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Economic development and institutional factors affecting income distribution: the case of Iran, 1967-1993

D.P. Doessel and Abbas Valadkhani
Department of Economics, The University of Queensland, Brisbane, Australia

Introduction

The relationship between income equality and economic development has attracted the attention of a plethora of applied economists. The dilemma associated with economic development and income equality pertains to the following question: is there a trade-off between economic development and income equality? This question was first addressed by Kuznets (1955) who tabulated time series data for England, Germany and the USA as well as regions (Prussia and Saxony). For such "presently developed countries" the general conclusion is "…that the relative distribution of income…has been moving towards equality with these trends particularly noticeable since the 1920s but beginning perhaps in the period before the first world war" (Kuznets, 1955, p. 4). Such observations form the basis of what is now commonly called the U-hypothesis, i.e. that income equality has a U-shape when depicted against the level of development: as development first takes place income equality worsens, but at higher levels of development income equality occurs.

Kuznets is at pains to emphasise two points. First, this conclusion is not explained by re-distributive programs (in cash or in kind) of government, as the data relate to incomes, prior to government tax and expenditure effects. Thus, if government tax and expenditure policies were re-distributive towards the lower income groups, then the narrowing of inequality (post fisc) would be greater than that indicated by the data he employed. Second, the stability, or decrease, in inequality he observed occurred at the same time as real per capita income was rising. Thus if inequality is constant, or decreasing, it follows that the (absolute) per capita income of the lower income groups is rising at the same rate for the country as a whole, or rising faster than the country as a whole.

Kuznets presents some pre-direct tax and pre-expenditure data, albeit imperfect, on some developing countries, and those data indicate that income inequality is more pronounced than in developed countries (Kuznets, 1955,

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pp. 20-1). Generally, the size distribution of income "… remains more unequal in the underdeveloped countries than in the developed: the income shares of the very top ordinal groups are higher, though the shares for the much larger low ordinal groups are not significantly lower" (Kuznets, 1966, pp. 424-5). Furthermore, Kuznets speculates that "… inequality in the secular income structure of underdeveloped countries may have widened in recent decades" (Kuznets, 1955, p. 24). Further data on these issues are given in Kuznets (1963).

Kuznets' work is based on his interpretations of time series data for individual countries. At a general level the hypothesis is that as development occurs for a low income country, inequality of the size (or personal) distribution of income will increase, reach a turning point, and then begin to decrease as development (measured by the level of per capita income) continues. It should be noted that if inequality is measured by (say) the income share of the bottom 40 per cent of the population, the U-shape will arise. If inequality is measured by the Gini coefficient, then, by construction of that coefficient, the Kuznets hypothesis implies an inverted U-shape for the relationship between income distribution and the level of development.

Kuznets (1955) also provides an explanation as to why this happens: it arises from inter-sectoral differences in an economy. Assume a dualistic economy, such as that of Lewis (1954), with two sectors such as agriculture and manufacturing, that there is income inequality in both sectors, that the average income in manufacturing is higher than in agriculture, and that the income inequality is greater in the manufacturing sector than in agriculture. In such a situation, if the inequality index is decomposable, overall income inequality is the sum of the "within sector" inequality and the "between sector" inequality. Adelman and Robinson (1989) describe this analysis as "variance decomposition". A common characteristic of economic development is migration of labour from agriculture to the manufacturing sector. As this migration occurs "within sector" inequality increases. The net effect is that overall inequality increases at the initial stage of economic development, and then decreases. For a concise demonstration of the process see Robinson (1976). This strand in the literature on equality and economic development can be described as a theory of inter-sectoral shift (Fields, 1980).

However, there is a second strand which can be categorised loosely as "institutionalist" or "structuralist", an early example of such work being that of Adelman and Morris (1973). The institutionalist approach implies that factors such as a country's history, the political system, the distribution and relative importance of education, the role of the labour movement, the role of government in the economy and various social mores may also be determining factors of relative equality. These two approaches, it should be emphasised, are not mutually exclusive. Adelman and Morris (1973), considered as early advocates of the latter approach, also estimated the effect of the level of development, albeit as an afterthought. *Inter alia*, Ahluwalia, an author to whose work we now turn, also adopted both level of development and institutional factors, as explanatory variables, in explaining inequality.

In his empirical work on income distribution, Ahluwalia (1976a, 1976b) employed cross-country data for a sample of 60 developing and developed countries, as well as a separate sub-sample of 40 developing countries. His results confirm the Kuznets U-hypothesis. Ahluwalia concludes that "there is strong support for the proposition that relative inequality increases substantially in the early stages of development, with a reversal of this tendency in the later stages" (1976b, p. 338). The context of this comment is that not only are the per capita income and per capita income squared terms significant, but "institutional" variables are also significant. These results have been utilised by the World Bank in the projections of inequality in the year 2000 (World Bank, 1978 and 1979). For a detailed account of this literature see Fields (1980).

This paper is structured as follows: the next section addresses an important methodological issue associated with econometric estimation on cross-section and time series data. Then, the U-hypothesis, and/or the inverted U-hypothesis, associated with Kuznets is tested on Iranian data. The penultimate section of the paper introduces some institutional or structural variables which are relevant to an explanation of distribution in Iran. The emphasis of this paper is on empirical results obtained by econometric estimation. The last section provides some concluding remarks.

An important issue of methodology

The dominant style of analysis of the U-hypothesis has been to undertake multiple regression analysis of cross-section data, where the unit of observation has been individual countries. An early study of this kind is that of Adelman and Morris (1973). With data for 43 developing countries and three separate measures of income inequality they applied an analysis-of-variance technique and concluded that there were six variables which determined income distribution, one of which was the level of per capita GDP.

In addition, various refinements addressing data comparability have been undertaken, for example, employing purchasing power parity (PPP) data as calculated by Kravis *et al.* (1982) and Summers and Heston (1984). See, for example, Ram (1988) and Tsakloglou (1988). Furthermore, there have been some studies, e.g. Roberti (1974), Loehr (1980) and Gupta and Singh (1984), which have used cross-section and time series data. However, it should be noted that some of this work does not address only the U-hypothesis.

It is of paramount importance to recall that Kuznets was concerned with the distribution of income in a particular country as economic development occurred through time. In other words, the phenomenon with which Kuznets was concerned was time series in nature. *Inter alia,* Ahluwalia's (1976a, 1976b) work was cross-sectional in nature. By this is meant that the observations on which his work was based are for individual countries at different levels of development.

It must be recognised that econometric procedures applied to such cross-sectional data indicate nothing about time series phenomena except under very special circumstances (Kuh, 1959). This econometric procedure of estimating a relationship that is time series in nature by the use of cross-sectional data is not unique to this area of economic inquiry. For example, there is a large literature

on the relationship between exports and economic growth. This literature has its origins in the protectionist or inward-looking policy associated with, *inter alia,* Rosenstein-Rodan (1943) and Singer (1950). Given the poor economic performance of newly independent countries in the decades after World War II, a counter-revolution in trade policy was initiated by Krueger (1978) and Balassa (1978a, 1978b). The early studies on the relationship between exports and economic growth were cross-sectional in nature and hence are subject to criticism. However, more recent studies on the export-growth nexus have employed time series data on individual countries (Ram, 1987).

A little reflection on the relationship between exports and growth indicates that the relationship can be appropriately analysed for individual countries over time. In fact, it could be argued that this is the appropriate way to proceed. The limitations of using cross-section data on various samples of countries have been recognised in some papers. For example, Feder (1982) points out that the interpretation of his econometric results must be carefully considered given his use of cross-section data. He writes "any cross-country study assumes implicitly that parameters are in some general way similar across countries… It is probably best to treat the estimated coefficients as average values which provide a general order of magnitude within the sample but are not applicable to any specific country" (Feder, 1982, p. 64). Writing on the same issue Ram (1987) begins by pointing out that there are large differences between countries and that "imposition of a common structure in the form of cross-section models can be a drastic simplification, and important parametric differences could be masked in cross-section estimates even when the samples chosen look fairly homogeneous with reference to certain prior criteria" (Ram, 1987, p. 52). For Ram, the final conclusion is that the models of the "export-growth nexus" should be tested on time series data for individual countries. See also Papanek and Kym (1986), Ram (1988) and Tsakloglou (1988).

Another example of this inappropriate econometric procedure is indicated by Antle and Heidebrink (1995) who have postulated a U-hypothesis between environmental quality and the level of economic development. Essentially their Kuznets-type relationship is time series in nature, however, for reasons associated with data availability, their empirical work is undertaken on cross-sectional data for numerous countries at different levels of economic development.

This discussion leads to the inexorable conclusion that the numerous empirical studies on this central issue of development, if based on the analysis of cross-section data, are fundamentally flawed. Put otherwise, such studies provide policy makers with no insight into the issues with which they have to grapple, given the specific institutional and structural peculiarities of their individual countries. See Saith (1983) for a relevant discussion of this issue. The analysis of this issue requires time series data for individual countries.

Testing the simple Kuznets relationship and the perverse Kuznets relationship

Anand and Kanbur (1993) criticise Ahluwalia's findings on several grounds. First, they contend that various functional forms result in diverse shapes for the

inequality-development relationship. Second, they argue that the database used by Ahluwalia is not consistent with respect to the income concept, population unit and survey coverage. Third, using a "minimally consistent" database, Anand and Kanbur find a reversal of the commonly accepted U-shaped hypothesis. This reversal will be referred to as the "perverse U" in this paper to avoid confusion. This perverse U curve is their preferred equation.

In the context of the Iranian economy, Pesaran (1975) has used a time-series approach (with a limited number of observations) and his findings are similar to those obtained by Ahluwalia. However, the *t*-statistics in Pesaran's equations are not statistically significant and also the goodness of fit statistics for his equations are low. Likewise, the adjusted R^2 for Anand and Kanbur's final equations (equations 1.1c and 1.2c) are less than 0.22.

In sum, although Ahluwalia's results can be criticised on the above-mentioned, and relevant, grounds, Anand and Kanbur's proposed equations suffer from mis-specification. In fact, a cursory look at Figure 2 presented in Anand and Kanbur's (1993, p. 26) paper reveals that the relationship between per capita GNP and the income share of the lowest 40 per cent of the population is neither linear nor quadratic. It could be a circle or something else!

The incongruence between these two hypotheses, i.e. the Kuznets inverted U-hypothesis and Anand and Kanbur's "perverse" U-hypothesis, provides an ambivalence towards the relationship between economic development and income inequality. That the existing literature has ended up in this "blind alley" suggests that a new approach is needed. As argued above, an alternative way to analyse the inequality-development nexus involves the use of time series data for a particular country.

It should be observed that these hypotheses result in contradictory policy messages, particularly in the context of developing countries. In other words, the behavioural equations reported by Ahluwalia and Anand and Kanbur are not only incongruous and inconsistent, but very sensitive to functional forms. The change in the functional form, i.e. non-log or log forms, as estimated by Anand and Kanbur, and the exclusion of a number of countries from the sample, produce conflicting results.

In addition, both the inverted U- and perverse U-hypotheses yield mis-specified behavioural equations, which have quite low coefficients of determination. The reason for this can be associated with the fundamentally different structure of the economies in their empirical study. It is quite pertinent to accept the view that "economic structure, not level or rate of economic growth, is the basic determinant of patterns of income distribution" (Adelman and Morris, 1973, p. 186). Thus, adherence to a cross-country analysis would be inappropriate.

Put otherwise, it is central to the Kuznets conception of economic growth and income inequality that the phenomenon is time series in nature and applicable to an individual country, given each country's unique historical and institutional characteristics. Given this conception it is bizarre to examine the relationship using cross section data of different countries at different levels of

development. As emphasised here it is necessary to examine the relationship between the Gini coefficient (or some other measure of inequality) and per capita GDP for each individual country using longitudinal (time series) data. It is recognised that this method of analysis may not be feasible for some developing countries because of the lack of time series data on the Gini coefficient (or other inequality indices), as well as the lack of data on the explanatory variables. Fortunately, in the case of Iran there are 26 annual observations for the Gini coefficient for the period 1967-1993. Thus, the relationship (if any) between the Gini coefficient and per capita income can be tested on an adequate number of observations.

If one accepts the inter-sectoral shift hypothesis, i.e. the Kuznets U-hypothesis, as being the only determinant of income inequality, then one would expect the following equation to provide a good fit to the data:

$$\text{GINI}_t = \alpha + \beta\,\text{PERY}_t + \gamma\text{PERY}_t^2 + \varepsilon_t \qquad (1)$$

where GINI_t is the Gini coefficient in time t,

PERY_t is per capita GDP in time t, and

ε_t is the stochastic residual in time t.

Given that all inequality data employed in this study are Gini coefficients, the Kuznets U-hypothesis is, in fact, manifested by an inverted U-relationship. In equation (1) this implies that γ will be negative. On the other hand, if Anand and Kanbur's (1993) "perverse" relationship holds, then γ should be positive.

Prior to undertaking any empirical test, it is useful to observe the scatter diagram of per capita GDP (1982 prices) and the Gini coefficient for the period 1967-1993. See Figure 1. Casual empiricism indicates that both the inverted U-hypothesis and the "perverse" U-hypothesis are inappropriate in the context of the Iranian economy, as there is no systematic relationship, as such, between per capita GDP and the Gini coefficient.

Attention is now directed to fitting a quadratic equation to the data in level and log forms. The following results have been obtained, the data in parentheses being t-statistics:

$$\begin{array}{lllll} \text{GINIt} = 0.316 + 0.828\,\text{PER}_t - 1.348\,\text{PERY}_t^2 & & & & R^2 = 0.03\ \text{DW} = 1.52\ F(2,24) = 0.37 \\ \quad (2.08) \quad (0.75) \quad (-0.71) & & & & \\ \log(\text{GINI}_t) = -4.021 + 1.575\log(\text{PER}_t) - 0.140\,(\log(\text{PER}_t))^2 & & & & R^2 = 0.05 \\ \quad (-0.89) \quad (0.97) \quad (-0.96) & & & & \text{DW} = 1.54 \\ & & & & F(2,24) = 0.64 \end{array}$$

Irrespective of the different functional forms (linear and log forms), these equations provide ample evidence that neither the inverted U-hypothesis nor the "perverse" U-hypothesis is relevant in the context of the Iranian economy. As seen, both the t-ratios and the coefficients of determination do not lend any support for either of these hypotheses. Thus, on the basis of these data, inter-sectoral shifts do not explain anything about Iranian inequality.

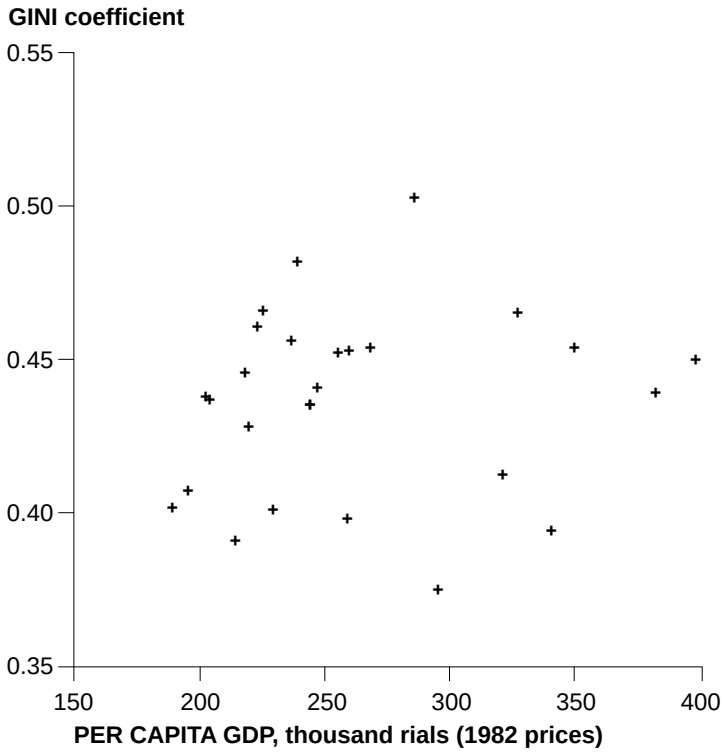

Figure 1.
Plot of per capita GDP and the Gini coefficient of household expenditure, Iran, 1967-1993, thousand rials (1982 prices)

Sources: Nili (1996), the Statistical Centre of Iran (1985, 1992) and the Plan and Budget Organisation of Iran (1994).

Testing the relationship between inequality and institutional or structural determinants

The previous results provide no support for a conventional, or "perverse", quadratic relationship, as suggested in the literature on inter-sectoral shifts. However, it needs to be recognised that the data employed here relate to a relatively short time period (26 years), given the broad canvas of time on which Kuznets paints his picture. This qualification needs to be borne in mind.

The non-existence of the quadratic relationship between the Gini coefficient and per capita GDP should not be taken to imply that there is no relationship between these two variables: the relationship could be linear and associated with institutional and structural characteristics of Iran. In other words, the previous estimated equations may be mis-specified and for that reason we have found no quadratic relationship.

In this section an institutional and structuralist approach to model the Gini coefficient in the Iranian economy in the period 1967-1993 is applied. To

this end, a list of variables which will be employed in this context is as follows:

PERY	is per capita total GDP;
PER1	is the per capita value added by the goods-producing sectors;
PER2	is the per capita value added by the service sectors;
PERSUB	is the per capita transfers and subsides paid by the government, predominantly for foodstuffs;
PERG	is per capita total government expenditures (current and capital);
GINI	is the Gini coefficient of household expenditure;
PEREDU	is the per capita expenditure on education by both the private and government sectors; and
SER	is the ratio of value added by the service sectors to total GDP.

The goods-producing sector is here defined as the sum of value added in the following sectors, as employed consistently in the Plan and Budget Organisation of Iran (1994) database: agriculture, manufacturing, mining, petroleum, construction, electricity, water and city gas. The service sector consists of the summation of value added for the following sectors: trade, hotels and restaurants, transport, communication, storage, real estate, financial institutions and banks, and personal and domestic services. Note that value added in the public sector has been excluded from the latter definition since its inclusion would create a problem of multicollinearity with government expenditure in the analysis reported below.

All these variables are measured in 1982 constant prices, and have been extracted from the data published by the Plan and Budget Organisation of Iran (1994), the Central Bank of Iran (various issues), and the Statistical Centre of Iran (1985, 1992).

The next step prior to undertaking any econometric estimation relates to the determination of the time series properties of the above-mentioned variables. The Augmented Dickey-Fuller (ADF) test has been used for this purpose (Dickey and Fuller, 1979, 1981). Table I summarises the ADF test results for the level and first difference forms of these variables. This Table indicates that all variables are integrated of order one, i.e. $I(1)$. Thus, in order to avoid obtaining spurious regressions, these variables should be first differenced (Δ) to reach stationarity.

Thus, in order to obtain consistent estimators in our regression analysis all the variables are first differenced to become stationary. Table II presents the econometric results for four specific regressions modelling the Gini coefficient. In this Table the first two equations (columns 1 and 2) and the last two equations (columns 3 and 4) will be discussed in tandem below.

The first equation in column (1) of Table II assumes that the Gini coefficient is explained by per capita GDP, per capita government transfers and subsidies,

Variable	Level	First difference	Order of integration
PERY1	–2.14 (1)	–2.99 (0)	*I*(1)
$PERY2_t$	–2.16 (1)	–2.63 (0)	*I*(1)
$PERY_t$	–2.52 (1)	–2.65 (1)	*I*(1)
$PERSUB_t$	–1.82 (0)	–5.01 (0)	*I*(1)
$PERG_t$	–1.73 (1)	–3.17 (0)	*I*(1)
GINIt	–2.07 (0)	–6.43 (0)	*I*(1)
$PEREDU_t$	–1.93 (0)	–4.92 (0)	*I*(1)
SER_t	–1.15 (0)	–4.99 (0)	*I*(1)

Table I.
ADF test results for the level and first difference forms for eight variables for Iran, 1967-1993

Notes: Figures in parentheses indicate the optimal lag length in the ADF regression.
The Schwarz criterion has been utilised to determine the optimal lag in the ADF regression
The Mackinnon critical value at the 10 percent significance level is –2.63, when there is a constant but no trend in the ADF regression

per capita government expenditures, the ratio of value added in the service sectors to total GDP, and the lagged dependent variable. Note that this regression is not significant on the basis of an overall *F* test, and that only two coefficients (for subsidies and the share of the service sectors) are statistically significant. The significance of the ratio of the service sectors to total GDP suggests a disaggregation of the (single) income variable into two variables measuring the size of the goods-producing and service sectors. The only difference between this estimated equation and that appearing in column (2) of Table II pertains to the disaggregation of per capita income into the two categories mentioned above, viz. per capita value added by goods-producing sectors and per capita value added by the service sectors. As seen from Table II, per capita income is not significant in the first estimated equation, but SER_t is significant with a positive sign. This indicates that if the ratio of value added in the service sector (SER_t) increases, as an institutional factor, income inequality rises. This result is not counter-intuitive, given the prevalence of rent-seeking activities in most of the service sectors in Iran (Farzin, 1995; Karshenas and Pesaran, 1995; Mazarei, 1996; Pesaran, 1995).

If per capita income is disaggregated into per capita value added in goods-producing sectors and per capita value added in the service sectors, these two per capita income terms become relatively significant, but with opposite signs (column two of Table II). This is a very important result as it suggests that economic activity in these two broadly defined sectors has a differential repercussion on equality. Per capita value added in the goods-producing sectors has a negative impact on income inequality, whereas that for the service sectors is the other way round. These results indicate that it is important to disaggregate per capita income for Iran, to take account of an important institutional and structural feature of the economy. This disaggregation corresponds with economic sectors in which rent-seeking is rife, or alternatively, virtually non-existent. It should be mentioned that ΔSER_t

Variable	(1)	(2)	(3)	(4)
Constant	–0.002	–0.002	–0.0005	0.0018
	(–0.53)	(–0.44)	(–0.14)	(–0.50)
$\Delta PERY_t$	0.153	–	–	–
	(0.67)			
$\Delta PERY1_t$	–	–0.454	–0.383	–0.449*
		(–1.29)	(–1.92)	(–2.19)
$\Delta PERY2_t$	–	1.752*	1.063	1.744*
		(2.23)	(1.32)	(2.84)
$\Delta PERSUB_t$	8.481*	6.914*	5.672*	6.936*
	(2.58)	(2.28)	(2.15)	(2.59)
$\Delta PERG_t$	–1.129	–1.322*	–0.917	–1.324*
	(–1.95)	(–2.40)	(–1.56)	(–2.57)
$\Delta PEREDU_t$	–	–	4.274	–
			(1.50)	
ΔSER_t	0.643*	–0.007	–	–
	(2.20)	(–0.02)		
$\Delta GINI_{t-1}$	–0.447*	–0.455*	–0.566*	–0.455*
	(–2.28)	(–2.57)	(–3.31)	(–2.65)
Goodness of fit statistics				
Adjusted R^2 (difference form)	0.22	0.32	0.44	0.36
Adjusted R^2 (level form)	0.59	0.65	0.70	0.67
F test	$F(5,18) = 2.28$	$F(6,19) = 2.89$*	$F(6,19) = 4.07$*	$F(5,20) = 3.67$*
Diagnostic tests				
h Durbin	0.001	–1.74	–1.65	–1.58
Ramsey RESET	$F(2,16) = 1.84$	$F(2,17) = 1.93$	$F(2,17) = 2.57$	$F(2,18) = 1.95$
Jarque-Bera $\chi^2(2)$	0.85	1.17	0.96	1.15
Lagrangian Multiplier $\chi^2(2)$	0.08	3.55	5.79	3.27
ARCH $\chi^2(2)$	1.25	0.19	0.76	0.18
Ljung-Box $\chi^2(2)$	0.66	1.33	3.32	1.33
Box-Pierce $\chi^2(2)$	0.53	1.18	2.79	1.17
Chow forecast (1988-1993)	$F(6,18) = 0.67$	$F(6,19) = 0.77$	$F(6,19) = 0.54$	$F(6,20) = 0.83$
Chow break point (1980)	$F(6,12) = 0.54$	$F(7,11) = 0.77$	$F(7,10) = 0.24$	$F(6,13) = 0.45$

Notes: Numbers in parentheses below the estimated coefficients are *t*-ratios
*indicates that the relevant null hypothesis is rejected at the 5 percent level of significance
Adjuster R^2 for level form is obtained by transferring the fitted value of $\Delta GINI_t$ to $GINI_t$

Table II.
Econometric results of factors determining inequality, employing an institutional or structuralist approach, 1967-1993

becomes insignificant in the equation reported in column (2), because this disaggregation of per capita income captures the effect of $DSER_t$. Thus this variable will be excluded in the next equations reported in Table II.

It could be argued that the estimated equations reported in columns (1) and (2) of Table II are deficient as they take no account of an important human capital variable, viz. education, that is often thought to be income equalising. See Tsakloglou (1988). The equation in column (3) of Table II includes per capita expenditure on education by both the private and government sectors. The

estimated coefficient of per capita total education expenditure (first differenced) is neither statistically significant nor carrying the expected negative sign.

It is highly likely that this variable ($\Delta PEREDU_t$) is collinear with per capita government expenditure (current and capital), since government education expenditure is already included in total government expenditure. As a result of this collinear relationship, when per capita education expenditure is excluded from the analysis, as indicated in the equation reported in column (4) of Table II, the $\Delta PERG_t$ has become highly significant compared with the statistically insignificant coefficient reported in column (3). Thus, one can conclude that the impact of per capita education expenditure will be captured by per capita government expenditure. The estimated equation reported in column (4) of Table II is our preferred equation. This equation performs well in terms of goodness of fit, and all parameters are statistically significant at the 5 per cent level. This preferred equation indicates that equality in Iran is affected by the change in sectoral value added for two broadly defined sectors, per capita government expenditure and per capita subsidies for (particularly) foodstuffs. Generally, these results indicate that there are some institutional forces at work in Iran. This estimated equation also passes a battery of diagnostic tests, as do all the equations reported in Table II.

It could be argued that there would be a collinear relationship between $\Delta PERG_t$ and $\Delta PERSUB_t$. However, this problem has not affected the significance of all the coefficients for both variables. See the calculated *t*-statistics for $\Delta PERSUB_t$ and $\Delta PERG_t$.

Three substantive points can be drawn from this analysis. First, the disaggregation of per capita income into two components, one corresponding to economic sectors which are associated with the production of goods, and the other related to services, is fundamentally important. The fact that rising income in the goods-producing sector is negatively related to relative income inequality, whereas the expansion of the service sectors adversely affects the distribution of income, indicates the dualistic nature of the Iranian economy. This dimension of dualism has not been previously delineated.

The second substantive policy message of this empirical investigation pertains to the role of per capita government transfers and subsidies. Contrary to expectations, in all four equations reported in Table II, $\Delta PERSUB_t$ has a highly significant and positive sign. This indicates that government outlays on these subsidies and transfers aggravate income inequality, as measured by the Gini coefficient. Government subsidies for essential commodities, such as food, are often thought to be motivated by distributional concerns. However, these results indicate that pursuit of such policies are in fact counter-productive for achieving a more equitable distribution of income.

This result is not surprising for several reasons. It is commonplace in economics that it is more efficient to re-distribute in money than in kind and price subsidisation clearly involves re-distribution in kind (Watson, 1972). Another dimension to this policy in Iran is that the subsidisation is restricted geographically, in that the issuing of coupons is generally confined to people in

urban areas. Given that incomes in urban areas are higher than in rural areas, it is self-evident that $\Delta PERSUB_t$ has exacerbated income inequality.

The last, but not least, policy message relates to the effect of per capita government expenditure in total. The estimated coefficients for $\Delta PERG_t$ are negative in all four equations and highly significant in three. The equation in which this variable was not significant was the same equation in which multicollinearity was problematic. This result highlights the important role of government, in aggregate, in reducing income inequality in Iran.

Conclusion

That a trade-off might exist between economic development, as measured by rising per capita income, and relative income inequality, has been a worrisome issue for development economists since the seminal work by Kuznets (1955). For Fields (1980) the inevitability of increasing inequality as development occurs is a major dilemma. This leads Fields to argue that the type of development, not development *per se*, is the central issue. Thus, he emphasises policies which are favourable to both equality and development. See also Ravallion and Datt (1996).

The literature on the determinants of income inequality recognises not only the inter-sectoral shifts to which Kuznets draws our attention, but also institutional or structural factors. The empirical literature on the development-inequality nexus is dominated by the application of multiple regression analysis to cross-section data. Although multiple regression analysis is the appropriate technique to apply to this issue, the use of cross-section data is inappropriate. Time series data for individual countries are the necessary ingredients for analysing this issue.

This paper employs time series data to examine the sectoral shifts and institutional or structural factors which might determine income inequality in Iran for the period 1967-1993. The empirical tests undertaken in this paper reject the relevance of the inverted U-hypothesis. In this paper it is also found that the distribution of income cannot be improved unless appropriate measures are taken to expedite production in goods-producing sectors and limit the service sectors in which rent-seeking behaviour is believed to be rampant. The empirical results show that per capita government expenditures (current and capital) have played an important role in alleviating relative poverty. However, high income groups benefited more from subsidies and transfers.

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