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A Duration-Sensitive Measure of the Unemployment Rate: Theory and Application

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Abstract

The measurement of unemployment, like that of poverty, involves two distict steps: identification and aggregation. In this two-step process, the issue of identifying the unemployed has received considerable attention but, once the unemployed have been identified, the aggregation issue has been addressed by simply 'counting heads': the unemployment rate is conventionally defined as the proportion of the labour force that, on a given date, is unemployed. This, in particular, leads to differences between individuals, in their unemployment experiences being ignored when the unemployment rate is being computed. This paper - predicated on the proposition that what matters to a person is not just the fact of unemployment but also its duration - proposes a methodology, derived from the measurement of income inequality, for adjusting unemployment rates so as to make them "duration-sensitive". In consequence, different values of the "duration-sensitive" rate will, depending upon the degree of inequality in the distribution of unemployment duration, and upon the extent to which society is averse to such inequality, be associated with the same value of the conventionally defined unemployment rate. A numerical example, based on published data for seven major OECD countries, illustrates the methodology.

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1 Introduction

The unemployment rate for a country is usually measured as the proportion of persons in its labour force who, at a particular date, are unemployed. One of the drawbacks of this measure is that it takes no account of differences between persons in their 'unemployment experience'. If, for example, at the census date of December 2001, 24 out of 144 persons in the labour force were unemployed, then the unemployment rate for 2001 would have been reported as 16.7%. However, the 24 persons unemployed in December 2001 could also have been unemployed in *each* of the other months of the year. On the other hand, *each* of the 144 persons in the labour force could have been unemployed for two months in the year. In between these two extreme scenarios, several other scenarios for the distribution of unemployment experience between persons in the labour force are possible. The point is that all these scenarios, embodying different distributive outcomes with respect to unemployment experience, result in the same value for the unemployment rate: 16.7%.

One might reasonably suppose that the loss to society (hereafter, referred to as 'social loss') from a given unemployment rate would be greater when the burden of unemployment fell on a small number of persons, who, in consequence, suffered unrelieved joblessness, than when a (brief) experience of joblessness was shared among a large number of persons. In short, the social loss from unemployment could depend on the proportion of the labour force that was unemployed *and* upon the distribution of unemployment experience between those who comprised the labour force. The purpose of this paper is to propose a methodology, based on the contribution of Atkinson (1970) to the measurement of income inequality, for adjusting unemployment rates so as to make them 'duration-sensitive'. In consequence, different values of the 'duration-sensitive' rate will, depending upon the degree of inequality in the distribution of unemployment duration, and upon the extent to which society is averse to such inequality, be associated with the same value of the conventionally defined unemployment rate.

One of the problems with implementing such a methodoloy is that, typically, information on the unemployment experience of individuals is not readily available. Instead, most researchers have to make do with published data: these provide highly aggregated information on the distribution - in different countries and in different regions of countries - of unemployment by duration. Using these data it is possible to classify countries both according to whether or not they have an 'unemployment problem' (high versus low unemployment rate countries) and according to whether or not they have a 'long-term unemployment problem' (high versus low proportion of the unemployed in long-term unemployment). The important point is that these two issues are, typically, discussed separately[1] . This is partly due to the lack of a methodological framework for integrating these two aspects: providing such a framework is one contribution that this paper makes to the understanding of unemployment. However, another reason for the separate treatment of the number of persons unemployed and the duration of their unemployment could be the paucity of individual-level data: the second contribution of this paper is to show how the proposed methodology can be implemented, under suitable assumptions, on the sort of unemployment data regularly published *inter alia* by the OECD.

2 The Analytical Framework

There are N persons in the labour-force of a country ($i = 1, ..., N$) and T "time-periods" ($t = 1, ..., T$). More concretely, one may think of a time-period as being a month and, if $T = 12$, the "time-span" as being a year. Define the variable s_{it} such that $s_{it} = 0$ if person i is employed, and $s_{it} = 1$ if person i is unemployed, in month t. Then $M_t = \sum_{i=1}^{N} s_{it}$ is the number of persons unemployed in month t and $m_t = M_t/N$ is the associated *unemployment rate* for that month. Hereafter, m_t is referred to as the "person-based unemployment rate". If $t = T$ is the census date, then m_T is the conventional definition of the unemployment rate.

Define a *unemployed-month* and a *labour force-month* as, respectively, one person unemployed,

[1] Beach and Kaliski (1986) developed a statistical methodology to analyse the distribution of unemployment experiences across workers in an economy.

and one person in the labour force, for one month. Then the "period-based unemployment rate", u, for the year may be defined as the ratio of the total number of unemployed-months to labour force-months in that year:

$$u = \frac{\sum_{t=1}^{T} \sum_{i=1}^{N} s_{it}}{NT} \tag{1}$$

From equation (1):

$$u = \left(\frac{\sum_{t=1}^{T}}{T} \right) \left(\frac{\sum_{i=1}^{N} s_{it}}{N} \right) = \left(\frac{\sum_{t=1}^{T} m_t}{T} \right) = \bar{m} \tag{2}$$

where $\bar{m}$ is the *mean* of the monthly "person-based unemployment rates" for the year ($t = 1, ..., T$).

Alternatively, u may be written as:

$$u = \left(\frac{\sum_{i=1}^{N}}{N} \right) \left(\frac{\sum_{t=1}^{T} s_{it}}{T} \right) = \left(\frac{\sum_{i=1}^{N}}{N} \right) \left(\frac{d_i}{T} \right) = \left(\frac{\sum_{i=1}^{N} p_i}{N} \right) = \bar{p} \tag{3}$$

where: d_i is the number of months in the year in which person i was unemployed ($0 \square d_i \square T$), hereafter referred to as the *duration of unemployment*; p_i is the proportion of months in the year that person i was unemployed ($0 \square p_i \square 1$) and $\bar{p}$ is the average proportion of months in the year that persons in the labour force were unemployed.

The average duration of unemployment (in months) is defined as:

$$\bar{d} = T\bar{p} \tag{4}$$

where, for the purposes of this analysis, $T = 12$. Since $d_i \geq 0$ is the unemployment duration of person i ($i = 1..N$):

$$\bar{d} = \sum_{i=1}^{N} d_i \tag{5}$$

If the burden of unemployment was equally shared so that everyone in the labour force had the same (brief) experience of unemployment then $d_1 = d_2 = .. = d_N$. In general, however, the burden of unemployment will not be equally shared: for many persons in the labour force, $d_i = 0$ while, for those who are long-term unemployed, $d_i = 12$.

If the same number of persons (though, not necessarily, the same persons) were unemployed in each month (so that, $M_1 = M_2 = .. = M_T$) then $u = \bar{p} = \bar{m} = m_T$. Under this assumption, by

equations (2) and (3), the unemployment rate (m_T) is equal to the average proportion of months in the year that persons in the labour force were unemployed ($\bar{p}$): consequently, the average duration (in months) of unemployment may be reformulated as: $\bar{d} = Tm_T$.

3 The Social Loss Function

Let L denote the 'social loss' from unemployment - higher values of L signifying greater levels of loss - with L being a function of the d_i, the unemployment duration of the different persons in the labour force:

$$L = L(d_1...d_N) \tag{6}$$

where: $L \geq 0$, with $L = 0$ if $d_i = 0 \; \forall i$, and $L_i = \partial L_i / \partial d_i > 0, i = 1...N$. Suppose that the social loss function (SLF) of equation (6) can be written in additively separable form as:

$$L = \sum_{i=i}^{N} F(d_i) \tag{7}$$

The function $F(.) \geq 0$ in equation (7), represents society's valuation of the loss (to it) arising from person i being unemployed for d_i months. Higher values of $F(.)$ represent higher levels of loss. The sum of the individual-specific losses is the social loss associated with a given average unemployment duration, $\bar{d}$.

The change in the value of the SLF, following a change in the d_i, is, from equation (7):

$$\Delta L = \sum_{i=1}^{N} a_i \Delta d_i \tag{8}$$

where: $a_i = \partial F(d_i) / \partial d_i > 0$ is the 'social marginal loss' associated with a change in person i's unemployment duration. If it is assumed that the function $F(.)$ is strictly convex, then social marginal loss increases for increases in d_i. Consequently, for a given $\bar{d}$, social loss is minimised when unemployment duration is the same for *all* the persons in the labour force, that is when: $d_1 = d_2 = ... = d_N$. A given $\bar{d}$ will, therefore, generate *different* levels of social loss, depending on how it is distributed (in terms of the individual d_i) between the N persons in the labour-force. It

is this distributional aspect that the conventional definition of the unemployment rate, based as it is on simply 'counting heads', ignores.

The SLF has constant elasticity if, for $\varepsilon \geq 0$, $F(.)$ can be written as:

$$F(d_i) = \frac{d_i^{1+\varepsilon} - 1}{1+\varepsilon} \tag{9}$$

since then: $a_i = \partial F(d_i)/\partial d_i = d_i^{\varepsilon} \Rightarrow (\partial a_i/\partial d_i)/(d_i/a_k) = \varepsilon > 0$. Consequently, the percentage change in the welfare weights, following a percentage change in person i's proportion of unemployed-months, is both positive and constant. The greater the value of ε, the greater the proportional increase in the welfare weights in response to a proportional increase in the d_i. The parameter ε represents, as shown below, society's aversion to 'unemployment inequality', where unemployment inequality is defined as differences, between persons in the labour force, in unemployment duration.

4 Analysis of Social Loss

Suppose for two persons j, k, such that $d_j > d_k$, $(d_j, d_k > 0)$ the unemployment duration of j (an "employment-poor" person, relative to k) is reduced by Δd_j, with an increase, Δd_k in the unemployment duration of k (an "employment-rich" person, relative to j). If $\Delta d_k = -\Delta d_j$ and $\Delta d_i = 0$, $i \neq j, k$ then the average duration, $\bar{d}$, remains unchanged. Suppose that $d_j = \lambda d_k$, $\lambda > 1$. Then the change in social loss, as a consequence of these changes is:

$$\Delta L = a_k \Delta d_k - a_j \Delta d_j = d_k^{\varepsilon} \Delta d_k - \lambda^{\varepsilon} d_k^{\varepsilon} \Delta d_j \tag{10}$$

Setting $\Delta L = 0$ in equation (10) yields:

$$\Delta d_k = \lambda^{\varepsilon} \Delta d_j \tag{11}$$

From equation (11), if $\varepsilon = 0$, $\Delta d_k = \Delta d_j$. This implies that society would be prepared to decrease the unemployment duration an employment-poor person (j), in exchange for an *equal* increase in the unemployment duration of an employment-rich person (k). As a consequence of this

redistribution, $\bar{d}$, the average duration of unemployment, would not change. If $\varepsilon > 0$, then, in order to reduce j's unemployment duration by Δd_j, society would be prepared to raise k's unemployment duration by $\Delta d_k = \lambda^{\varepsilon} \Delta d_j$ $(> \Delta d_j)$ with the consequence that $\bar{d}$ would rise. In other words, society would be prepared to countenance a rise in the average duration of unemployment $(\bar{d})$ in exchange for greater equality in its distribution. This tolerance of a higher $\bar{d}$, in exchange for a given reduction in the inequality of its distribution, is greater for higher values of ε. In this sense, the value of ε represents the degree to which society is averse to unemployment inequality.

5 A Duration-Adjusted Unemployment Rate

Let $d^* \geq \bar{d}$ represent the average duration of unemployment which, *if also the unemployment duration of every person in the labour force,* would yield the *same* level of social loss as the *existing* distribution of unemplyment duration, $d_1, ..., d_N$. Then d^* may be termed the "equally distributed equivalent unemployment duration"[2] . Following from this, Atkinson's (1970) inequality index, defined with respect to the parameter ε, applied to differences between unemployed persons in their proportions of unemployed-months, yields[3] :

$$A_{\varepsilon} = (d^*/\bar{d}) - 1 = \left[\sum N^{-1} \left(\frac{d_i}{\bar{d}} \right)^{1+\varepsilon} \right]^{1/(1+\varepsilon)} - 1 \tag{12}$$

When $\varepsilon = 0$, society is indifferent as to how a given average unemployment duration is distributed: $d^* = \bar{d}$ and $A = 0$. For $\varepsilon > 0$, $d^* > \bar{d}$ and $A > 0$. The higher the value of the unemployment inequality aversion parameter, ε, the greater will be the value of d^* and, therefore, of the inequality index, A.

The social loss corresponding to the observed average duration $\bar{d}$ is:

$$L = \bar{d}(1 + A_{\varepsilon}) = d^* = \bar{m}(1 + A_{\varepsilon}) = m^* \tag{13}$$

where: $\bar{m}$ $(= \bar{p} = u) = \bar{d}/T$ and $m^* = d^*/T$. Equation (13) has a very natural interpretation:

[2] If equally distributed, d^* is equivalent, in terms of social loss, to the unequally distributed $\bar{d}$.

[3] By definition of $L(.)$, $F(.)$ and d^*: $NF(d^*) = \sum F(d_i) \Rightarrow (d^*/\bar{d})^{1+\varepsilon}$
$= \sum N^{-1} (d_i/\bar{d})^{1+\varepsilon}$

the social loss from a given ('conventionally defined') unemployment rate $\bar{m}$ is increased by the degree of inequality in the distribution of its incidence. The value of m^* represents the 'duration-adjusted unemployment rate' corresponding to the 'conventionally defined' unemployment rate $\bar{m}$. The value of m^* reflects the social loss associated with $\bar{m}$: this social loss (encapsulated in the value of m^*) depends not just on the value of $\bar{m}$ (computed by 'counting heads') but also upon the degree of unemployment inequality.

It is, perhaps, worth making the point that inequality indices other than that of Atkinson (1970) also embody - though not quite so explicitly - the notion of 'inequality aversion'. For example, the family of 'Generalised Entropy' measures of inequality - is defined, with respect to a parameter θ, as:

$$E_\theta = \frac{1}{\theta^2 - \theta}\left[\frac{1}{N}\sum_{i=1}^{N}\left(\frac{d_i}{\bar{d}}\right)^\theta - 1\right] \tag{14}$$

Putting $\theta = 1 - \varepsilon$ in equation (14), for values of $\theta < 1$, the generalised entropy measures - derived from information-theoretic considerations - are ordinally equivalent to the welfare-theoretic measure A_ε (Cowell, 1995). Consequently, d^* and m^* of equation (13) could equally have been defined with respect to E_θ as with A_ε.

As equation (13) makes clear, the greater the degree of unemployment inequality, the higher the value of A and the higher the value of m^*, the duration-adjusted unemployment rate. There is no unique value for m^*: for a given distribution of unemployment duration corresponding to $\bar{m}$, the value of m^* depends upon, and is positively related to, society's degree of aversion to unemployment inequality, encapsulted in the value of ε.

<Figure 1>

The above points can be represented diagramatically. In Figure 1, each point on QQ represents a (d_j, d_k) combination that yields the same (given) value of $\bar{d}$ (see equations (3) and (4)): QQ can, therefore, be regarded as the "duration-possibility" locus corresponding to the average duration of unemployment for persons in the labour force. From equation (3), the slope of QQ is -1.

Superimposed upon QQ are the indifference curves associated with the loss function (equation (6)) with curves further away from the origin representing higher levels of social loss.

From equations (6) and (7), the slope of the loss indifference curve is: $\partial L/\partial d_j/\partial L/\partial d_k = a_k/a_j$ and social loss is minimised when the slope of the indifference curve is equal to that of the "duration-possibility" locus: that is, when $a_k/a_j = 1 \Longrightarrow a_k = a_j$. Since by convexity, the marginal losses a_j and a_k increase in d_j and d_k, $a_j = a_k \Rightarrow d_j = d_k$. Therefore, in Figure 1, the tangency between the indifference curve and the duration-possibility locus occurs at a point (A) point on the 45^0 line: for a given $\bar{d}$, social loss is minimised when both persons have the same unemployment duration. If, however, the outcomes with regard to d_j and d_k - the unemployment duration of j and k - are at T, then the average duration AB is *welfare-equivalent* to average duration RS, if RS is equally distributed between j and k. This means that society is indifferent between the lower $\bar{d} = AB$ at T, which is unequally distributed between j and k, and the higher $\bar{d} = RS$ at R, which is equally distributed between j and k. The degree of inequality in the distribution of unemployment rates is, from equation (12), $(RS/AB) - 1$ and this is also the percentage amount by which the social loss from locating at T exceeds its minimum value at A. The greater the degree of inequality aversion, the more "bowed" will be the indifference curves, the higher will be the point R along the 45^0 line and the greater will be the degree of inequality associated with the distribution at T.

6 A Numerical Illustration

This section continues the example of the introductory section in which $N = 144$ and $M_t = 24$ $\forall t$, t =January(1),...,December(12). Then the number of unemployed-months and labour-force months in the year are, respectively, 288 and 1,728 so that $u = m_T = \bar{p} = 16.7\%$. The average length of time in the year that persons in the labour force are unemployed is $\bar{d} = 0.167 * 12 =$ 2 months. This average, as was noted earlier, could hide considerable inter-person disparities in unemployment duration. Three scenarios were considered:

- Equality Scenario: *each* of the 144 persons in the labour force was unemployed for two months in the year.
- Intermediate Scenario: 72 of the 144 persons in the labour force were *each* unemployed for four months of the year, the remaining 72 persons held jobs in every month of the year.
- Inequality Scenario: the 24 persons who were unemployed in December were also unemployed in *all* the other months, the remaining 120 persons were employed in every month of the year.

For each scenario, using different values of the inequality-aversion parameter ε, the duration-adjusted unemployment rate, corresponding to the 16.7% (person- or period-based) unemployment rate, was calculated. These calculations are shown in Table 1, below.

<Table 1>

This shows that with a low degree of inequality aversion ($\varepsilon = 0.4$), a 16.7% unemployment rate translates into a duration-adjusted unemployment rate of 20% under the Intermediate scenario, and 28% under the Inequality scenario; with a high degree of inequality aversion ($\varepsilon = 1.5$), the corresponding values for the duration-adjusted unemployment rate are, respectively, 26% and 49%.

7 An Inter-Country Comparison of Unemployment Rates

This section shows how, under judicious assumptions, *using published data*, a country's unemployment rate can be 'adjusted' - using the methodology described in the previous sections - so that it incorporates the duration profile of unemployment. Table 2 shows, for 1996, the size of the labour force, the unemployment rate and the proportion of the total numbers unemployed in different unemployment durations (short: <6 months; medium: 6-12 months, and long: ≥12 months) for seven major countries of the OECD: Canada, France, Germany, Italy, Japan, the UK and the USA.

What is immediately apparent from the Table is that there were strong differences between the countries, both in their unemployment rates and in the distribution of their unemployed across the three durations. In general, compared to Japan, Canada and the USA, the four European countries had higher unemployment rates and also a greater proportion of their unemployed in the longer durations. The last column of Table 2 shows what the average duration (in months) of unemployment in the country would have been if *every* person in its labour force had experienced unemployment in the year. This average duration, denoted $\bar{d}_j$ for country j, is obtained - as discussed earlier - as the (conventionally defined) unemployment rate for the country multiplied by 12. (So, for example, the average duration of 1.2 months for Canada was obtained as $12*0.097 = 1.2$). This average duration varied from a low of 0.4 months for Japan to a high of 1.5 months for France and Italy.

The unemployment rates corresponding to different distributions of the average duration are shown, for each of the seven contries, in Table 3 under different distributive scenarios and for different degrees of inequality aversion[4] . Under Scenario 1, every person in the labour force experienced unemployment in the year and the duration of unemployment was the same for all the persons. Under this 'perfect equality' scenario, looking down the column headed 'Scenario 1', the unemployment rate does not alter for increasing degrees of inequality aversion: there is no inequality for aversion! In Scenario 2, the entire burden of unemployment falls on the persons who are observed to be unemployed in a particular month: it is assumed that each of these unemployed persons (1,145=0.097*14902 persons for Canada) was unemployed in every month of the year, the other persons in the labour force being in continuous employment over the year.

The total number of unemployed-months is the same under Scenarios 1 and 2; it is just the distribution of this number across the labour force that is different[5] . With no inequality aversion ($\varepsilon = 0$), distribution is irrelevant and the unemployment rate is the same under both scenarios.

[4] Represented by the values of ε, with higher values representing greater degrees of inequality aversion.

[5] The total number of unemployed-months in a country is $12\bar{p}_j N_j = \bar{d}_j N_j$.

However, with even a moderate degree of degree of inequality version ($\varepsilon = 0.1$), the unemployment rate under Scenario 1 (the published rate) is considerably lower than that under Scenario 2 (9.7% versus 12.0% for Canada) and this difference increases for higher degrees of inequality aversion: for $\varepsilon = 0.5$, the unemployment rate in Canada was computed as 21.1% under Scenario 2.

The unemployment rates corresponding to $\varepsilon > 0$ are the 'duration-adjusted' (or 'equally-distributed equivalent') unemployment rates. An inequality-averse policy maker in Canada (with $\varepsilon = 0.5$ as his/her degree of aversion) would regard the social loss from an unemployment rate of 9.7%, the burden of which was distributed according to Scenario 2, as being equal to the social loss from an unemployment rate of 21.1%, the burden of which was distributed equally, as per Scenario 1, between all those in the labour force (see Figure 1).

Scenarios 3 and 4 moderate the extreme inequality of Scenario 2: in Scenario 3, it was assumed that one-fourth of the labour force experienced unemployment in the year and, in consequence, that the duration of unemployment of every unemployed person was $4 * \bar{d}_j$; in Scenario 4, it was assumed that one-half of the labour force experienced unemployment in the year and that the duration of unemployment of every unemployed person was $2 * \bar{d}_j$. As Table 3 shows, for every degree of inequality aversion the unemployment rate was higher under Scenario 3 than under Scenario 4 and the unemployment rate under both scenarios rose as the degree of inequality aversion was increased.

Scenarios 5 and 6 utilised the duration data shown in Table 2, which are published, on an annual basis, by the OECD for all its member countries. In order to use this data it was assumed that, in every country, the *average* duration of unemployment of the persons who had experienced medium-term or long-term unemployment was 10 months and that this was also the unemployment duration of *each* of these persons. So, for example, in Canada, of the 1,445 persons recorded as unemployed in 1996, 182 persons were medium-term unemployed and 241 persons were long-term unemployed: it was assumed that each of these 423 persons had been unemployed for 10 months and, in consequence, 4,230 unemployed-months were accounted for by the unemployment of these

persons. That left 13,652 unemployed-months, out of the total of 17,882 unemployed-months in Canada[6] , to be distributed among the remaining 14,479 (=14,902-423) persons in the labour force. Then the average duration of short-term unemployment inCanada was: $\hat{d}_j = 13,652/14,479 = 0.9$ months.

In Scenarios 5 and 6 it was assumed that, respectively, one-fourth and one-half of the remaining persons in the labour force (that is, those who had not experienced medium-term or long-term unemployment) had experienced short-term unemployment of the *same* duration ($4 * \hat{d}_j$ and $2 * \hat{d}_j$ months, respectively). So in Canada, under Scenarios 5 and 6, it was assumed that, respectively 3,620 and 7,240 persons in the labour force had experienced short-term unemployment of, respectively, 3.6 and 1.8 months duration each. The unemployment rates computed under these Scenarios, for different degrees of inequality aversion, are shown in the penultimate (Scenario 5) and ultimate (Scenario 6) columns of Table 3.

An important point about the results shown in Table 3 is that the gap in published unemployment rates - between countries which had a 'long-term unemployment problem' (France, Germany and Italy) and those which did not (Canada, Japan, the USA) - increased when the unemployment rates were 'duration-adjusted'. So, for example, in the absence of inequality aversion, the US and German unemployment rates were respectively 5.5% and 8.9% in 1996: a gap of 3.4 percentage points. Since, as Table 2 shows, Germany had a much larger proportion of its unemployed in medium/long-term unemployment than did the USA, the gap in US-German unemployment rates increased as the degree of inequality aversion rose: with $\varepsilon = 0.5$, the US and German unemployment rates increased from their, respective, published (no 'duration-adjustment') values of 5.5% and 8.9% to, respectively, the 'duration-adjusted' values of 7.8% 14.7%, resulting in a 'duration-adjusted' US-German unemployment rate gap of 6.9 percentage points.

[6] Average duration (1.2) times labour force (14,902).

8 Conclusions

The measurement of unemployment, like that of poverty, to use the language of Sen (1976), involves two steps: identification and aggregation. In this process, the issue of identifying the unemployed has received considerable attention. For example, there is the question of whether the unemployed are to be identified according to whether they have registered for receiving unemployment-related benefits or according to whether they are seeking and available for work. Even within the ambit of treating people as unemployed if they are 'seeking and available for work' there is considerable latitude in defining what is meant by the terms: 'seeking', 'available' and, indeed, 'work'. The implications of such latitude, in the context of identifying persons as unemployed or employed, have attracted considerable attention[7] . However, once persons have been identified as unemployed, the issue of aggregating over unemployed persons, in order to arrive at the 'unemployment rate', has been reduced to one of simply counting heads. (By contrast, the aggregation issue has received considerable attention - some would say too much attention, relative to the identification issue - in poverty studies).

In arriving at a measure of the unemployment rate, the neglect of the aggregation issue has, in particular, led to differences in the unemployment experience of the different individuals in the labour force being ignored. This paper has suggested a methodology for redressing this neglect and it has, also, shown a way of implementing this methodolgy using published, and readily available, data.

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[7] See chapter 5 of Borooah (1996) for a discussion of the salient features of the debate.

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Table1
Values of the Distribution-Sensitive Unemployment Rate Corresponding to an Unemployment Rate of 16.7%

	EQUALITY SCENARIO	*INTERMEDIATE SCENARIO*	*INEQUALITY SCENARIO*
$\varepsilon=0$	16.7	16.7	16.7
$\varepsilon=0.4$	16.7	20.3	27.8
$\varepsilon=0.8$	16.7	22.7	37.0
$\varepsilon=1.0$	16.7	23.6	40.8
$\varepsilon=1.5$	16.7	25.3	48.8

Equality Scenario: each of the 144 persons in the labour force was unemployed for two months in the year

Intermediate Scenario: 72 of the 144 persons in the labour force were each unemployed for one four months in the year, the remaining 72 were not unemployed in any month

Inequality Scenario: 24 persons of the 144 persons in the labour force were each unemployed in every month of the year, the remaining 120 persons were not unemployed in any month

Table 2
Unemployment Rates Across Major OECD Countries, 1996

	Labour Force (,000)	*Unemployment Rate (%)*	*Short-Term Unemployment*	*Medium-Term Unemployment*	*Long-Term Unemployment*	*Average Duration (months)*
Canada	14,902	9.7	70.7	12.6	16.7	1.2
France	25,621	12.2	38.5	22	39.5	1.5
Germany	39,649	8.9	34.7	17.5	47.8	1.1
Italy	22,604	12.3	19.2	15.2	65.6	1.5
Japan	67,116	3.5	59.6	20.2	20.2	0.4
UK	28,753	8.2	41.9	18.3	20.2	1.0
USA	133,945	5.5	82.5	8.0	9.5	0.7

Short-term unemployment: those unemployed for less than 6 months
Medium-term unemployment: those unemployed for 6-12 months
Long-term unemployment: those unemployed for 12 months or more
All expressed as a percentage of the total numbers unemployed
Average Duration of Unemployment: (Unemployment Rate x 12)/100

Source: OECD Economic Outlook, June 2000 and OECD Employment Outlook, June 2000.

Table 3
Unemployment Rates Across Major OECD Countries Under Different Degrees of Inequality Aversion, 1996

	Scenario 1	*Scenario 2*	*Scenario 3*	*Scenario 4*	*Scenario 5*	*Scenario 6*
Canada						
ε=0	9.7	9.7	9.7	9.7	9.7	9.7
ε=0.1	9.7	12.0	11.0	10.3	11.1	10.5
ε=0.3	9.7	16.6	13.4	11.4	13.4	12.1
ε=0.5	9.7	21.1	15.4	12.2	15.6	13.6
France						
ε=0	12.2	12.2	12.2	12.2	12.2	12.2
ε=0.1	12.2	14.8	13.8	13.0	13.8	13.4
ε=0.3	12.2	19.8	16.8	14.3	16.9	15.9
ε=0.5	12.2	24.6	19.4	15.4	19.7	18.3
Germany						
ε=0	8.9	8.9	8.9	8.9	8.9	8.9
ε=0.1	8.9	11.1	10.1	9.5	10.2	10.0
ε=0.3	8.9	15.6	12.3	10.4	12.9	12.3
ε=0.5	8.9	19.9	14.1	11.2	15.5	14.7
Italy						
ε=0	12.3	12.3	12.3	12.3	12.3	12.3
ε=0.1	12.3	14.9	13.9	13.1	14.0	13.8
ε=0.3	12.3	20.0	16.9	14.4	17.3	16.7
ε=0.5	12.3	24.7	19.5	15.5	20.5	19.7
Japan						
ε=0	3.5	3.5	3.5	3.5	3.5	3.5
ε=0.1	3.5	4.7	4.0	3.7	4.1	4.0
ε=0.3	3.5	7.9	4.8	4.1	5.4	5.0
ε=0.5	3.5	10.7	5.6	4.4	6.8	6.3
UK						
ε=0	8.2	8.2	8.2	8.2	8.2	8.2
ε=0.1	8.2	10.3	9.3	8.7	9.4	9.2
ε=0.3	8.2	14.6	11.3	9.6	11.9	11.2
ε=0.5	8.2	18.9	13.0	10.3	14.3	13.4
USA						
ε=0	5.5	5.5	5.5	5.5	5.5	5.5
ε=0.1	5.5	7.2	6.2	5.9	6.3	6.0
ε=0.3	5.5	10.7	7.6	6.5	7.8	6.9
ε=0.5	5.5	14.5	8.7	6.9	9.2	7.8

Figure 1
The Distribution-Sensitive Unemployment Rate