SHORT NOTE

ALTERNATIVE QUANTITATIVE MEASUREMENTS OF GROWTH AND WELFARE

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1. Rationale

Measuring development, growth and welfare is an important issue in normative and positive economics. The issue is more critical in developing economies where a good statistical indicator of income, living standard or poverty is crucial for decision-makers in corporate, government, non-government and international organizations in their for-profit or non-profit plans to promote business and trade, enhance growth and welfare, and reduce poverty in needy countries. In the current literature on development economics, trade liberalization for example has been encouraged through official negotiations and agreements and supported by the extensive technical programs of the International Monetary Fund, the World Bank, the Asian Development Bank or the World Trade Organisation and with substantial human and financial resources, to increase growth and raise income or reduce poverty in open but low-income economies. Several quantitative measurements in this context have been adopted to record the effects of this liberalization. The issue is that these different measurements can produce different outcomes casting confusion on the impact of trade liberalization and the evaluation of the effectiveness of economic and trade policy (Winters 2007). This note is a simple demonstration of the sources of the difference in two popular indicators of growth and welfare, namely the rates of change of the GDP and GDP per head (called *y* and *yh* respectively). It can be regarded as a technical guide to the use of alternative income measurements. The note also has some pedagogical and practical value, and its results can be applied to other areas of economic and non-economic activity such as productivity, investment, consumption, inflation, education expenditure, labour skills, profitability, taxation, finance, bankruptcy, or other fields of quantitative investigation where scaled and ratio measurements are conceptually required.

2. Three Propositions

Suppose we have two measures of growth or welfare, *y* and *yh*, then, with P=population

$$y \equiv \quad [GDP-GDP(-1)]/GDP \text{ and} \qquad \ldots (1)$$

$$yh \equiv \quad \{[(GDP/P)-(GDP(-1)/P(-1))]/[GDP(-1)/P(-1)]\}. \qquad \ldots (2)$$

For small changes, we have equivalently

$$y = \quad \log(GDP)-\log(GDP(-1), \text{ and} \qquad \ldots (3)$$

$$yh = \quad \{\log(GDP/P)-\log[GDP(-1)/P(-1)]\}. \qquad \ldots (4)$$

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By expansion, (4) becomes

$$\begin{aligned} yh &= [\log(GDP)-\log(P)]-[\log(GDP(-1)-\log(P(-1))] \\ &= [\log(GDP-\log(GDP(-1)]-[\log(P)-\log(P(-1)] \\ &= y-p, \text{ where } p \text{ is the rate of change of P.} \end{aligned} \qquad \ldots (5)$$

Thus,

Proposition 1: $y > yh$ iff $p > 0$ QED
Proposition 2: $y = yh$ iff $p = 0$ QED
Proposition 3: $y < yh$ iff $p < 0$ QED

3. Some Applications

In some developing low-income, high-economic activity and moderate-population growth economies such as Vietnam, the difference between average y and yh during 1986-2005 is 2.10 per cent. For India, one of the world's two high-growth and most populous countries, the difference during 1952-2007 is 2.25 per cent. For Japan, an OECD country, this difference is however -0.16 per cent, reflecting a low-GDP activity and low-population growth during 1986-2005. Another important application of the results above is when P denotes the consumer price index or the more popular GDP implicit price deflator. The difference between y and yh now represents the effect of inflationary pressure on the economy. A high inflationary pressure will reduce GDP growth and the living standard. Using this application, the difference between average quarterly y and yh for the US is 0.94 per cent during 1960:2-2004:4. For France, this difference is 1.01 per cent during 1978:2-2004:4, reflecting a higher inflationary pressure than that in the US.

References

ICSEAD (2006) Databases, http://www.icsead.or.jp/7publication/eaep_e.html.

OECD (2005) *DX Databases*, Melbourne, Australia.

Reserve Bank of India (2008), http://www.rbi.org.in/scripts/AnnualPublications.aspx?head=Handbook%20of%20 Statistics%20on%20Indian%20Economy. Accessed 9 Feb 2008.

Winters A (ed.) (2007), *The WTO and Poverty and Inequality*, Cheltenham: Edward Elgar.

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