	98.6	3.8	4.5	2.9
1967	44.21	98.1	3.8	4.7	2.9
1968	44.00	97.6	3.6	6.3	4.2
1969	43.48	96.5	3.5	6.7	5.4
1970	43.91	97.4	4.9	5.9	5.9
1971	44.51	98.8	5.9	6.8	4.3
1972	43.95	97.5	5.6	6.7	3.3
1973	43.07	95.6	4.9	6.8	6.2
1974	43.02	95.5	5.6	7.7	11.0

Sources: US Department of Labor, Bureau of Labor Statistics: *Handbook of Labor Statistics* and *Monthly Labor Review* (Washington), various issues.

Appendix 2. Canadian data, 1954-74

Year	Potential Labour Surplus (%)	Index of Potential Labour Surplus (1964 = 100)	Unemployment (%)	Change in money wages (%)	Change in Consumer Price Index (%)
1954	49.54	102.3	4.6	3.7	0.7
1955	49.38	102.0	4.4	2.8	0.1
1956	48.31	99.8	3.4	4.8	1.5
1957	48.46	100.1	4.6	5.9	3.3
1958	49.85	102.9	7.0	3.1	2.6
1959	49.35	101.9	6.0	4.2	1.0
1960	49.49	102.2	7.0	3.5	1.1
1961	49.63	102.5	7.1	2.2	1.1
1962	49.14	101.5	5.9	2.7	1.1
1963	49.15	101.5	5.5	3.7	1.8
1964	48.43	100.0	4.7	3.6	1.9
1965	47.73	98.6	3.9	4.9	2.4
1966	46.89	96.8	3.6	6.1	3.7
1967	46.77	96.6	4.1	6.7	3.6
1968	47.17	97.4	4.8	7.5	4.0
1969	46.81	96.7	4.7	8.1	4.5
1970	47.50	98.1	5.9	7.9	3.3
1971	47.49	98.1	6.4	9.0	2.9
1972	47.07	97.2	6.3	7.9	4.8
1973	45.68	94.3	5.6	8.8	7.5
1974	44.83	92.6	5.4	13.5	10.9

Sources: Statistics Canada: *Labour Force* and *Canadian Statistical Review* (Ottawa), various issues.