

Economic development and income distribution

Fred Campano, Dominick Salvatore*

Department of Economics, Fordham University, Bronx, NY 10458, USA

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1. Introduction

The Kuznets' U-shaped hypothesis, which postulates that income inequality first increases and then decreases during development, has been extensively tested and empirically confirmed. The reason that income inequality first rises and then falls during the development process, however, has not been adequately analyzed and explained.

In this paper, we construct a two-sector, two-goods model of a developing economy with sectoral income inequality resulting from labor productivity and real wages being higher in the modern sector than in the traditional sector. Higher wages in the modern sector attracts labor from the traditional sector as long as the expected wage in the modern sector exceeds the actual real wage in the traditional sector, as postulated by the Harris and Todaro (1970) model. When real wages in both sectors have been equalized and unemployment in the modern sector and throughout the economy has fallen to the natural rate of unemployment, income inequality falls to zero.

Our paper shows that the Gini coefficient is zero when there is no modern sector, becomes positive with the introduction of a modern sector, reaches a unique maximum, and then declines and reaches zero when real wages in the modernized traditional sector and in the original modern sector have become equal and unemployment throughout the economy has fallen to the natural rate.

We then introduce a Monte Carlo simulation of a country passing through four stages of development, starting at stage 1 of a low-wage, labor-intensive country to stage 4 which is a high-wage developed country. Transition to each stage is based upon the introduction of a new modern sector which sets the country on a new potential GDP path. The simulation randomizes

* Corresponding author. Tel.: +1 718 817 4045; fax: +1 718 817 3518.

E-mail address: Salvatore@fordham.edu (D. Salvatore).

the percentage of the traditional labor force that is absorbed into the modern sector and then computes the Gini coefficient and the income per worker at each stage of development.

2. The cross-country evidence

Justification for the assumption of a Kuznets' curve in the above scenario is based upon cross-country empirical studies started by Ahluwalia (1976). He estimated equations to test the Kuznets' hypothesis which were of the form:

$$\text{Income share of (percentile group)} = a + b \log \left(\frac{Y}{P} \right) + c \left[\log \left(\frac{Y}{P} \right) \right]^2 + d \text{ dummy var.}$$

A follow-up study was done by Campano and Salvatore (1988) with an entirely different and larger collection of income distributions. The results were consistent with the original estimates by Ahluwalia in that the coefficients b and c had the right signs and significant t -tests. In this paper we are presenting the results of a second follow-up study, which updates our previous study with observations to the year 2000. The new data are quintiles taken from the World Bank's 2004 *World Development Indicators*, table 2.7. We have allowed for multiple observations, and have moved from real per capita GNP using market exchange rates to real per capita GDP in international dollars (1996 base year). We feel the latter do a better job in capturing the differences in living standards between countries. The estimated equations are shown below; the input data may be obtained from the authors at request by sending an e-mail to: campano@fordham.edu:

Income share of top 10%

$$= \underset{(t=-2.7)}{-87.0849} + \underset{(t=4.2)}{33.30081} \ln \left(\frac{Y}{P} \right) - \underset{(t=-4.7)}{2.22245} \left[\ln \left(\frac{Y}{P} \right) \right]^2, \quad \text{adj } R^2 = .28$$

Income share of bottom 60%

$$= \underset{(t=5.6)}{145.781} - \underset{(t=-4.9)}{30.6327} \ln \left(\frac{Y}{P} \right) + \underset{(t=5.3)}{1.974186} \left[\ln \left(\frac{Y}{P} \right) \right]^2, \quad \text{adj } R^2 = .23$$

Note that in both our 1988 and 2006 estimations we have dropped the dummy variable which was used by Ahluwalia to adjust for the more equal income distributions of socialist countries. Another difference in our specification is that we are using natural logarithms rather than common logarithms.

The above equations are plotted in Fig. 1, which indicates that the turning point is somewhere around \$2000 per capita in real 1996 international dollars. The deterioration in equality is rapid from about \$400 to the turning point, but the recovery back towards equality is very gradual over a very long period of time.

One can roughly estimate the time horizons to the turning point for a typical developing country by considering a country whose per capita income is \$400 (International) growing at the rate of 5% per annum. This is a rather good growth rate for a poor country and would be difficult to sustain over a long period of time. So consider this as an optimistic estimate. Now suppose the country's population is growing at 2% per annum. This is a reasonable assumption since Africa had

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