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A NOTE ON KUZNETS' U

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I. Introduction

It is well over a quarter of a century ago that Kuznets (1955) formulated what has since then been referred to as his celebrated U-hypothesis. In its classical version, the hypothesis maintains that given a two-sector economy with not too distinct degrees of inequality within sectors but different sectoral mean incomes, a continuous transfer of population from one sector to another will initially increase aggregate inequality and only later decrease. Kuznets demonstrated this by calculating the aggregate Lorenz curve for a hypothetical economy with simple sector-specific distributions; Robinson (1976) proved the U-shape to be a general phenomenon if the variance serves as the measure of inequality; and Knight (1976) showed the same to hold true for the Gini coefficient using, however, the extreme assumption of perfect equality within sectors.

Opinions differ as to what the classical U-hypothesis actually means. For some, the U-shape is merely a technical property of certain inequality measures. Knight, for instance, questioned whether one should be concerned at all about changes in measured aggregate inequality if they reflect essentially a transfer of individuals from a poor sector to a richer one. For others, the U-hypothesis, along with the observation that economic development is typically accompanied by increasing urbanization, has condensed to a simple theory that may help to explain the empirical evidence. According to this evidence[1] economic development appears to be associated for a longer part of the process with a worsening income distribution. We shall consider the U-hypothesis here in this latter interpretation as a theory about the nexus between development and inequality, and we intend to investigate how realistic its underlying assumptions are.

Identifying the development process with increasing urbanization, as the classical U-hypothesis does, appears to be entirely unproblematic. There is a very close correlation between urbanization and GDP per capita. Consequently, the degree of urbanization can be considered to be as good an indicator of a country's

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[1] See, e.g., the work of Oshima (1962), Adelman and Morris (1973), Paukert (1973) or Della Valle and Oguchi (1976).

level of economic development as the conventional GDP per capita. We are questioning, however, the basic assumption of a constant differential in sectoral mean incomes during the development process since there is evidence that this element of inequality between sectors tends to decrease. Accordingly, the main purpose of this note is to investigate the qualitative consequences of this observation and to relate it to what the classical U-hypothesis suggests. In order to avoid arguing along entirely hypothetical lines we will discuss this question on the basis of a small cross-country study. As a matter of fact, we will use a sample of 33 countries to construct a representative country. We shall then track how aggregate inequality would develop in this country if the differential in sectoral mean incomes were to stay constant at some meaningful level (classical hypothesis) and contrast this with the pattern that would arise if this differential is allowed to narrow systematically (extended hypothesis).

II. The Effect of Narrowing Inequality between Sectors

Since we want to use a realistic setting, data availability forces us to choose the Gini coefficient as the measure of inequality. And since we wish to track aggregate inequality under different assumptions about how the differential in sectoral mean incomes develops, we need some representation of the aggregate Gini as a function of this differential, of the sector specific Ginis, and of the distribution of population among sectors. Thus, we need a representation of the type $G = H(G_1, G_2; \mu_1, \mu_2; n_1, n_2)$ where G is the aggregate Gini and G_i, μ_i and n_i denote the sectoral Ginis, mean incomes and number of people in the sectors, respectively. Now, Cowell and Shorrocks (1980) have shown that the Gini coefficient is in general not decomposable in this way except in the unlikely case in which the sectoral distributions do not overlap. We will therefore resort here to using a convenient approximation to the aggregate Gini coefficient which has a simple form and appears to be fairly reliable.[2] Writing $b = \mu_1/\mu_2$ for the ratio of the first to the second sector's mean income, $c = n_1/(n_1 + n_2)$ for the first sector's share in total population, and defining $a_i = (1 - G_i)/(1 + G_i)$, this approximation reads

$$G = G(a;b;c) = \frac{bc^2}{bc + 1 - c}\,\frac{1 - a_1}{1 + a_1} + \frac{(1 - c)^2}{bc + 1 - c}\,\frac{1 - a_2}{1 + a_2} + \frac{c(1 - c)}{bc + 1 - c}\,B \qquad (1)$$

where

$$B = \begin{cases} 1 - b + 2b\,\dfrac{(1 - a_1)^2}{1 - a_1 a_2}\left(\dfrac{a_1 b}{a_2}\right)^{a_1/(1-a_1)} & \text{if } a_1 b \leqq a_2 \\[2ex] b - 1 + 2\,\dfrac{(1 - a_2)^2}{1 - a_1 a_2}\left(\dfrac{a_1 b}{a_2}\right)^{a_2/(a_2-1)} & \text{if } a_1 b \geqq a_2 \end{cases}$$

[2] This approximation builds on the assumption that the sectoral distributions follow a Pareto distribution. For details see Braulke (forthcoming).

The information required for using (1) in a practical application is obviously minimal; yet even this is often more than what is readily available. More specifically, identifying for our purpose sector 1 with the rural and sector 2 accordingly with the urban sector, data on the urban and the rural Gini coefficients and hence the parameters a_i constitute the major bottleneck. Such sector-specific information exists for only a few countries and, in addition, refers to various income definitions. To use some average of these largely incompatible sectoral Ginis as a realistic value for our representative country appears therefore to be unadvisable. We instead prefer to estimate the required parameters a_i for the representative country by fitting (1) to country-specific data on G, b, and c. Such data on the aggregate Gini coefficient, the population shares and even on the sectoral income differential are more easily available. But again, it doesn't seem advisable to mingle countries where the reported aggregate Gini coefficients refer to incompatible income definitions. We consequently restrict our attention to the sample of 33 countries listed in table 1 which form a homogeneous group in that their distribution statistics are based on household income. Using then (1) as the specification for the non-linear regression of the country-specific aggregate Ginis G^j against the corresponding b^j and c^j yields

$$G^j = G(\underset{(16.0)}{0.520},\ \underset{(19.4)}{0.439}; b^j; c^j) + e^j \qquad \bar{R}^2 = .596 \qquad (2)$$

where e^j denotes the residual and the t-ratios are given in parentheses. The two estimates $\hat{a}_1 = 0.520$ and $\hat{a}_2 = 0.439$ correspond to a rural Gini coefficient of 0.32 and an urban Gini coefficient of 0.39, respectively. They are not significantly different from each other,[3] but they agree rather well with the general observation that in most countries for which such sectoral information exists the income distribution in the rural sector tends to have somewhat less inequality than that in the

[3] On the basis of a likelihood ratio test it can indeed not be ruled out at any acceptable level of significance that these sectoral Ginis are equal. Rerunning (2) with the restriction $a_1 = a_2$ yields an $\bar{R}^2$ of 0.571 and the estimate $\hat{a}_1 = \hat{a}_2 = .472$ corresponding with (identical) sectoral Ginis of 0.36.

urban sector. We will consequently use them for our representative country.

In order to compare what the classical U-hypothesis states in contrast to the extended hypothesis, we must merely determine the constant income differential $\bar{b}$, which is implicit in the assumptions of the classical hypothesis, as well as the function $\tilde{b} = \tilde{b}(c)$, which reflects the alleged narrowing of this differential under the extended hypothesis. As regards the former, we will set somewhat arbitrarily $\bar{b} = .320$ which corresponds to the geometric mean of the income differentials observed in our cross-country sample. And for the latter, we will simply use for the function $\tilde{b}(c)$ both the form and the estimated parameters of the linear regression

$$b^j = \underset{(8.73)}{0.555} - \underset{(3.26)}{0.360}c^j + e^j \qquad \bar{R}^2 = .232 \quad F(1,31) = 10.6 \qquad (3)$$

where again e^j denotes the residual. Note that this regression which clearly passes the F-test at the 1% level of significance indeed suggests an improvement in the rural–urban income differential b as urbanization proceeds (c declines).

Using then again (1) and identifying the approximation $G(\hat{a};\bar{b};c)$ with what the classical hypothesis maintains and identifying accordingly the approximation $G(\hat{a};\tilde{b};c)$ with the extended hypothesis, a comparison between these two hypotheses reduces to comparing the respective paths as depicted in figure 1. Both clearly exhibit the shape of an (inverted) U, but the differences are striking. Compared to the pattern suggested by the classical hypothesis (solid line), the path corresponding to the extended hypothesis (dotted line), which takes into account the likely narrowing in the rural–urban income differential during the development process, is characterized by a more dramatic

TABLE 1.—ACTUAL AGGREGATE GINI COEFFICIENTS AND RELATED DATA FOR A CROSS-COUNTRY SAMPLE

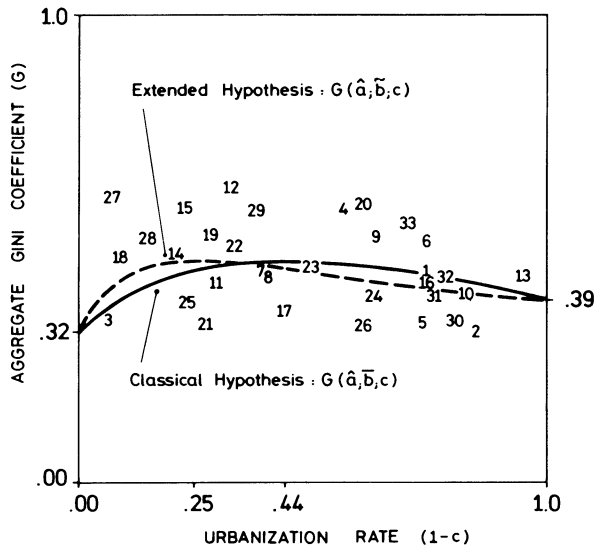
No.	Country	Year of Income Survey[a]	Aggregate Gini Coefficient[b] G	Rural–Urban Income Ratio[c] b	Rural Sector's Share in Population[d] c
1	Argentina	1961	.4375	.621	.262
2	Australia	1968	.3185	.893	.158
3	Bangladesh	1967	.3420	.495	.942
4	Brazil	1970	.5744	.175	.441
5	Canada	1965	.3333	.498	.272
6	Chile	1968	.5065	.260	.265
7	Costa Rica	1971	.4445	.380	.616
8	Egypt	1965	.5028	.265	.600
9	France	1962	.5176	.368	.370
10	Germany (F.R.)	1970	.3939	.362	.187
11	Guyana	1956	.4192	.535	.717
12	Honduras	1968	.6188	.275	.691
13	Hong Kong	1971	.4301	.441	.063
14	India	1968	.4775	.298	.806
15	Jamaica	1958	.5766	.194	.787
16	Japan	1971	.4223	.331	.272
17	Korea	1971	.3601	.386	.574
18	Malawi	1969	.4696	.152	.924
19	Malaysia	1970	.5179	.348	.731
20	Mexico	1969	.5827	.177	.413
21	Pakistan	1971	.3299	.357	.742
22	Philippines	1971	.4941	.345	.682
23	Puerto Rico	1963	.4526	.361	.520
24	Spain	1965	.3930	.397	.383
25	Sri Lanka	1970	.3771	.402	.782
26	Taiwan	1964	.3290	.441	.408
27	Tanzania	1969	.5973	.058	.945
28	Thailand	1962	.5103	.125	.868
29	Turkey	1968	.5679	.175	.634
30	United Kingdom	1968	.3385	.641	.212
31	United States	1970	.4074	.671	.260
32	Uruguay	1967	.4279	.629	.236
33	Venezuela	1962	.5445	.122	.312

[a] All data refer as closely as possible to this period.
[b] Refers to household income. Data from Jain (1975).
[c] For want of more appropriate data the ratio of agricultural to non-agricultural GDP per capita was used. Calculated according to the formula $b = k(1 - s)/((1 - k)s)$ where s is the share of agriculture in total civilian employment and k its share in GDP (3-year average). Employment data from International Labour Office or World Bank and GDP data from United Nations.
[d] Data are taken from United Nations (1976) and were extrapolated where necessary.

widening of aggregate inequality in the initial phase followed by a speedier improvement in the consequent stages. More specifically, the end of the deterioration phase comes at the urbanization rate $(1 - c)$ of 0.25 whereas under the assumptions of the classical hypothesis this turning point would be reached at the urbanization rate[4] 0.44, and thus markedly later. That this difference is substantial is highlighted by the fact that out of the 33 countries in our sample as many as 16 had not yet reached the turning point suggested by the classical hypothesis, whereas under the extended hypothesis there were only 7. Were our representative country to follow the pace of urbanization that was recorded in the more recent past for less developed regions,[5] the distance between these two turning points would be equivalent to a time span of approximately four decades.

If we trust the evidence in our sample, the representative country is not free to choose between the two paths; according to the data, the urban–rural income differential will narrow as urbanization proceeds and consequently it will have to travel along the path suggested by the extended hypothesis. What might account for this decrease in the inequality between sectors? We can only offer conjectures at this point. One possible reason is that the more modern technologies, first introduced in the urban sector, will also eventually spread to the rural sector, thereby increasing this sector's productivity level to that of the urban sector.[6] This process might be accelerated as labour in the rural areas becomes more and more scarce, as is the case now in many developed countries. Also, the abandonment of the countryside means an increase of population in the urban centers that has to be fed. This may lead to adjustments in the terms of trade in favour of the rural sector, which again could result in that sector's productivity catching up.

FIGURE 1.—ACTUAL AGGREGATE GINI COEFFICIENTS[a] AND PATHS CALCULATED UNDER THE CLASSICAL AND THE EXTENDED U-HYPOTHESIS



[a] The actual positions are indicated by the numbers, which agree, of course, with the numbering in the table.

III. Conclusion

It has been argued that Kuznets' classical U-hypothesis is incomplete as an empirically founded theory because it neglects the likely narrowing of the income differential between sectors as the development process proceeds. When this aspect is taken into account within a realistic setting, the path described by the aggregate Gini coefficient will continue to exhibit the characteristic U-shape, but it will at the same time show a substantially shorter initial phase of widening inequality. In this sense, the classical U-hypothesis loses some of its pessimistic undertone.

Even though we constructed a representative country on the basis of a small cross-country sample and argued that this artifact had to follow a prescribed path, we do not understand our discussion as a plea for the neglect of a conscious income distribution policy. When looking again at the figure and the actual positions of the countries in our sample, it is obvious that many countries do in fact deviate substantially from what the extended U-hypothesis suggests for the representative country at the same stage of development. It is hardly surprising that among the countries doing markedly better one finds particularly those which aim for a more balanced income distribution. Or, conversely, the countries with substantially worse actual Gini coefficients are essentially those which have shown little taste for such income distribution policies. This suggests then that the individual country in fact has considerable freedom to determine the distribution within and between sectors and hence the level and the shape of the specific U-curve along which it will travel.

[4] Had we chosen for the classical hypothesis the arithmetic mean $\bar{b} = .369$ instead of the geometric mean, this turning point would come at an urbanization rate of 0.48 and thus even later.

[5] According to table 1, in the U.N. compendium of Housing Statistics (1976) urbanization in these regions proceeded by nearly 10 percentage points between 1950 and 1970.

[6] It is interesting to note that Kuznets in his original paper expected in contrast that the urban–rural income differential ". . . is stable at best, and tends to widen because per capita productivity in urban pursuits increases more rapidly than in agriculture" (1955, p. 8). When looking at time series evidence for the United States or other developed countries, this view appears to be correct for the period from late last century up to World War II; since then, however, the pattern of productivity growth has completely changed. See U.S. Bureau of the Census (1975), Series W 1-11.

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UNEMPLOYMENT INSURANCE INCENTIVES AND UNEMPLOYMENT DURATION DISTRIBUTIONS

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The effects of Unemployment Insurance Compensation (UI) on unemployment have been studied extensively. This study is novel in two aspects. First, it examines the impact of UI on the distribution of unemployment durations rather than focusing on a single parameter, mean duration. Second, employer incentives are considered as well as employee incentives. The purpose of this study is to investigate the impact of UI on completed spell duration distributions emphasizing the distinction between the responses of unemployed workers and the reactions of employers to the incentives created by the UI system.

There is an extensive theoretical and empirical literature concerning UI system incentives for the eligible unemployed based on the well-established inverse relationship between search costs on reservation wages in job search models. As UI benefits reduce search costs, theory would predict higher reservation wages and longer duration. Kiefer and Neumann (1979) have empirically verified the reservation wage effect while a number of authors, most notably Ehrenberg and Oaxaca (1976) have found evidence that UI results in longer durations. Indeed, the evidence is so extensive that Topel and Welch (1980) consider the issue resolved.

The literature concerning UI's employer incentives is less extensive but growing. Feldstein (1976, 1978) has argued that incomplete experience ratings and the existence of maximum UI tax rates have resulted in high layoff employers being subsidized by low layoff employers. Empirical estimates of the effects of employer incentives are limited. Feldstein (1978) found a positive relationship between the probability that an individual was on temporary layoff and the ratio of UI benefits to lost wages. Brechling (1981) found that manufacturing layoff flows were higher and durations longer the more limited the experience rating. Halpin (1979) indirectly supports Feldstein's hypothesis with the result that experience rating tended to smooth seasonal fluctuations in employment.

The approach of this study is to look at parameters of States' duration distributions to detect the separate influences of the Job Search based theory and Feldstein's theory. Job Search clearly implies an increased mean duration. Feldstein's increased temporary layoffs would increase the relative frequency of short duration unemployment, which would be measured as an increase in the skew of distribution. The objective of this study is to relate measures of States' UI system incentives to the mean, standard deviation, and skew of the States' duration distributions.

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