The Economic Journal of Nepal
Vol III No. 3 July-Sept. 1980 EIC-TU

Factors Causing Income Concentration in Nepal

(A case study of eighteen urban centres)

--Alok Bohara and Bijaya Thapa★

I. INTRODUCTION

It has long been the interest of many researchers that why incomes are more concentrated in some areas than others. The Kuznet's thesis says that the incomes tend to be more unequally distributed in the developing economies than those which have attained some degree of maturity.[1] Despite the efforts and work of Kravis and Kuznets elsewhere, there is no formal theory available which satisfactorily concerns itself with the relationship between development factors both social and economic, and the inequality of incomes.[2] In this paper an attempt has been made to test various hypotheses regarding the relationship between the degree of income concentration and socio- economic factors. This paper may lead to debatable conclusions concerning consistency or inconsistency with the Kuznet's generalization, however, that may well be because of concept of income, the reliability of sample and the measure of inequality used.

Finally, what we have tried here indeed, is to draw to attention of policymakers to the mechanism which generates income inequality so as to avoid the social and political undesirable consequences.

★ Mr. Bohara is a member of the Statistics Instruction Committee in T. U. Kirtipur and Mr. Thapa is an assistant Research officer in the Center for Educational Innovation and Development, Kathmandu.

1. Al—Samarrie, A. & Miller, H.P., "The American Economic Review": Vol. LVII. 1967, P, 175.
2. Ibid, P. 176.

II. OBJECTIVE

This thesis tries to identify the socio-ecomomic mechanism which is found to have generated variations in income concentration through out the eighteen urban centres in Nepal.

III. DATA

The data source for the study was "The Household Budget Survey" Nepal Rastra Bank. The blocks involved in our study were eighteen urban areas scattered throughout the Nepal. The survey was conducted in two phases-first phase was carried out in 73/74 covering eleven places and second phase in 74/75 covering remaining seven places. Since the income distribution in each place is based on a single year we cannot ignore the data-limitation being reflected in our results.

IV. METHODOLOGY

The first problem to deal with, in this connection, is the choice of measures of income inquality. The chosen measure should bear two properties-first it should be unaffected by equal proportional increases in all incomes, secondly it should be sensitive to disproportionate changes at all levels of income.[3]

The recommended measures of income inequality were,

(a) The Gini Concentration Ratio.[4]
(b) The Standard Deviation of the logarithms of income.
(c) The Coefficient of Variation.

Besides these other methods are also available. The formula for the calculation of concentration is,

---

3. B A., Anthony, "On the Measurement of Equality." Journal of Economic Theory: Vol. 2, February 1970, P. 247. For details see—H. Theil, "Economics and Information Theory": 1967, P. 121—125.

4. The Gini's concentration ratio is a measure of Income concentration this is derived from the Lorenz Curve which is obtained by plotting the cumulative per cent of families (income receivers—in our case desile groups) on the X axis against the cumulative per cent of aggregate income accounted for by thess units on the Y axis.

$$R = \sum_{1=2}^{m} P_{i=1} \; Q_i - \sum_{i=2}^{m} P_i \; Q_{i-1} \quad [5]$$

$$= \sum_{i=1}^{m-1} (P_i \; Q_{i+1} - P_{i+1} \; Q_i)$$

Where,

m = Classes arried from low to high.

P = Cumulative percentage of income recipients.

Q = Cumulative percentage of total income accounted for by arried income classes.

However, graphical method was also used to calculate ratios for comparison purpose.

Further, multiple regression analysis was done to see the impact of various socio-economic characteristics.

Supposing the linear relationship between income inequality "R" and other explanatory variables, we formulate the following model.

$$R=a+b_1 \; MFI + b_2 \; LI + b_3 \; HS + b_4 \; NE + b_5 \; CE + b_6 \; PT + b_7 \; ALF + b_8 \; LF +$$

$$b_9 \; FLF + b_{10} \; FLF/MLF + b_{11} \; HPP + b_{12} \; HPM + b_{13} \; HPF + U \ldots\ldots\ldots (1)$$

Where,

R = Gini's concentration ratio of the size distribution of income received by families of eighteen urban areas in Nepal.

MFI = Mean family income in Rs.

LI = Per household income from wages and salaries.

HS = Household size.

NE = Number of earners in per household.

CE = Civilian employment as a percentage of economically active labor-force.

5. Sovani, N. V., "Artha Bijnana": Vol. 6, 1964, P. 155.

PT = Professional and technician workers as a percentage of economically active labour-force.

ALF = Percentage of economically active labour-force engaged in agriculture.

LF = Labour-force as a percentage of economically active people.

FLF = Percentage of female labour- force in economically active females.

MLF = Percentage of male labour-force in economically active males.

HPP = Percentage of high school pass people.

HPF = High school pass female as a percent of total females.

HPM = High school pass male as a percent of total males.

V. ANALYSIS

The following table gives the Gini's concentration ratio, the standard deviation of incomes, and coefficient of variation calculated for each of eighteen urban centers.

Table 1: Gini's Concentration Ratio, Standard deviation and Coefficient of Variation of Income Received by Families in eighteen Urban Centers of Nepal.

Places	R	S.D.	C.V.
Bhairahwa	.3064	.2356	.2524
Mahendranagar	.3124	.2353	.2525
Baglung	.3178	.2397	.2581
Surkhet	.3246	.2505	.2708
Bhaktapur	.3332	.2663	.2898
Okhaldhunga	.3360	.2635	.2868
Ilam	.3404	.2613	.2847
Hetauda	.3468	.3678	.2931
Dang (Ghorai)	.3508	.2640	.2890
Lalitpur	.3568	.2684	.2952
Nepalgunj	.3584	.2714	.2988
Dhankuta	.3648	.2854	.3158

(Contd. On Page 78)

(Contd. Form Page 77)

Pokhara	.3700	.2853	.3163
Kathmandu	.3710	.2927	.3254
Biratnagar	.3864	.2920	.3268
Bhadrapur	.3976	.2968	.3344
Janakpur	.4070	.3038	.3447
Birgunj	.4276	.3176	.3659

The Table 1. shows the variation of income concentration considerabely from place to place, ranging from .3064 (Bhairahwa) to .4276 (Birgunj) and within this range there are marked differences in income concentration among the eigeteen places. The places are arranged in an ascending order.

On the basis of all three measures, comparisons are made between four development regions which are represented by their respective centers-Surkhet, Kathmandu and Pokhara.

Table 2: Inter Regional Dispersion in the Concentration Ratio

Measures	Surkhet	Dhankuta	Pokhara	Kathmadu	All Places
Concentration Ratio	.3246	.3648	.3700	.3710	.3560
Standard Deviation	.2505	.2854	.2853	.2927	–
Coefficient of Variation	.2708	.3158	.3163	.3254	–

The values of concentration ratios R in Table 2. say that Kathmandu has the highest income inequality followed by Pokhara, Dhankuta and Surkhet. The coefficients of variation also give the same order. The values of standard deviations show that the place with highest inequality is Kathmandu followed by Dhankuta, Pokhara and Surkhet.

Since no statistical test is available to see the difference between R in four places, the F-test is used to test the null hypothesis of "no difference".[6]

Table 3: Inter Regional Camparisons of Income Distribution

Comparisons	F calculated
Surkhet–Dhankuta	1.139
Dhankuta–Pokhara	1.000
Pokhara–Kathmandu	1.026
Bhairahwa–Birgunj	1.4**

**Significant at 5% level.

Except for Bhairahwa–Birgunj, differences in other combinations are in-significant.

VI. CHOICE OF APPROPRIATE MEASURE

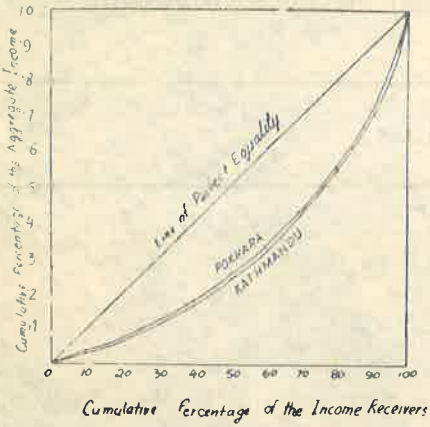
There is a growing doubt about the supermacy of the Gini's concentration ratio as a measure of inequality, because it does not provide any emperical test to compare the two or more ratios. Since our prime objective is to see the effects of socio-economic variables on income

6. Since F-test apply to normal distribution only, assumption of normality is made here. However, Income distribution is not normal but is usually log—normal, we made a logarithmic transformation of the original income distribution and used the F-Test to compare the two Variations of the logs of incomes.

An evidence that income (Farm) is log-normally distributed can be found in H.S. Bal and Gurbachan Singh's "Pattern of Incomc Distribution in Rural Areas", Indian Journal of Agricultural Economic Vol. XXV No. 3. July-September 1970. PP. 81-91.

distribution, the use of Gini's concentration ratios as our endogenous variable seems to serve our purpose best. Moreover, in most of the studies done in this area, the concentration ratios were used oftenly.

Fig. 1 Distribution of Household Income in Surkhet and Dhankuta



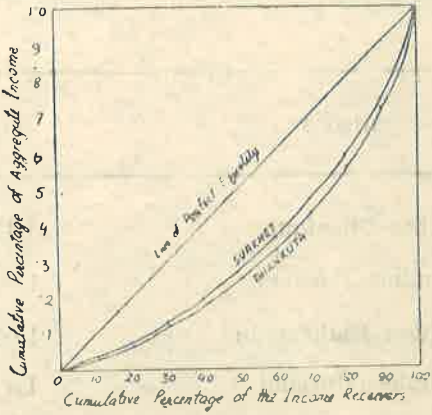


Fig 2 Distribution of Household Income in Pokhara and kathmandu

VII. INTERPRETATION

In Figure 2 the verval translation of the ratio in Kathmandu which is .3710 is that this area has moved a little more than half way towards perfect equality in so far as the distribution of the value measured on the Y- axis is concerned. In the same Figure the area of inequality for Pokhara was found to be a bit smaller indicating less income inequality as compared to that of Kathmandu. The Figure 1 reflects the higher income inequality for Dhankuta (.3648) as compared to that of Surkhet (.3246).

Now in order to establish a relationship between development factors and income inequality, the sample consisting eighteen urban centers is divided into three groups and their corresponding concentration ratios were also obtained by taking means. The values are given in Table 4.

Table 4: Croups of Urban Centers by Ascending Qrder of Gini's Concentration Ratio and Corresponding Mean Values of Different Factors

Variables	Groups			All group
	I	II	III	
R	.3217	.3530	.3933	.356
MFI	518.83	543.5	668.33	576.89
LI	111.67	165.33	209.67	162.22
CE	6.75	9.53	13.77	10.02
PT	2.48	3.65	6.42	4.18
ALF	60.27	42.13	20.37	40.92
LF	67.37	57.42	50.97	58.58
FLF	59.33	40.87	26.27	42.16
HPP	6.2	7.7	11.42	8.44
TL	45.97	53.1	63.75	54.27

The values in Table 4 give the impression that the places with the high literacy level, higher mean family income have higher degree of income inequality. Similarly labour-force variables (ALF, LF and FLF) have negative relationship with R. Other variables like labour income, civil servants, technicians and education are found to have positive relationship with R. That means, as the labour force engaged in agriculture is diverted to other areas like civil service technical job etc, the income inequality increases. From above, the rapid industrialization is also found to have exerted negative effect on income distribution as shown by high R value of group III, and which consist of industrialized places likeKathmandud, Biratnagar, Janakur and Birgunj. Similar relationships may be observed from the zere-order correlation matrix (Table 5) also.

VIII. MULTIPLE REGRESSION ANALYSIS AND VARIATION IN INCOME CONCENTRATION

Previously we noted that there are prominent differences among the urban centers in various socio-economic factors that are related to income concentration. Urban places, which

ave high degree of industrialization or in which large proportion of the people is educated or ngaged in civil service and Technical jobs, are likely to have high income concentration inequality). Now we try to see this relationship by using multiple regression analysis.

Our equation is,

$$R_i = a + b_1 MFI_i + \ldots\ldots\ldots\ldots + b_{13} HPF_i + U_i \text{ ---- (2)}$$

$$i = 1, 2, \ldots\ldots\ldots 18.$$

The thirteen exogenous variables outlined, above in the methodology are tested in a egression analysis and the results of fourteen different estimated regression lines are summarized n Table 6.

In regression equation 1, the coefficient of determination with six factors on con- entration ratio is only .57 with none of the coefficients significant except intercept and educa- ion variable (HPP). The low R^2 suggests that 43 percent place to place variation in the income nequality is unexplained. However, calculated F=3, 20 indicates the overall significance of the oefficients.

Table 5: Zero-order Correlation Matrix

	R	MFI	LI	CE	PT	ALF	LF	MLF	HPP
R	–	.493	.521	.667	.523	–.741	–.583	–.716	.77
MFI		–	.719	.621	–.505	–.425	–.212	–.218	.776
LI			–	.816	.767	–.627	–.592	.509	.885
CE				–	.643	–.719	–.684	–.631	.900
PT					–	–.587	–.524	–.48	.235
ALF						–	.849	.889	–.762
LF							–	.600	.622
MLF								–	–.545
HPP									–

A close examination of correlation matrix will reveal the existence of multicollinearity between exogenous variables. In the presence of high correlation among many of the variables, the statistical test may be biased leading us to draw distorted inferences.However, an attempt will be made to correct it by dropping "suspect" variables.

After trying several combinations the equations which improved considerabely are equation numbers 7, 8, 9, 11, 12 and 13. The income variable (MFI) never showed remarkable effect–as indicated by its t–valuess–except in the combination with labor-force variable (LF) in equation no. 12. However, only 47% of the total variation is explained and moreover, most of which is accounted for by LF as shown by its high beta vaue[7]. 50 other variables with no significant impacts are household size (HS) and number of earners (NE).

The education variables such as HPP, HPM and HPF may be taken as important factors to cause income variation because they are highly significant in all combinations, though positively.

The ratio of female labor–force to male labor–force is also found to be an important factor because it is highly significant through out the equations 3, 7, 9 and 13. Since it has a negative sign the relationship is inverse. Or in other words, there will be a significant decrease in income inequality as the percentage of MLF increases with respect to percentage of FLF. The FLF alone is also found to be a significant factor, as given by eq. 8, which has R^2 as high as .64.

In eq. 2 which has a very low $R^2 = .36$, the employment variable (CE) is found to be a significant factor.

Another employment variable (PT) is also highly significant in eq. 11 with highest beta value .46.

IX. CONCLUSION

On the basis of analysis done above we may conclude that the places with high level of education, greater degree of industrialization, large proportion of population engaged in civil services and technical jobs are likely to have greater concentration of income.

It indicates that the process of industrilization, and development of conventional education, have not been able to benefit the majority of the people falling in the lower income levels. Also it shows the lack of proper planning to exploit local resources.

---

7. Maddla, G. S. "Econometrics": McGraw—Hill Book Company, 1977, P 119.—Beta coefficient is obtained by multiplying the net regression coefficients by the ratios of st. dev. of the different independent variables to the st. dev. of dependent variable. By reducing the net regression coefficients to a common denominator, the beta-values enable us to say which indenpendent factor is the more important in explaining variations in the dependent variable.

Table 7: Data

Places	R	MFI	LI	HS	NE	CE	FT	ALF	IF	FLF	MLF	HPP	HPF	HPM	TL	FLF/MLF
Bhairahwa	.3064	448	149	4.5	1.8	6.3	2.1	35.5	58.8	41.9	75.2	5.9	3.1	8.4	52.7	.557
Mahendranagar	.3124	668	90	5.4	3.2	3.8	1.2	77'8	82.6	80.5	84.3	4.7	1.5	7.2	45.1	.955
Baglung	.3178	634	161	5.3	2.4	10.6	3.9	46.1	64.9	62	68.1	9.7	5.2	14.7	63.9	.910
Surkhet	.3246	406	93	4.9	1.8	8.8	2	60.1	55.7	36.2	76.1	4	1.3	6.9	36.9	.476
Bhaktapur	.3332	388	76	5.9	2.9	2.7	2.1	69.4	62.8	54.6	70.9	5.4	2.3	8.5	31.7	.770
Okhaldhunga	.3360	569	149	5.3	2.9	8.8	3.6	72.7	79.4	80.8	78	7.5	2.6	12.6	45.5	1.036
Ilam	.3404	647	178	5.2	2.3	9.2	4.3	49.8	62.4	51.2	73.2	7.3	3.4	11.2	54.8	.700
Hetauda	.3468	464	150	5.3	1.8	6.9	3.2	45.6	54.4	30	76.7	6	2.4	9.5	59.1	.391
Dang (gho)	.3508	484	125	5.9	2.9	7.0	2.5	54.5	73.4	66.7	80.5	5.8	8.1	9.8	40.9	.828
Lalitpur	.3568	661	256	5.8	2.4	10.9	8.0	43.7	52.1	39	65.2	9.9	6.0	13.9	52.6	.598
Nepalgunj	.3584	492	130	5.3	1.6	10.5	4.6	12	44.3	11	74.5	7.8	4	11.1	53.3	.148
Dhankuta	.3648	513	153	5.7	2.4	12.5	4.3	47.2	57.9	47.3	70.2	9.4	6.3	13	57.9	.674
Pokhara	.3700	488	123	4.7	1.2	6.7	3.7	47.8	65.4	59.6	72.4	9.7	5	15	55.9	.823
Kathmandu	.3710	791	310	5.7	1.8	19.8	8.7	21.9	44.4	24.6	63.0	13.9	10.5	17 2	71.4	.391
Biratnagar	.3864	607	231	5.3	1.5	16.1	4.4	10.2	43.5	11.6	70.9	12.1	8	15.6	65.3	.164
Bhadrapur	.3976	792	196	5.3	1.7	11	4.1	14.3	51.7	21.5	76.2	11.9	9.2	14.1	63.1	.282
Janakpur	.4070	626	209	4.1	1.5	11.8	11.7	14.7	52.7	24.1	73.4	9.5	6	12.1	62.7	.328
Birgunj	.4276	706	189	5.4	1.7	17.2	5.9	13.3	48.1	16.2	74	11.4	5.3	16.5	64.1	.219