

Alternative Measures of Labour Underutilisation

Gender, education and unemployment

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- The extent to which the available labour supply is underutilised is an important economic issue - reflects and affects the performance of an economy.
- Because of its importance it is necessary to measure it accurately.
- The conventional unemployment rate is widely used as a key indicator to the degree of labour underutilisation.

- Many criticisms have been raised about its ability to accurately measure the level of labour underutilisation.
- One criticism is:

The conventional measure is based on the assumption that workers are homogeneous.

- Greenwood and Kohli (2003) proposed a number of alternative measures of labour underutilisation.

These measures take into account the different skills of workers.

- The purpose of this presentation is to present experimental estimates of labour underutilisation for Australia, using these alternative measures.

- Labour is divided into H categories.
- n_h is the number of employed workers in category h .
- l_h is the total number of workers (employed and unemployed) in category h .
- w_h is the wage rate of the employed workers in category h .

Derivation of the Alternative Measures

- The alternative measures are derived by assuming optimising behaviour and by specifying different functional forms for the labour aggregator function.
- The resulting measures:
 - depend on n_h , l_h and w_h - all observed variables.
 - each measure is exact (in the sense of Diewert (1976)) if the labour aggregator function takes the specific functional form from which the measure was derived.

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- Leontief Measure (no substitution, lower bound):

$$u^{LF} = \min\{u_1, u_2, \dots, u_H\} \text{ where } u_h \equiv 1 - n_h / l_h$$

- Cobb-Douglas Measure:

$$u^{CD} = 1 - \prod n_h^{s_h} / \prod l_h^{s_h} \text{ where } s_h \equiv w_h n_h / \sum w_k n_k$$

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- CES Measure:

$$u^{CES} = 1 - (\sum w_h n_h)^{\frac{1}{\rho}} / (\sum n_h^{1-\rho} l_h^{\rho} w_h)^{\frac{1}{\rho}}$$

Note: $\frac{1}{1-\rho}$ is the elasticity of substitution between the different labour categories and it can range between zero and infinity.

The Basic Data Set

- The basic dataset for Australia is taken from Wei (2004).
- The database was drawn from the Australian Census of Population and Housing conducted in 1981, 1986, 1991, 1996 and 2001.
- The database contains information for the Australian adult working age population (25-65) and includes information on:
 - personal incomes
 - employment rates
 - labour force
- The database is cross-classified by gender and educational attainment, where educational attainment is divided into four categories: unqualified, skilled labour, bachelor degree and higher degree.

The Basic Data Set - Market Labour Incomes

- Gross annual incomes per capita (proxy for annual labour incomes).
- Annual income increases with the level of education (both for females and males).
- Annual incomes increased between 1981 and 1986, fell between 1986 and 1991 and since 1991 have increased again (both for females and males).
- For each level of educational attainment, men's incomes are higher than women's incomes.

The Basic Data Set - Labour Force

- The number of labour force members, both for women and men, has increased over the 20 years period for almost all educational attainment categories.
- In 2001 the number of women with bachelor degree in the labour force exceeded the number of men with bachelor degree in the labour force.

Except for this observation, the number of male members of the labour force exceeded the number of female members of the labour force across the different years for all levels of educational attainment.

The Basic Data Set - Unemployment Rates

- For men's data, higher educational level is associated with lower unemployment rate.
- Generally and excluding the higher degree category, women with more education experience lower unemployment rates.

For all census years, women from the higher degree category experienced higher unemployment rates than women from the bachelor degree category.

Experimental Estimates of Labour Underutilisation for Australia

- We construct experimental estimates for:
 - Females - labour categorised by educational attainment.
 - Males - labour categorised by educational attainment.
 - All Persons - labour classified by educational attainment and gender (method I).
 - All Persons - labour classified by educational attainment only (method II).

Experimental Estimates of Labour Underutilisation for Females and Males

Estimates for Females

Year	\tilde{u}	u^{LN}	u^{CD}	u^{CES}	u^{LF}
1981	4.23	4.11	4.11	4.09	2.87
1986	7.26	6.93	6.91	6.82	3.66
1991	8.33	7.90	7.88	7.77	4.55
1996	6.81	6.44	6.42	6.33	3.57
2001	5.38	5.03	5.01	4.96	2.74

Note: u^{CES} is calculated for $\rho = -4$.

Estimates for Males

Year	\tilde{u}	u^{LN}	u^{CD}	u^{CES}	u^{LF}
1981	4.03	3.86	3.85	3.81	1.25
1986	7.18	6.80	6.76	6.59	1.82
1991	10.49	9.95	9.88	9.60	3.85
1996	8.53	8.01	7.95	7.73	3.54
2001	6.70	6.28	6.24	6.11	3.29

Experimental Estimates of Labour Underutilisation for Females and Males - cont.

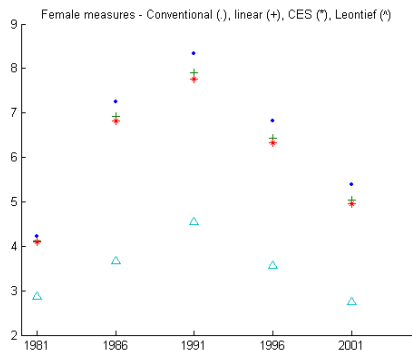


Figure: Estimates for Females

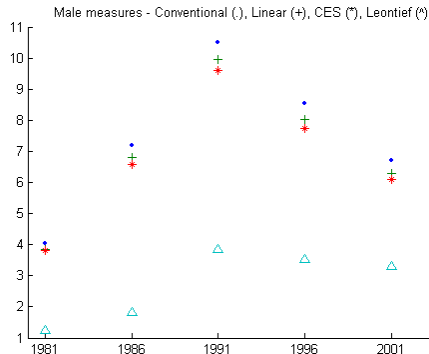


Figure: Estimates for Males

Experimental Estimates of Labour Underutilisation for All Persons

Estimates for Persons I

Year	\tilde{u}	u^{LN}	u^{CD}	u^{CES}	u^{LF}
1981	4.10	3.92	3.92	3.88	1.25
1986	7.21	6.83	6.80	6.65	1.82
1991	9.61	9.32	9.26	9.01	3.85
1996	7.80	7.48	7.43	7.25	3.54
2001	6.11	5.83	5.80	5.69	2.74

Note: u^{CES} is calculated for $\rho = -4$.

Estimates for Persons II

Year	\tilde{u}	u^{LN}	u^{CD}	u^{CES}	u^{LF}
1981	4.10	3.92	3.91	3.88	1.63
1986	7.21	6.80	6.76	6.63	2.33
1991	9.61	9.07	9.03	8.84	4.32
1996	7.80	7.30	7.27	7.12	3.76
2001	6.11	5.71	5.69	5.60	3.08

Experimental Estimates of Labour Underutilisation for All Persons - cont.

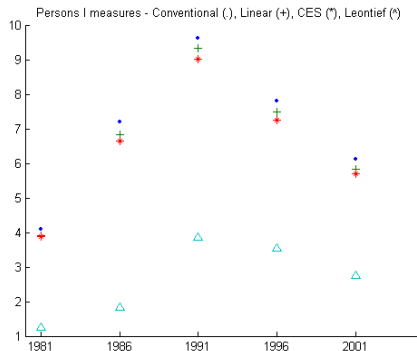


Figure: Estimates for Persons I

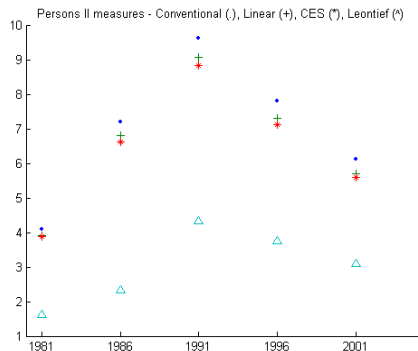


Figure: Estimates for Persons II

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- Relative to the alternative measures, the conventional measure overestimates the degree of labour underutilisation (for Males, Females, Persons I, Persons II)
- Greenwood and Kohli (2003) found that for the US the conventional measure yielded an overestimate of about 13.9%, on average, relative to the Cobb-Douglas measure.

In the Australian case, the conventional measure yielded, on average, an overestimation of:

6.5% for males, 5.6% for females, 4.9% for persons I and 6.7% for persons II, all relative to the Cobb-Douglas measure

Concluding Remarks - cont.

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 - Obtaining more accurate information on labour income.
 - Measuring the degree of labour underutilisation in terms of the number of potential hours of labour that are not used (percentage wise).
 - More observations to apply the econometric approach suggested by Greenwood and Kohli (2003) and comparing it with the index-number approach.

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 - provide a deeper understanding of developments in the economy.
 - aid in the estimation of potential output in macroeconomic modelling.
 - inform the formulation of appropriate education and labour market policies.