Björklund, Anders

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No. 73

MEASURING THE DURATION OF UNEMPLOYMENT: A NOTE*

by

Anders Björklund

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I INTRODUCTION

Ever since the early seventies, when labour economists became interested in "unemployment dynamics", a lot has been written about pure measurement problems in this field. The background to this literature is, shortly, the following: The only easily available unemployment duration statistics in the beginning of the seventies were the duration of uncompleted spells i.e. the time the unemployed had been unemployed until the time of the survey.

Most researchers found this statistic insufficient, and sometimes even irrelevant. Therefore a lot of work has been devoted to get data and measurement methods which provide statistics on especially the duration of the completed spells for those who become unemployed. In many countries the Bureaus responsible for unemployment statistics have made significant efforts to produce and publish the more detailed data that were needed for these purposes.

Recently Akerlof and Main[1] and Clark and Summers[2] have suggested additional statistics which highlight the total unemployment experiences for those currently unemployed. In particular Akerlof and Main suggest an "experience-weighted measure of unemployment duration", which is the average time those now unemployed will be unemployed until they eventually get a job (or leave the labour force).

In a note in this journal, written as an answer to Main, Layard[3] advocates the "traditional statistics", the duration of uncompleted spells, available already in the early seventies both for positive and normative purposes. Consequently one can

believe that all the work on measurement problems and all the money spent on production of more detailed data have been wasted. Furthermore, there is a high risk that Layards paper is taken as an excuse for not going on and producing more detailed unemployment data than are available today in many countries.

Even though I think that Layards paper in one respect contains a very constructive approach for further research in this field, I want to stress that the traditional statistics are not the only relevant measure of unemployment duration. Other measures are also needed both for positive and normative purposes.

II POSITIVE ANALYSIS

Suppose we are interested in positive analysis of unemployment, i.e. we want to explain why we have the stock of unemployment which we have. For this purpose Layard argues that the traditional statistics, i.e. the average uncompleted spell until the time of the survey, should be used. The reason is that, in a steady state, this measure also has another interpretation; it tells us how long time the average unemployed will remain unemployed from the time of the survey onwards.[4] Consequently it is a measure of the prospects facing the existing stock of unemployment. The experience-weighted measure proposed by Main and Akerlof does not have such a useful interpretation for positive analysis.

However, this is not all that can be said about positive analysis. The familiar decomposition of

unemployment into an inflow and a duration component

Stock = Inflow • Expected duration of those flowing in (1)

is also useful for such purposes. In my view (1) is useful because it is a way to decompose the stock of unemployment into different determinants. The reason is that the decisions by the actors in the labour market which influence, on the one hand, the inflow of new unemployed (or the probability of becoming unemployed) and, on the other hand, the expected duration of unemployment spells (or the inverse of the probability of leaving unemployment) are likely to differ substantially. For example the determinants of the probability of being laid off are likely to differ from the determinants of the probability of getting a new job given that unemployment already has occurred. Therefore it is a fruitful approach to apply different explanatory models to the two unemployment components. However, to become a really useful approach for positive analysis one also has to disaggregate the unemployment stock according to reason for having become unemployed; entrance and reentrance to the labour force, quits, temporary and permanent lay-offs are candidates in this respect.[5]

III NORMATIVE ANALYSIS

Layard develops a very constructive device for normative analysis of unemployment, namely a cost function for unemployment. If the compensated labour supply schedule of yearly hours is linear

it can be argued that the cost of unemployment as a function of duration is linear too. By applying a little simpler notation than Layard, the cost of unemployment in week t can be written

$$C_t = a \cdot t \qquad (2)$$

If the number of unemployed is denoted U and the number who have been unemployed t weeks is denoted U_t, the total unemployment costs in a certain week becomes

$$TC = \sum_{t=1}^{\infty} U_t \cdot a \cdot t = U \left(\sum_{t=1}^{\infty} \frac{U_t}{U} \cdot a \cdot t \right) = U \cdot \bar{t} \cdot a \qquad (3)$$

Consequently the total unemployment costs are proportional to the stock of unemployment and to the traditional duration statistics, the average length of unemployment until the time of the survey for those currently unemployed (here denoted $\bar{t}$). On the other hand the costs are <u>proportional</u> to the experience-weighted measure of unemployment duration too, since this is (in a steady state) twice as high as $\bar{t}$.

Of course, Layards conclusion relies on the assumption made about the cost function. Even though it is important to stress that more research is needed to find out the exact nature of this cost function, the one adopted by Layard seems to be reasonable as a first approximation to the problem.

However, Layard does not take into account that some individuals experience <u>repeated</u> spells with rather short intervals which must be taken into

account within the theoretical framework that is used.[6] To provide a simple counter-example to Layards proposition that the traditional statistics are the most important for normative purposes I will present another duration measure which probably is superior for groups who suffer from repeated spells.

Suppose we have data about the total number of persons who have been unemployed during a whole year (denoted N) and the number of unemployment weeks per person during the year. Such data are available in the U.S. and in Sweden since retrospective questions about the preceding year are asked in the labour force surveys in March and February respectively in these countries. The advantage with such data is that all unemployment spells during the calendar year are included. On the other hand it is a disadvantage that a spell which covers two calendar years is truncated and hence underestimated in such data. With this disadvantage in mind let us none the less see how such data can be used to estimate total unemployment costs.

First, note that the average stock of unemployment, U, with such data will be:

$$U = \frac{1}{52} \sum_{t=1}^{52} N_t \cdot t \qquad (4)$$

Let us next define a measure of unemployment duration which answers the following question: What are the expected unemployment weeks during a calendar year for a person, who is unemployed at a randomly chosen time during the year. This is in a sense an experience-weighted measure of duration

since persons with many unemployment weeks have higher weights. By our notation the measure becomes:

$$EW = \sum_{t=1}^{52} \left(\frac{N_t \cdot t}{52 \cdot U}\right) t \qquad (5)$$

The term within brackets represents the weight given to individuals with t weeks of unemployment during the year.

Next, we derive the total unemployment costs per week if the cost function (2) is applied to the total unemployment weeks during a year.

$$TC = \frac{1}{52} \sum_{t=1}^{52} N_t \cdot \frac{a}{2} \cdot t^2 \qquad (6)$$

To see this, note that the total unemployment costs for t weeks equals

$$\frac{a \cdot t^2}{2}.$$

From (5) and (6) we can see that total costs equals:

$$TC = U \cdot \frac{a}{2} \cdot EW \qquad (7)$$

Consequently it is proportional to the duration measure defined above.

Because of the truncation problem mentioned above this formula will underestimate the true costs. Still it captures repeated spells within a year which is an advantage for groups who usually suffer from this.

In Table 1 estimates of EW in (5) and the experience-weighted duration proposed by Akerlof and Main are presented using Swedish data. It appears that EW most years is higher for youth indicating that repeated spells are common for this group. In Table 2 corresponding data for the U.S. are presented. The same pattern appears for the U.S. However, the difference between EW and $2 \cdot \bar{t}$ is even higher for American youth, indicating that recurrent spells are more common in this country.

IV CONCLUSION

In this note it has been argued that the traditional duration measure - the average duration of incompleted spells until the time of the survey - is not sufficient for positive and normative analysis of unemployment.

The familiar "unemployment = inflow • duration" decomposition is useful for positive analysis and information about recurrent spells of unemployment is needed for normative analysis especially for youth.

Too little is known about the "cost function" for unemployment. Much more research is needed on this in the future. This research in turn will require detailed data about unemployment histories for individuals.

Consequently Layard's article cannot be taken as an excuse for not producing and presenting more detailed unemployment data than was done until the beginning of the seventies in most countries.

Table 1 Experience-weighted measures of unemployment duration in Sweden

	16-24 years		16-74 years	
	EW[a]	$2 \cdot \bar{t}$[b]	EW[a]	$2 \cdot \bar{t}$[b]
1971	22.9	18.2		
1972	26.2	23.0		
1973	22.9	23.4		
1974	21.6	19.6		
1975	22.3	20.0		
1976	20.8	20.0	24.9	30.4
1977	22.4	23.0	27.4	30.6
1978	23.5	22.8	28.1	32.4
1979	21.3	21.0	27.0	33.6
1980	24.1	20.6	26.8	31.0

[a] Estimated from the yearly retrospective survey, Central Bureau of Statistics. (See appendix.)

[b] Estimated from the regular labour force survey, Central Bureau of Statistics

Table 2 Experience-weighted measures of unemployment in the U.S.

	16-24 years		16 years and over	
	EW[a]	$2 \cdot \bar{t}$[b]	EW[a]	$2 \cdot \bar{t}$[b]
1978	24.1	18.4	24.5	23.8
1979	25.0	17.0	24.5	21.6
1980	27.0	19.2	27.0	23.8

[a] Source: Work Experience of the Population in 1978, Bureau of Labor Statistics. (See appendix.)

[b] The regular labor force surveys, Bureau of Labor Statistics.

NOTES:

1 G Akerlof and B Main, "An Experience-Weighted Measure of Employment and Unemployment Durations", American Economic Review, December 1981 and B Main "The Length of Employment and Unemployment in Great Britain", Scottish Journal of Political Economy, June 1981.

2 K Clark and L Summers, "Labor Market Dynamics and Unemployment: A Reconsideration", Brookings Papers, Washington 1979, 1.

3 R Layard, "Measuring the Duration of Unemployment: A Note", Scottish Journal of Political Economy, November 1981.

4 This result is explained by Layard op.cit. in note 3 and in Akerlof and Main op.cit. page 1005.

5 See A Björklund, "Studies in the Dynamics of Unemployment", Stockholm School of Economics, 1981, chapter 2, for such a look at Swedish unemployment.

6 Actually Layard is more explicit about this in his article "Youth Unemployment in Britain and the United States Compared" in R Freeman and D Wise (eds), "The Youth Labor Market Problem", University of Chicago Press, 1982.

7 R D Morgenstern and N S Barrett, "The Retrospective Bias in Unemployment Reporting by Sex, Race and Age", Journal of the American Statistical Association, June 1974.

8 A Björklund, "The Development of Unemployment in Sweden During the 1970s According to a New Measure", Statistisk Tidskrift 1981:3 (in Swedish with an English Summary).

APPENDIX

Some approximations were needed to compute EW. In both countries only frequency intervals are available for t.

The most detailed information is available for Sweden, namely 1, 2-4, 5-13, 14-26, 27-39, 40-49, 50-52 weeks. The midpoints in the intervals were used.

For the U.S. different information is available for those with and those without any work experience during the year. For the first group the following intervals are available: 1-4, 5-10, 11-14, 15-26, 27-39, 40-52. The midpoints were used for this group. For the group without work experience the following intervals are available: 1-4, 5-14, 15-26, 27-52. The midpoints were used except for the last interval for which a higher figure (44 weeks) was used. The reason is that the observations are likely to be concentrated on 52 weeks.

The use of these data are not without problems. In particular, there might be bias because of the retrospective nature of the questions. The study by Morgenstern and Barrett[7] indicates that this problem might be serious for the U.S., whereas the study by Björklund[8] for Sweden indicates the reverse for Sweden.

However, this problem is not at variance with the main point made in this paper, namely that more detailed data about unemployment durations are needed.

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