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**Conference Paper**

## Once again on Interregional, International and Cross-age Comparison of Unemployment

43rd Congress of the European Regional Science Association: "Peripheries, Centres, and Spatial Development in the New Europe", 27th - 30th August 2003, Jyväskylä, Finland

**Provided in Cooperation with:**

European Regional Science Association (ERSA)

*Suggested Citation:* Kazakevitch, Gennadi (2003) : Once again on Interregional, International and Cross-age Comparison of Unemployment, 43rd Congress of the European Regional Science Association: "Peripheries, Centres, and Spatial Development in the New Europe", 27th - 30th August 2003, Jyväskylä, Finland, European Regional Science Association (ERSA), Louvain-la-Neuve

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European Regional Science Association 2003 Congress  
Jyväskylä, Finland, 27-30 August, 2003

## Once again on Interregional, International and Cross-age Comparison of Unemployment

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### Abstract

*An approach is suggested, which allows for making interregional, international and cross-age comparison of unemployment more accurate. Artificially constructed unemployment rate indicators are based on the actual employment and unemployment data, and participation rate assumed to be equal across compared populations and/or across observations related to different periods of time. These indicators show unemployment disparities, if there were no interregional international, inter-temporal or cross-age disparities in participation rate. The proposed indicators are compared with conventional ones for two of the Australian states. An analogous time series analysis is conducted on unemployment in two developed market economies with different cultures (Australia and Japan). In addition, the issue of youth unemployment in Australia is considered from the perspective of the suggested comparative measurement.*

## 1. Introduction

The deficiency of unemployment measurements has been always understood. Two indicators - the unemployment rate and participation rate are two linked to each other, the most widely used, monitored and cited economic statistics. However, the definition of unemployment, and the associated definition of participation, remains controversial. The majority of authors writing on this matter pay attention at either intrinsic inconsistency of measurement methodology, or at difficulties of the comparison of indicators based on incompatible statistical methodologies.

The intrinsic consistency of unemployment measurement was questioned in a number of papers.

Based on a definition of the concept of unemployment in economic theory, Junankar & Kapuscinski (1996) considered the strengths and weaknesses of different data sources which are available to study unemployment, and undertook a taxonomy and survey of unemployment databases available in Australia.

Using the US data, Greenwood & Kohli (2003) concluded that the conventional unemployment rate measures tend to overestimate the degree of labor underutilisation, if unemployment disproportionately affects less educated and generally less productive workers. Based on the index number theory as well as on econometric techniques, they proposed a number of alternative measures for specific labor aggregator functions.

Paul (1991) proposed a new measure of unemployment for taking into account both the intensity and distribution aspects of unemployment. The proposed index was generalised to a parametric family of measures where the parameter was interpreted as an indicator of aversion to unemployment. Paul (1992) proposed a different measure of unemployment overcoming some of the limitations of the existing indices and taking into account the incidence of unemployment, duration of unemployment, and the disparity in the distribution of the burden of unemployment. Both measures introduced by Paul were tested using the US data.

Riddell (2000) surveyed research on the measurement of labor market activities. He questioned the consistency of the conventional approach to distinguishing between unemployment and non-participation. In contrast, he suggested a different approach that

employed evidence on the subsequent consequences of current activities, in particular on transitions among labor force states.

A number of attempts has been undertaken to overcome difficulties in cross-national comparison of unemployment.

Sorrentino (2000) considered how definitions of labour force and unemployment recommended by the International Labor Office were used and interpreted in guidelines in the US, Canadian and European labor force surveys. Measurement differences were sorted and classified according to the direction of their impact. Also, adjustments of US unemployment rates to European and Canadian concepts were undertaken.

Riddell & Jones (1999) paid attention at a particular difficulty in the comparison of unemployment measurement - differences in unemployment criteria across countries and over time within countries. They argued that diversity in the degree of labor force attachment was a challenge for measurement, and that there was a need to truncate the underlying distribution of labor force attachment into a small number of categories.

Burtless (1998), Riddell & Sharpe (1998) have studied definition and measurement issues of US-Canada unemployment comparison. In particular they addressed the problem of separating the component of unemployment gap between two countries attributed to measurement from the one caused by differences in macroeconomic situations and structural disparities.

In all of the above mentioned publications it is explicitly or implicitly recognized, that discussion on unemployment is not restricted with the data on unemployment only. Unemployment is linked to several key indicators, the most obvious of which are the number of employed, active population and participation rate. As we often see, increase in unemployment occurs simultaneously with increase in the number of jobs, if at the same time the participation rate increases at a faster rate. This makes particularly doubtful any simplistic interregional, international, inter-temporal or cross-age comparison of unemployment data taken in isolation from corresponding participation rates.

Interregional and international differences in unemployment depend not only on general economic situation in compared regions or countries, but also on historic and cultural

differences. For example, it is inaccurate to compare unemployment situation in two countries with different participation rate of females (such as Japan and Australia). Neither regional employment situations are comparable if their economic, social, ethnic bases considerably differ from each other.

Furthermore, inter-temporal or time series analysis of unemployment makes sense only if participation rate is stable. By no means, this is applicable to such country as Australia, where the participation rate fluctuates, depending upon a phase in the business cycle.

In addition, methodological inaccuracy of cross-age analysis has been also noticed with regard to the youth unemployment measurement which excludes from consideration potentially most employable young people continuing their full-time education or professional training (Zagorsky, 1993).

A simple approach is suggested, which allows making the above-mentioned comparisons more accurate in one respect. The conventional indicator of unemployment relates the number of job seeking persons to the number of persons in labour force that includes employed and job seeking unemployed persons. This indicator is a sufficient unemployment characteristic for a particular population in the short-run or, if the participation rate is rather stable, in the long-run. If the participation rate fluctuates, as this is particularly observed in Australia, the unemployment rate cannot be considered isolated from either participation rate or the total number of available jobs. It cannot be used, therefore, by itself as a characteristic of long term unemployment dynamics. Neither it is suitable for inter-national, inter-regional or cross-age comparison.

The idea of a group of “artificial” unemployment indicators considered in this paper is to use a uniformed or hypothetical base for comparison of unemployment rates both between different populations and/or within the same population over a period of time. Unemployment rate indicators are artificially constructed based on the actual unemployment data, actual number of full time jobs, and a participation rate assumed to be equal across compared populations and/or across observations related to different periods of time. These indicators show unemployment disparities, if there were no interregional international, inter-temporal of cross-age disparities in participation rate. Proposed indicators are compared with conventional ones for the states of Australia with different economic structures (NSW and Victoria). An analogous analysis based on time-

serials data is conducted for developed market economies with different cultures (Australia and Japan). A modified indicator is also used to compare unemployment trend at “real” and “fixed” participation rates. In conclusion, the issue of youth unemployment in Australia is considered from the perspective of the suggested comparative measurement.

## 2. Inter-State Employment Disparities in Australia

Visible regional employment and participation rate disparities have been observed in many developed nations and very well explained in the literature. Such disparities are one of the immediate consequences of differences in the structures of regional economies. Meanwhile, for the purpose of inter-regional comparisons, those two indicators are normally represented separately from each other as independent variables, ignoring the fact that the unemployment indicator is a function of participation rate. Such a kind of analysis allows for comparing the pressure of underemployment on state economies, employment services, and social security system. On the other hand, from the cross-regional perspective, long term tendencies of human potential utilization by the society can't be compared at different participation rates. In contrary, disparities in participation rates should be a matter for comparison by themselves, and may reflect geographical, economic, structural, and/or cultural differences.

In order to eliminate the participation rate impact on unemployment in inter-regional comparison, let us consider an “artificial” unemployment indicator, based on the difference between the regional (state, in this instance) and national participation rate:

$$u_{S(A)} = \frac{U_S + P_S(p_A - p_S)}{U_S + E_S + P_S(p_A - p_S)} \quad (1)$$

where:

$u_{S(A)}$  - state unemployment rate taking in to account state and national participation rate disparities;

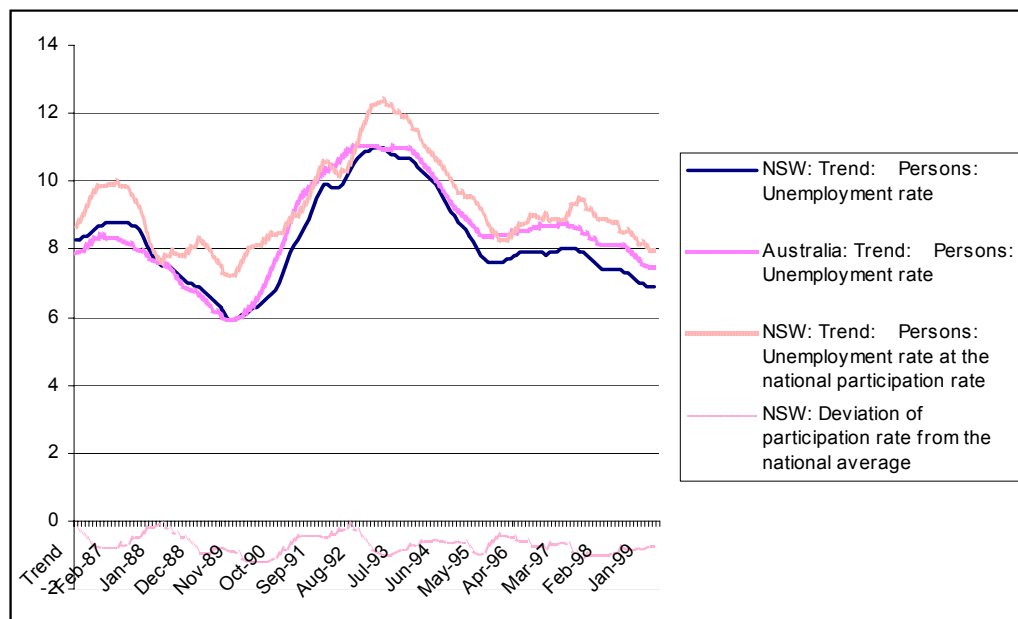
$U_S$  - unemployed persons in state  $s$ ;

$E_S$  - employed persons in state  $s$  ;

$P_S$  - civilian population aged 15 & over in state  $s$  ; and  
 $p_A$  and  $p_S$  - national (Australian) and state  $s$  participation rates.

The addition ( $P_S(p_A - p_S) > 0$ ) contributes to an “artificial” estimate of the total number of unemployed in the state, if the state’s actual participation rate is lesser than the national one. In this case, it is taken into account, that the pressure on job creation in the state is weaker than in the rest of the economy. In contrary, in the case where  $P_S(p_A - p_S) < 0$ , the “artificial” unemployment rate takes into account, that the actual pressure on job creation in the state is stronger than in the rest of the economy. Therefore, the indicator (1) reflects the employment creation power of states at comparable participation rates.

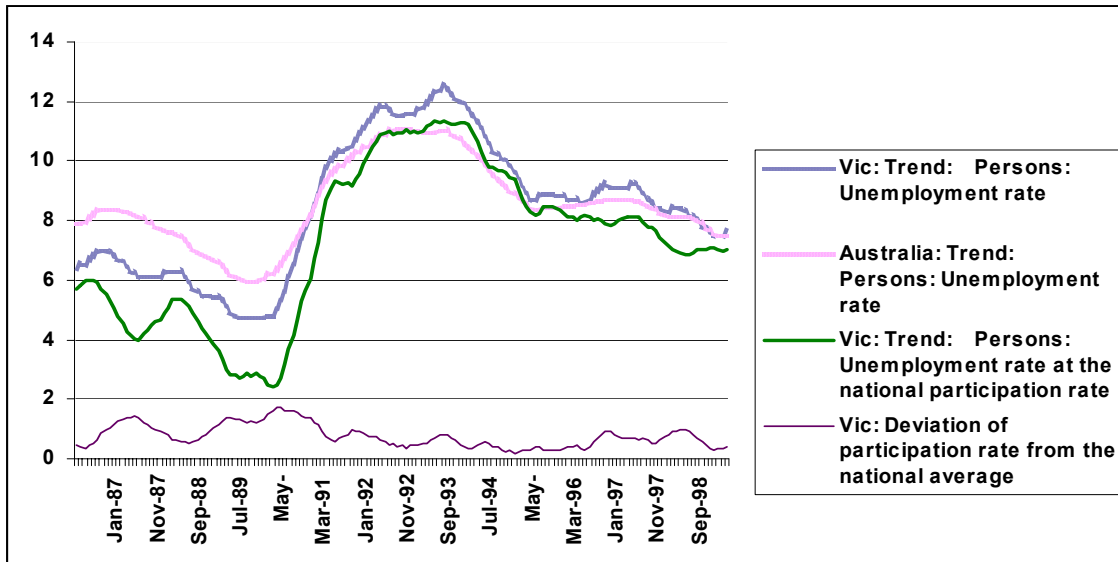
**Figure 1. NSW unemployment rate at NSW and Australian participation rate<sup>1</sup>**



<sup>1</sup> This and the following analyses are based on the most recent (April 2003) data from DX data bases, including:

- ◆ ABS (Australian Bureau of Statistics) Time Series Statistics Plus;
- ◆ OECD Main Economic Indicators; and
- ◆ World Bank World Tables.

**Figure 2. Victorian unemployment rate at NSW and Australian participation rate**



Graphs on Figures 1 and 2 were plotted using monthly ABS trend data on unemployment and labor force and participation rate in Australia as well as in the Australian states of New South Wales and Victoria.

It can be seen that through out the 14 year period (1986-1999), the actual participation rate in NSW is below the national one. That is why unemployment rate in NSW adjusted to the Australian participation rate is greater than the national and the state conventional ones.

In contrary, the actual participation rate in Victoria is above the national one. Therefore, unemployment rate in Victoria at the Australian participation rate is below the national and the state conventional ones.

Such a disparity reflects differences in regional structures of the Australian economy. In particular, in Victoria the proportion is higher of the urban metropolitan population as well as of the manufacturing industries. A more urbanistic population creates a comparably greater pressure on employment creation.



### **3. International Comparison: Japan versus Australia**

If two nations are successful market economies, then considerable non-cyclical disparities between them in long-term trends of unemployment can be explained by various reasons, such as:

- Economy structure;
- Culturally and economically accepted levels of education and training,
- General economic situation;
- The length the period of physical ability to participate in labour force;
- Social security system, in particular unemployment benefit and pension schemes; and
- Historic and cultural aspects of participation patterns of different groups of population:
  - females;
  - youth; and
  - senior citizens.

Most of the above-mentioned factors contribute to major differences in long term tendencies of unemployment between such countries as Australia and Japan. In particular, these two countries are an example of extremely different cultural patterns of participation in the labour force. Therefore, comparing employment/unemployment creation power at comparable participation rates between two nations is not less interesting than between regions. However, an indicator analogous to (1) can not be used unchanged for international comparison. There is no such a thing as “the national level of participation rate” as long as two countries are concerned. It is possible, however, to construct two reciprocal indicators and compare the actual levels of unemployment with “artificial” ones, calculated at the assumption of participation rate to be equal to the participation rate indicator of the other nation. In simple terms related to the above-mentioned countries, such “artificial” unemployment indicators can be calculated as follows:

$$u_{A(J)} = \frac{U_A + P_A(p_J - p_A)}{U_A + E_A + P_A(p_J - p_A)} \quad (2)$$

and

$$u_{J(A)} = \frac{U_J + P_J(p_A - p_J)}{U_J + E_J + P_J(p_A - p_J)}, \quad (3)$$

where

$u_{A(J)}$  and  $u_{J(A)}$  - unemployment rate in Australia at the Japanese participation rate or unemployment rate in Japan at the Australian participation rate;

$U_A$  and  $U_J$  - unemployed persons in Australia and Japan;

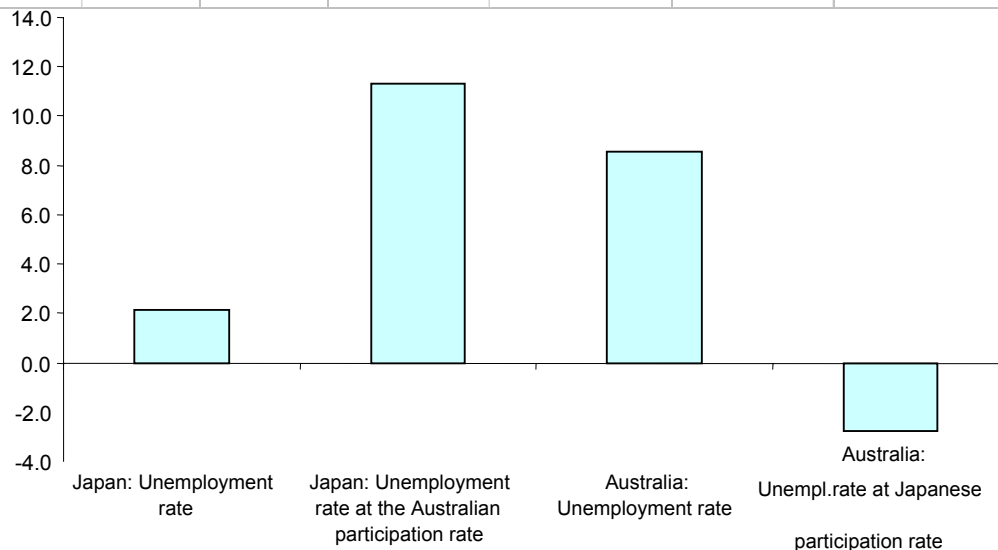
$E_A$  and  $E_J$  - employed persons in Australia and Japan;

$P_A$  and  $P_J$  - civilian population aged 15 & over in Australia and Japan;

$p_A$  and  $p_J$  - participation rate in Australia and Japan.

**Figure 3. Conventional unemployment rate versus unemployment measured at the other country's participation rate in Australia and Japan**

	Japan: Participation rate	Australia: Participation rate	Japan: Unemployment rate	Japan: Unemployment rate at the Australian participation rate	Australia: Unemployment rate	Australia: Unemployment rate, at the Japanese participation rate
1997	63.8	71.7	2.2	11.3	8.6	-2.8



Like in the case of regions, the addition ( $P_J(p_A - p_J) > 0$ ) contributes to the “artificial” total number unemployed in the Japan, where the actual participation rate is lesser than in Australia. In this case, it is taken into account, that the pressure on job creation in Japan is generally weaker than in Australia. In contrary, the analogous component of the Australian “artificial” unemployment indicator with respect to Japan is negative ( $P_A(p_J - p_A) < 0$ ). Therefore for the purpose of comparison, this indicator evens the impact of difference in actual pressure on job creation in Australia and Japan. The indicator (2), and the reciprocal one (3), reflect the employment creation power of two countries at comparable participation rates.

In contrary to the state monthly time series statistics, there is no international time series data on unemployment and participation rates, measured using comparable methodology. Meanwhile, periodical “snap shots” are provided in World Bank World Tables. Figure 1 is based on the 1997 data. The data correspond to the period when the conventional unemployment rate in Australia was much higher than in Japan. Meanwhile, through out the recent decades, the trend of the participation rate in Japan used to be considerably lower in Japan than in Australia. One of the reasons for that was (and is) lower participation in the labour force of Japanese women, especially after getting married. That is why, unemployment rate in Japan, if there was the Australian level of participation rate, appears to be much higher than the actual Australian one. In contrary, a negative unemployment rate in Australia at the Japanese actual participation rate means, that if the Australian participation was at the Japanese level and the number of jobs at the actual level of the day, then Australia would experience a shortage of labour force.

#### **4. Unemployment trend at “real” and “fixed” participation rates**

The suggested approach may be also useful for the analysis of the unemployment trend in conjunction with active population growth, eliminating the impact of changes in participation. For this purpose the indicator similar to (1) – (3) can be calculated using the trend data, and replacing the actual participation rate is with the fixed rate of the beginning of the period:

$$u_{t(t_0)} = \frac{U_t + P_t(p_{t_0} - p_t)}{U_t + E_t + P_t(p_{t_0} - p_t)}, \quad (4)$$

where:

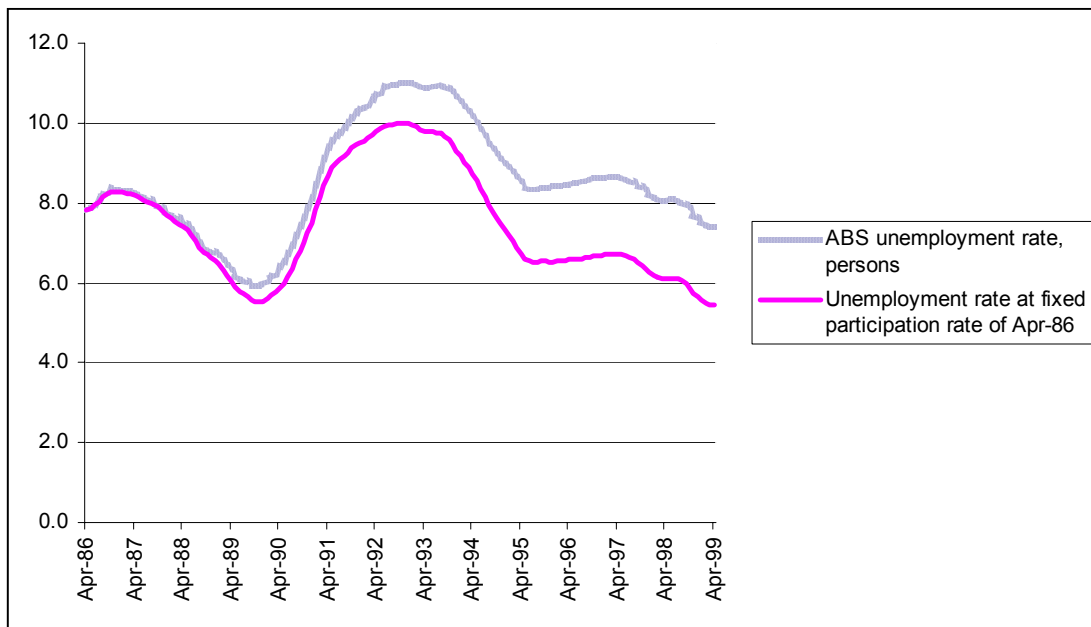
$u_{t(t_0)}$  - Unemployment rate in period  $t$  at “fixed” participation rate (of the period  $t_0$ );

$U_t$  - Unemployment at real participation rate;

$P_t$  - Civilian population aged 15 & over in period  $t$ ;

$p_{t_0}$  and  $p_t$  - Participation rates in periods  $t_0$  and  $t$ .

**Figure 4. Unemployment trend at real and fixed participation rates**



The result of such a computation for Australia in 1996-1999 (Figure 4) shows that the adjusted unemployment rate was always below the actual one, even though it was following the cyclical fluctuation of the real one. This reflects the trend of increasing participation during the above mentioned period. Therefore, during the considered

period, the job creation processes in Australia was servicing, relatively well, increase in active population, but was, in relative terms, behind increasing participation.

#### 4. Redefined Youth Participation and Unemployment Rates

Another area, where the proposed indicator of “redefined” unemployment rate can be applied to, is the analysis of youth unemployment. The conventional unemployment rate of the population within 15-19 years old age group appears to be considerably higher, than for the other age groups, in many developed nations, including Australia. The question is if it is really a separate problem, different to general unemployment, and if youth unemployment requires a special attention or specific policies.

Let us consider the youth unemployment trend data based on Australian statistics like it is represented by ABC. According to the trends of participation rate of both general and youth population, the participation rate of the youth population (15-19 years old) is considerably higher than the one of the general population of all active ages (See Figure 5).

The “redefined” unemployment rate, analogous to (1)-(4) in this case is:

$$u_{Y(C)} = \frac{U_Y + P_Y(p_C - p_Y)}{U_Y + E_Y + P_Y(p_C - p_Y)}, \quad (5)$$

where:

$u_{Y(C)}$  - Youth unemployment at “common” participation rate;

$U_Y$  - Youth unemployment at real participation rate (ABS data);

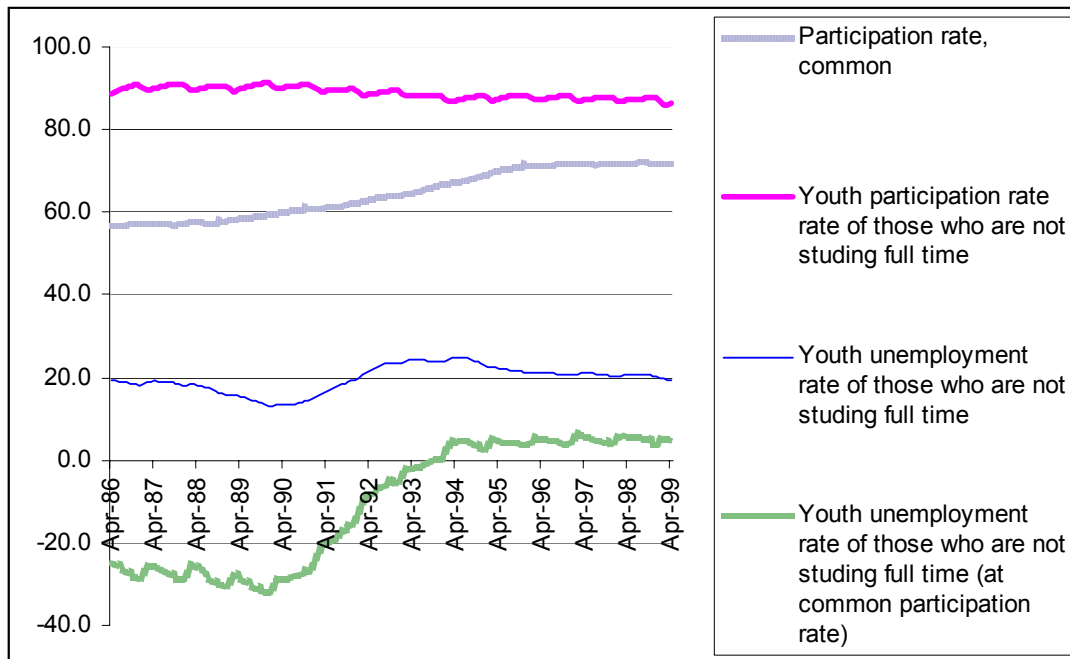
$P_Y$  - Youth population (ABS data);

$p_C$  and  $p_Y$  - Common and youth participation rates (ABS data).

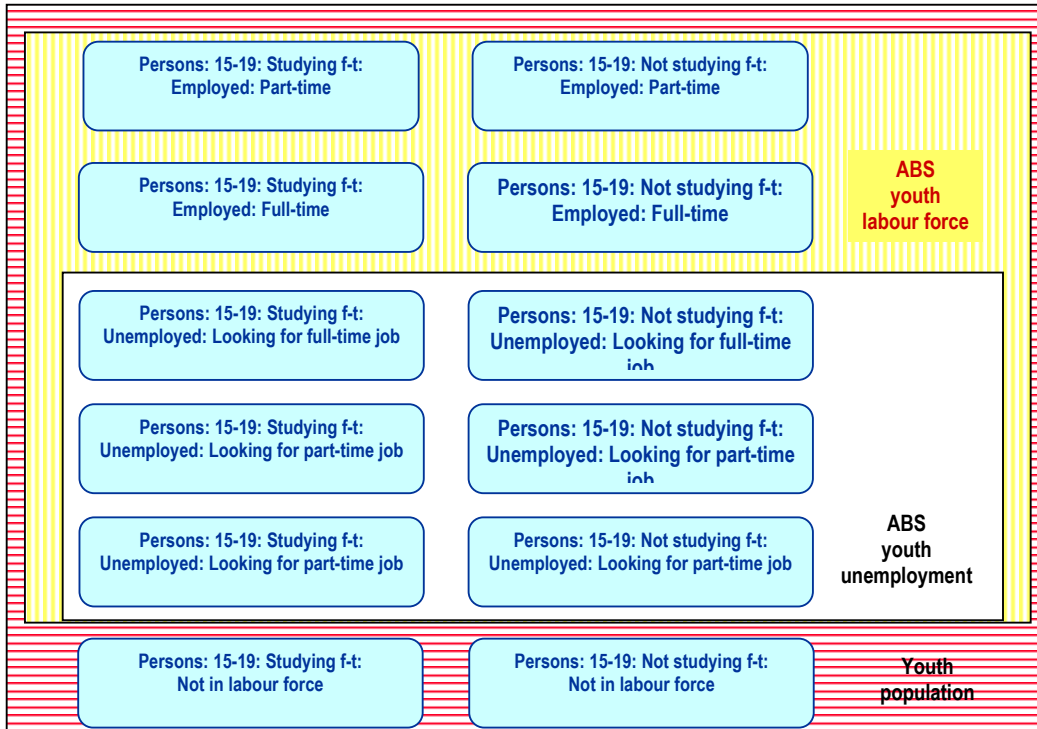
The youth unemployment rate, defined by ABC, reflects current pressure, by the considered population category, on job search and social security system. Meanwhile, the redefined youth unemployment rate allows for a comparison using common cross-age unemployment indicators. The conventional youth unemployment rate is fluctuating around 20% and is more than twice higher than the one of the general population. The redefined indicator, reflecting the disparity between the youth and general participation rate, appears to be near zero or even negative. The negative value of this indicator means that if the youth labour force is employed mostly in a specific niche of occupations (which is at least partially true), than at the common participation rate this niche would experience labour shortage.

The next question is what are the reasons for such a high level of youth participation rate? Of course this can be partially explained by the fact that it is the most active and healthy part of the population and it is eager to contribute to the labour force and to start earning their living. The other side of explanation is, however, the very definition of labour force, employment, and unemployment applied to the youth population.

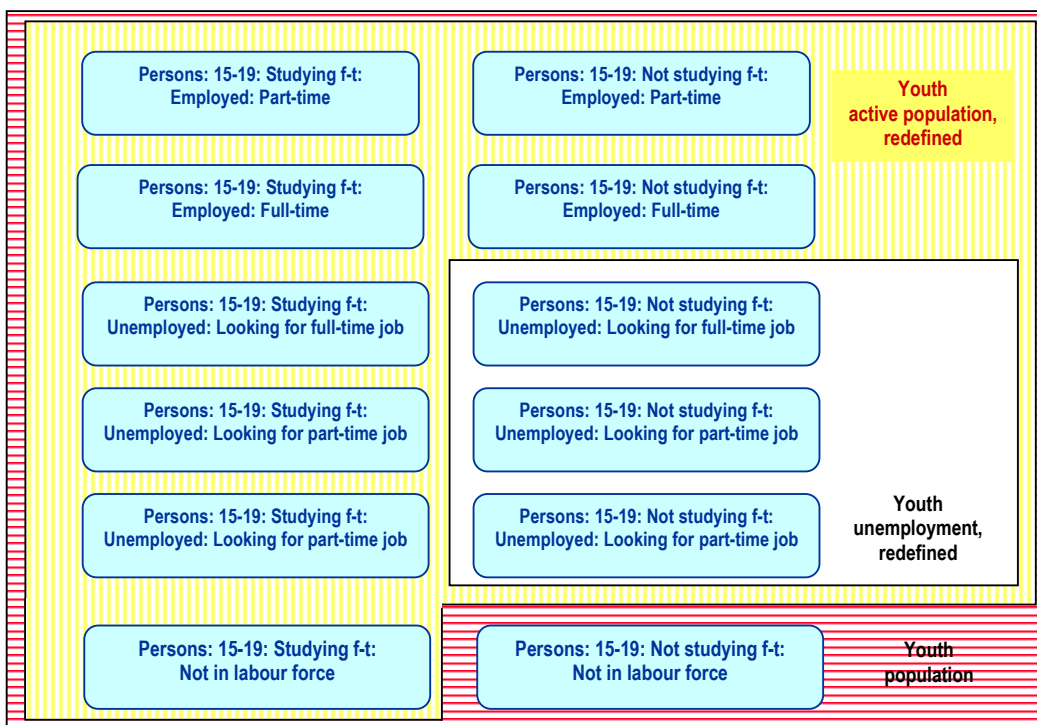
**Figure 5. Youth unemployment of those who are not involved in full time studies: at their and at common participation rates**



**Figure 6. The Structure of youth labour force, employment, unemployment and the ABS definition of youth unemployment rate**

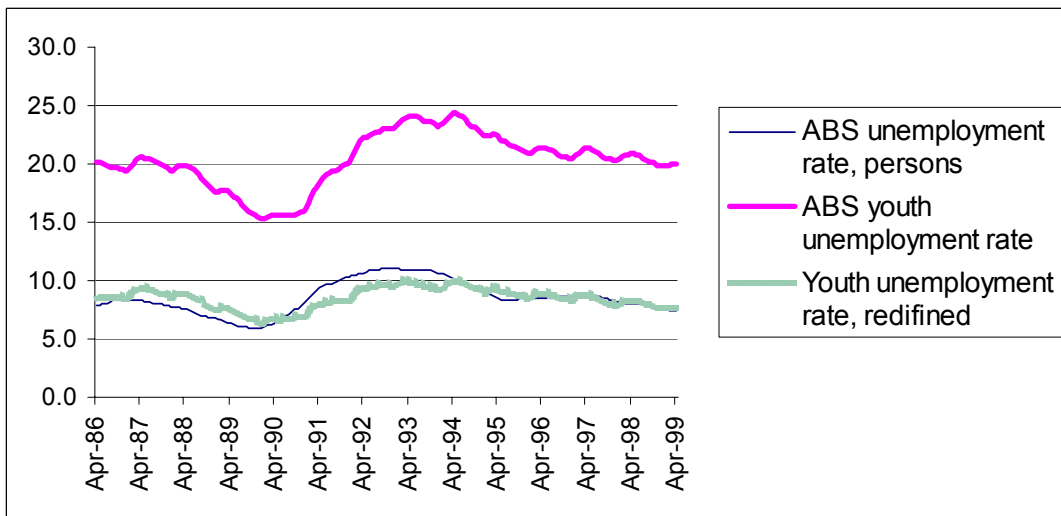


**Figure 7. The Structure of youth active population, redefined youth unemployment and corresponding definition of youth unemployment rate**



According to ABC, the youth labor force aggregate includes people of the appropriate age group both those studying full time and those not studying full time who are either working or looking for a job. On the other hand this indicator does not include people who are studying full time, but not looking for a job. (See Figure 6 for details). This means, that full time students looking for a job are considered as unemployed even though they are occupied full time in an unpaid so far activity, but in the one which will make them, during their active life period, more employable, compared to the national cross-age average. On the other hand, their fellow students, who are engaged in the same kind of activity, but not looking for a job, for the time being, are excluded from the labour force indicator.

**Figure 8. ABS versus redefined youth unemployment rates compared with the ABS unemployment rate**



It would be reasonable to suggest, however, that for the purpose of judgment whether youth unemployment constitutes a considerable specific problem, the concept of youth unemployment is redefined so that:

- Persons 15-19 years old studying full time and looking for a job are excluded from the unemployment data; and



- Persons 15-19 years old studding full time and “not in labour force”, according to ABC, are considered as a part of “Active Population (See Figure 7 for details)

Let us consider to unemployment rate indicators – the conventional and the redefined ones:

$$u_{ABC} = \frac{U_{ABC}}{U_{ABC} + E_{ABC}} \quad \text{and} \quad u_R = \frac{U_R}{U_R + E_R}, \quad (6)$$

where “ABC” is related to the Australian Bureau of Statistics and “R” - to the redefined indicators of youth unemployment rate, employed and unemployed youth persons.

It can be seen, that the redefined youth unemployment rate trend is far below the conventional one and, on the other hand, is very close to the general national unemployment rate. This is due to the assumption that full time studies towards potentially well employable careers are considered equivalent to employment in the case of collage age population. Also, this implicitly confirms, that there is a reasonable ground for an opinion in debates on unemployment that engaging as many young people as possible in further studies is a better solution for tackling youth unemployment than strategies towards creating specific job placement for young unemployed people.

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