

AGENCY FOR INTERNATIONAL DEVELOPMENT WASHINGTON, D. C. 20521 BIBLIOGRAPHIC INPUT SHEET	FOR AID USE ONLY Batch 68
---	-------------------------------------

1. SUBJECT CLASSIFICATION	A. PRIMARY Development and economics	DA00-0000-G570
	B. SECONDARY General--Asia	

2. TITLE AND SUBTITLE
Economic growth and the price level: An analysis of some Asian data

3. AUTHOR(S)
Sen, K.C.

4. DOCUMENT DATE 1966	5. NUMBER OF PAGES 35p.	6. ARC NUMBER ARC FEA332.414.L474
--------------------------	----------------------------	--------------------------------------

7. REFERENCE ORGANIZATION NAME AND ADDRESS
Wis.

8. SUPPLEMENTARY NOTES (Sponsoring Organization, Publishers, Availability)
(In Economic interdependence in southeast Asia research paper no.13)

9. ABSTRACT

10. CONTROL NUMBER PN-AAE-377	11. PRICE OF DOCUMENT
12. DESCRIPTORS Asia Data Growth Prices	13. PROJECT NUMBER
	14. CONTRACT NUMBER CSD-355 Res.
	15. TYPE OF DOCUMENT
Statistical analysis	

**THIS DOCUMENT HAS BEEN EVALUATED AS SUBSTANDARD COPY FOR
ROUTINE REPRODUCTION. EFFORTS IN AID/W TO OBTAIN A MORE
ACCEPTABLE COPY OF THE DOCUMENT HAVE NOT BEEN SUCCESSFUL.
DESPITE THIS DISADVANTAGE, WE HAVE CHOSEN TO REPRODUCE THE
DOCUMENT BECAUSE OF THE SUBJECT TREATED AND TO MAKE THE
DISCERNIBLE INFORMATION AVAILABLE.**

FEA
332,414
L494

Csd-355A

ECONOMIC GROWTH AND THE PRICE LEVEL--AN
ANALYSIS OF SOME ASIAN DATA

by

K.C. SEN

Draft of a Research Paper
University of Wisconsin/
AID Research Project on
"Economic Interdependence
in Southeast Asia"
March, 1966

A.I.D. WISCONSIN AND
TECHNICAL ASSISTANCE
BOOK BIDDING

ECONOMIC GROWTH AND THE PRICE LEVEL--AN
ANALYSIS OF SOME ASIAN DATA

SUMMARY

In whatever way inflation may be defined--as a sustained rise in the general level of prices, or as a state of generalized excess demand where too much money chases too few goods, or in some other way--the phenomenon does not lend itself to a simple explanation. The juxtaposition of the relevant variables--monetary, structural, and behavioral--differs from time to time and from country to country. It is essential to keep in mind the heterogeneity of situations and the interdependence of the factors involved. No universal panacea is available for fighting inflation. Policies must be adapted to the situation.

It is even hard to say whether inflation is an inescapable cost of economic growth at all. The empirical evidence--in Europe, the U.S., Latin America, and elsewhere--does not indicate any necessary or causal relationship between the rate of economic growth and the price level.

Much depends on the policies followed by an individual country. The more coordinated the policies--monetary, fiscal, and commercial--the less inflationary the growth process will tend to be. Attempts to follow such a coordinated policy effect a whole spectrum of economic and behavioral relationships. Particularly, the more militant, nationalistic, and autarkical the policies are, the greater is the need for safeguards against inflation. For instance, the drive towards economic self-sufficiency (through import substitution) might result in tariff structures or exchange rates which are both inflationary and harmful to export prospects. Similarly, the policies of the trade unions might lead to a divergence between the wage rate in the urban sector and the opportunity cost of

labor in the rural sector. This might cause the simultaneous occurrence of high urban money wages, expanding real output, and growing unemployment. And higher money wages are--in some countries, at least--an important factor behind the rise in prices.

This is by no means to suggest that the drive towards economic self-sufficiency is necessarily bad. If dynamic comparative cost advantage warrants it, or, if the economies of scale are a real issue, then the protection of certain industries may even be a welcome choice. It is in this context that countries might consider the possibilities of intraregional division of labor. This might promote economic growth, assure greater factor and product mobility, reduce inefficiency of resource allocation, and minimize the cost of economic growth in terms of inflation.

Introduction

It is uncertain whether there exists a unique and causal relationship between the rate of economic growth and the rate of change in prices. Theoretical reasoning and empirical evidence do not enable us to state with a great degree of accuracy the causes--or the relative importance--of an inflationary rise in prices.

This paper deals with the question of the relationship between economic growth and the price level. The format of the paper will be as follows:

- (1) A survey of the important studies in the field of the relationship between economic growth and the price level;
- (2) discussion and evaluation of three interpretations of the causes of inflation, namely, the "monetary fundamentalists", the "structural fundamentalists", and the "behaviorists";

I would like to thank Mr. P.A.V.B. Swamy of the Department of Economics, University of Wisconsin, for the help he rendered me in analyzing the data. I am also grateful to Professors P.T. Ellsworth, Everett D. Hawkins, and Theodore Morgan, Dr. Seiji Naya and Mr. Joel McClellan for their useful comments on an earlier draft of this paper.

(3) analysis of data between 1952 and 1962 in relation to the behavior of prices in some Asian countries; and (4) policy recommendations.

I. A Brief Survey

It is generally believed that inflation is a necessary cost of economic growth. Yet, there is no conclusive empirical evidence supporting this view. "Rapid economic growth has at different times been associated with rising, constant, and falling price levels, just as periods of slow growth, or indeed, of no growth, have been marked by every manner of price behavior."¹ "It is thus a question of Progress versus Stability," says Kaldor, but he also observes that "indeed the development of trade cycle theories...has proved to be inimical to the idea that cycle and dynamic growth are inherently connected analytically."² "There is no clear international evidence that countries with stable prices grow fast and that those with inflation grow more slowly. Some theorists would hold the reverse view, but there are few data that clearly support these opposite notions."³ The heterogeneity of experience may be gauged from the following studies.

A. The Less Developed Countries (LDC's)

(1) From a study made by UTun Wai of 31 less developed countries in Latin America, the Middle East, and Asia and the Far East (1938-54),⁴

¹Otto Eckstein, "Staff Report on Employment, Growth, and Price Levels," Joint Economic Committee, U.S. Congress (Washington, 1959), p.11.

²Nicholas Kaldor, Essays on Economic Stability and Growth (London, 1960), p.118.

³Lawrence R. Klein and Ronald G. Bodkin, et.al., "Empirical Aspects of the Trade-Offs Among Three Goals: High Level Employment, Price Stability, and Economic Growth," Inflation, Growth and Employment, in The Commission on Money and Credit (Prentice-Hall, 1964), p.403.

the general conclusion emerged "that for the LDCs the findings proved to be inconclusive in general; but for most of the small number of individual countries for which the available statistics cover periods in which the rates of price increases differ significantly, the evidence suggests that the rate of growth was higher when the rate of inflation was lower"⁵ (see Appendix Table 1).

(2) The United Nation's data for Latin America (1946-55) (see Appendix Table 2), shows that whereas prices rose only about 3 percent per annum in Venezuela, they rose over 20 percent per annum in Peru and Brazil, though the rates of growth of real income per head were roughly the same in the two cases. On the other hand, the rate of inflation was particularly high in those countries--Argentina, Chile, and Paraguay--in which growth was very slow, and moderate rates of inflation of 3 to 5 percent per annum generally seemed to go with moderate rates of growth.

(3) After analyzing the statistical data for relatively long periods for the Latin American countries (1945-59), Benjamin Higgins concludes: "the Latin American data provide examples of every conceivable combination: monetary stability with high rates of growth; monetary stability with stagnation; inflation with rapid growth, and inflation with stagnation."⁶

B. The Developed Countries

(1) Rattan Bhatia concluded from his study of five DC's that no

⁴U Tun Wai, "A Relation Between Inflation and Economic Development: A Statistical Inductive Study", International Monetary Fund Staff Papers, Vol. VII (1959-60), pp.302-17.

⁵Ibid., p.302.

⁶Benjamin Higgins, "Financing Accelerated Growth," in Government Finance and Economic Development (Paris: OECD, 1965), p.21.

systematic relationship between price changes and rate of growth existed; that "the relationship, if any, has differed from country to country. The rates of growth were inversely related to the rate of change in prices in Germany and Japan, whereas in Sweden and Canada the two tended to move together. However, in most cases, the correlation coefficients were low, so that no conclusion about the relation about the rate of price change can be drawn from the statistical data examined here."⁷ The results pertain to a long period (1860-1930), but the short period results are little different: the rate of growth was inversely related to the rate of price change in Germany and Japan. In Sweden and Canada, higher rates of price change were accompanied by higher rates of growth. In the U.K., contrary to what was found for the long periods, there was a positive relationship between the rate of price change and the rate of growth. At the 5 percent level of significance, the \bar{r} was significant only for Germany; for each of the other four countries it was too small to justify any firm conclusion.

⁷Rattan Bhatia, "Inflation, Deflation, and Economic Development," IMF Staff Papers, Vol. VIII (1960-61), pp.101-104. Bhatia fitted a linear equation relating rate of growth (Y) to the rate of price change (X) for each country separately and came out with the following results:

Country	No. of Observations	Regression Equation	Correlation Coefficient (r)
U.K.	5	$Y = 2.32 - 0.20 X$	- 0.47
Germany	3	$Y = 3.75 - 0.64 X$	- 0.75
Sweden	4	$Y = 2.89 + 0.42 X$	0.96
Canada	3	$Y = 4.19 + 0.45 X$	0.85
Japan	5	$Y = 4.67 - 0.12 X$	- 0.95

No standard errors are given.

(2) Long-term data for the U.S. and the U.K. further substantiate the lack of a systematic relationship between growth rate and rate of change in prices (see Appendix Table 3).

In the U.S., during the three decades (1884-93, 1904-13 and 1944-53) in which the average annual growth rates were almost identical, the price level moved erratically. In the first decade it declined by 2 percent per annum; in the second it increased by 2 percent per annum; and in the third it rose by 9 percent per annum.

In the U.K., a fall in output during the decade 1915-24 of nearly 1 percent coincided with an increase in prices by 106 percent, whereas during 1925-34, prices fell by 17 percent at a time when output increased by 21 percent.

(3) In hearings before the Joint Committee on Employment, Growth, and Price Levels, the late Professor Sumnar Slichter presented evidence regarding "the increase in the consumer price levels and the increase in real product per capita in 15 countries." His thesis was that a sustained "slow rise in price level (creeping inflation) is an inescapable cost of the maximum rate of growth."⁸ Yet he characterized as "a widely disseminated bit of nonsense" the statement that "creeping inflation is said inevitably to become a gallop."⁹ He was of the view that whether or not creeping inflation becomes a gallop rests in the last analysis with the monetary authorities. (See Appendix Table 4.)

⁸Hearings, Joint Committee on Employment, Growth, and Price-Levels, 86th Congress; 1st. Session, Part 1, p.11.

⁹Ibid., p.12.

C. All Countries

The strongest categorical statement available regarding a systematic relationship between the growth rate and inflation is the one made by Dorrance of the International Monetary Fund. "An examination of the available data, stratified to recognize the effects of wealth on comparative rates of progress," he holds, "indicates that recent experience supports the view that, while a declining price level inhibits growth, and while relatively slowly rising prices, particularly in the wealthier countries, may have a stimulating effect, beyond a certain rate, rising prices discourage economic development, and rapid inflation seriously inhibits growth."¹⁰

Dorrance offers what he calls the "family of profiles of inflation,"¹¹ one each for every country, varying with its level of wealth. He also emphasizes the role of "price flexibility," as provided by a mild rise in prices in a growing economy, for bringing about desired structural change.¹² There is, according to Dorrance, "an inverse relation between the relative price flexibility and the acceptability of inflation in any economy," and this, he suggests, depends upon the "traditionality of (the) price structure." Thus, if the traditional price structure is flexible, upward

¹⁰ Graeme S. Dorrance, "Inflation and Growth, the Statistical Evidence," Document of International Monetary Fund, May 26, 1965, p. 1. Also, see his "The Effect of Inflation on Economic Development," in Inflation and Growth in Latin America (Richard D. Irwin, 1964), pp.37-88.

¹¹ Ibid., p.6.

¹² Ibid., p.3.

and downward, as in the less developed countries, which have not very strong trade unions, one or two major primary products for exports, and other primary products, the acceptable rate of inflation tends to be very low compared to the more advanced economies which have strong labor unions, complex productive patterns, and hence negligible price flexibility. Consequently, "it follows that price stability will approximate the optimum 'level of inflation' in very poor countries, with rising 'optimum' levels as progress is achieved." His conclusion is that the "countries with average income levels maintaining relatively stable monetary conditions may be expected to achieve the highest level of economic progress. The problems facing both poorer and more wealthy countries will make it less likely that they will be able to achieve the rates of progress attained by the 'average' countries. However, the progress actually achieved by any country will be strongly influenced by its financial policies. Both monetary stagnation and undue inflation will lead to lower levels of achievement: relatively stable prices will be consistent with the highest levels of progress."¹³

In summary, neither on the basis of the time series data, nor on the basis of the cross-section data can we say that economic growth and price level changes are uniquely related. Furthermore, whatever generalizations are actually made must rest on certain very strong assumptions relating to institutional factors. In fact, both price increases and real output increases can go hand in hand and can change together as a result of common causes.

¹³ Ibid., p.11.

Three Standard Interpretations

There is no unanimity about the causes of a continual inflationary rise in prices. It is possible, however, to group those whose views diverge into three broad categories: the "monetary fundamentalists", the "structural fundamentalists", and the "behaviorists".

A. The monetary fundamentalists believe that a stable price level and a stable exchange rate are necessary conditions for growth; and that the authorities should keep the budget balanced and low, avoid a big credit expansion, and maintain a freely convertible currency at a single and steady rate of exchange, giving the price system an opportunity to work.

B. The structural fundamentalists, on the other hand, believe that an upward rise in prices is a necessary concomitant of economic growth-- a side effect which cannot be eliminated except by reducing over-all growth to the rate of expansion taking place in the bottleneck sectors. "Structural problems show up particularly in two interrelated problems, first, the balance of payments deficit, and second, the problem of inflation."¹⁴ The three major structural changes which may cause difficulty are, according to Chenery, (1) the response of agriculture, (2) the response of the export sector, and (3) the interdependence among the various branches of industry and between industry and overhead facilities. Hence, "the main structural problem arises due to the inability of the market to transmit

¹⁴ Guido di Tella, Inflation and Growth in Latin America, edited by Werner Baer and Isaac Kerstenetzky (Richard D. Irwin, 1964), p.431.

the right signals to producers, and in their adequacy in bringing about the very large changes which would be required, particularly in the cases where exports do not expand as rapidly as GNP... The analytical question is to identify for the policy maker the areas in which the market may not work properly, so that he can be prepared to take such steps as are necessary to compensate for the deficiencies of the market."¹⁵

C. The behaviorists believe that there is nothing inherently incompatible about growth and price stability, and that the crux of the problem lies in the distributive shares of various income groups. "Our findings to the effect," maintains Bombach, "that economic growth need not necessarily be accompanied by a continual rise in the general price level even in the presence of a permanent investment-saving gap seems to us to be of some interest also to underdeveloped countries...(and) with any particular income policy and propensity to save of private households and any particular government budget policy there is a unique rate of investment, and hence real rate of growth, which permits economic expansion at stable prices."¹⁶

Furthermore, the behaviorists believe that the monetary authority is part of a tri-lateral monopoly with labor and management, all of whom can exert independent power in the macro-market place.¹⁷ Hicks, following

¹⁵Hollis Chenery, Inflation and Growth..., op. cit., p.437.

¹⁶In "Price, Growth and Distribution", International Economic Association Papers, No. 10, pp.24-42.

¹⁷M.W. Reder, "The Theoretical Problems of a National Wage-Price Policy," Canadian Journal of Economics (February 1948), pp.46-61.

the same line of thought, argues that nations are no longer on a gold standard, but rather on a "labor standard." In the old days, if wages were too high, unemployment ensued, and wages were made to yield. Today, if wages are too high, the money supply tends to be increased and in the long run, if necessary, depreciation accepted.¹⁸

Two points may be made here:

(1) The distinction between the monetary and the structural fundamentalists is not sharp. In fact, if one knew the elasticities of demand and supply, and if it were possible to specify in precise quantitative terms the various economic magnitudes concerned, the separation between these two views will be greatly reduced. Also, the policy prescription for mitigating structural disequilibrium will depend upon the interpretation of its causes. For instance, if the cause is a lagging export sector, then the usual emphasis will be placed on devaluation of currency, accompanied by the suggestion that budget deficits should be minimized, as should the issue of currency. In such a case, therefore, the remedial measures of both the monetary school and the structural school do not really differ much from each other. It is true that "if deep structural problems exist, global financial policies are clearly inappropriate."¹⁹ But if budgetary deficits are accepted as an outstanding "structural" cause of inflation, the controversy between the monetarists and the structuralists is reduced, at least in part, to a simple game of words. And if one agrees with W. Arthur Lewis that in the less developed countries, generally speaking,

¹⁸ J.R. Hicks, "Economic Foundations of Wage-Policy", Economic Journal (September, 1955), pp.389-404.

¹⁹ Dudley Seers, "Inflation and Growth: The Heart of the Controversy", in Chenery, Inflation and Growth..., op. cit., p.101.

"the marginal ratio of government receipts to national income is below the average ratio, the price rise opens up a budget deficit, because government costs rise faster than government revenues,"²⁰ then it is not at all implausible to regard budgetary deficit as a structural cause of inflation. It is this reasoning that makes Lewis consider budgetary deficits as one of the twin causes--the other being rising wage rates--of spiral inflation of any kind. The distinction between the monetary fundamentalists and the structural fundamentalists is more superficial than it appears to be.

(2) There is so much interdependence among these three views that it is too hazardous to infer causal relationships. Emphasizing the interdependence among the various views as the explanation of inflation, Conard observes²¹ "that the major objection is not to an analysis which distinguishes between these types of causation, but rather to an attempt to define any given inflationary process as being of one type or another. This criticism usually rests upon one or more of three considerations. In the first place, statistical evidence used to classify an inflationary period is never wholly adequate. Often it is not even conceptually possible to distinguish types of causation from statistical evidence alone. Secondly, in any actual situation it is virtually certain that several types of causation will operate simultaneously and interdependently. Third, it is probably true that an inflationary movement initiated by cost-push forces could not continue unless demand is generated to sustain it." In spite of their interdependence, however, the various theories of inflation bear out one point distinctly: every effort should be made to identify the causes of inflationary price rises, so that appropriate policy measures may be prescribed.

²¹ Joseph W. Conard, "The Causes and Consequences of Inflation," The Commission on Money and Credit, op. cit., p.14.

III

Some Asian Data

In the LDC's, interdependence among the so-called causes of inflation becomes highly marked. No single-variable, single-equation approach to explaining the problem of inflation is, therefore, adequate. In view of the complexity of the problem, the approach must be as comprehensive as possible. The concepts employed in explaining the phenomenon of inflation should be broad and flexible. For no economic portrayal will be a gain in knowledge if "the concepts employed have been made too rigid, too sharp, too uniform relative to the heterogeneity and fluidity of the life that they are intended to reflect."²²

Some General Remarks

We have made an attempt to explain the behavior of prices in some Asian countries through the rates of change in aggregate real gross national product, money supply, wage rate, terms of trade, and past price behavior. Since the number of years for which the necessary data on each individual country are available is not sufficient to give us the necessary "degree of freedom", we have employed the temporal cross-section approach. The countries covered are Ceylon, India, Indonesia, Japan, Pakistan, and the Philippines. There are variations between countries in the number of years covered, but all these countries have observations in all the variables. The period covered is 1952-1962. All the observations are in percentage terms.²³

²² Simon Kuznets, Economic Growth (Durham: Duke University Press, 1955), p.9.

²³ This particular form relates the rate of change of the dependent variable with the rate of change of the independent variables. Also, percentage changes are approximately equal to the first differences in logs. The coefficients, therefore, indicate the elasticities. Moreover, for a cross-section study involving several countries, percentage changes are a more desirable form.

In our analysis, "real income" is the gross national product deflated at 1958 prices. The price series are the cost-of-living series. Money supply includes money plus quasi-money,²⁴ the former defined according to the International Financial Statistics as "reserve money including currency plus demand deposits," and the latter as including "time-deposits and post-office saving deposits." "Price expectation" may be defined as the percentage change in the level of prices in the period before the preceding one. Terms of trade figures are "percentage of unit value index of exports to unit value index of imports," as defined in the International Financial Statistics. And finally, wage rate series are money wage series. There is a great deal of heterogeneity in the wage rate series from country to country.²⁵

Analysis

A. Our first task was to find out the correlation coefficients for individual countries between the rate of change in real income and the rate of change in the price level. The results are given in Table 1.

²⁴This way of defining the stock of money is plausible, in view of a study made at the IMF by Joseph O. Adekunle, "The Demand for Money: An International Comparison," October 4, 1965 (mimeo). The study concludes with this observation: "To the extent that consideration of financial structure is relevant to the definition of money, it seems that in countries with relatively underdeveloped financial institutions the distinction between 'money' and 'quasi-money' is less clear-cut from the point of view of the holders." (p.12).

²⁵For instance, in India, the series represents "factory employees drawing up to Rs. 200/- per month," while for Indonesia it represents "minimum wage (man, wife, and two children) per day in North Sumatra."

Table 1

COEFFICIENTS OF CORRELATION BETWEEN RATE OF GROWTH AND THE PRICE LEVEL,
(1952-62)

COUNTRY	r*
Ceylon	-.341
India	-.127
Indonesia	-.895
Japan	.122
Pakistan	-.653
The Philippines	-.777

*Not much faith should be put, however, even in a high r^2 . After all, the game of who can produce the highest correlation is a very sterile one. Refer to the controversy on "The Relative Stability of Monetary Velocity and the Investment Multiplier," between Milton Friedman and D. Meiselman, on the one hand, and Albert Ando and Franco Modigliani, and Michael De Prano and Thomas Mayer, on the other, American Economic Review (September, 1965), pp.693-792.

It can be readily seen that there is a great deal of heterogeneity among countries. The general experience is that rising prices are associated with falling growth rates. No causal relationship, however, is attributed to occur between the two.

B - The model used for analyzing the temporal cross-section data (refer to Appendix Table 5) is the following:

$$\frac{P_t - P_{t-1}}{P_{t-1}} \cdot 100 = B_1 \left(\frac{Y_t - Y_{t-1}}{Y_{t-1}} \cdot 100 \right) + B_2 \left(\frac{M_{t-1} - M_{t-2}}{M_{t-2}} \cdot 100 \right) + B_3 \left[\left(\frac{P_{t-1} - P_{t-2}}{P_{t-2}} \cdot \frac{P_{t-2} - P_{t-3}}{P_{t-3}} \right) \cdot 100 \right] + B_4 \left(\frac{T_t - T_{t-1}}{T_{t-1}} \cdot 100 \right) + B_5 \left(\frac{W_t - W_{t-1}}{W_{t-1}} \cdot 100 \right)$$

+ 2 Dummy + 3Dummy + 4 Dummy + 5 Dummy + 6 Dummy

+ ξ

- where P_t is the cost of living in time t at 1958 prices;
 P_{t-1} is the cost of living in time $t-1$ at 1958 prices;
 P_{t-2} is the cost of living in time $t-2$;
 P_{t-3} is the cost of living in time $t-3$;
 Y_t is real GNP in time t at 1958 prices;
 Y_{t-1} is real GNP in time $t-1$ at 1958 prices;
 M_{t-1} is the money supply (as defined above) in time $t-1$;
 T_t is the terms of trade (as defined above) in time t ;
 T_{t-1} is the terms of trade in time $t-1$;
 W_t is the money-wage in time t ;
 W_{t-1} is the money-wage in time $t-1$;
 α is the price-intercept for Indonesia;
 2 Dummy is for India;
 3 Dummy is for Ceylon;
 4 Dummy is for the Philippines;
 5 Dummy is for Japan;
 6 Dummy is for Pakistan.

The results are given in Table 2.

Table 2

RESULTS OF THE TEMPORAL CROSS-SECTION STUDY OF CEYLON, INDIA,
 INDONESIA, JAPAN, PAKISTAN, AND THE PHILIPPINES
 (1952-1962)

Name of the Independent Variable	Coefficient	Standard Deviation	't' Test
Constant (Indonesia)	7.7832	2.6554	2.9310
Real Income	-0.42168	0.092092	-4.5789
Money Supply (lagged one year)	0.38106	0.072986	5.2209
Price Expectations	-0.034936	0.076753	-0.4551
Terms of Trade	-0.034344	0.051000	-0.6731
Money Wage	0.27973	0.13477	2.0551
2 Dummy (India)	-5.2045	2.5047	-3.2996
3 Dummy (Ceylon)	-7.7571	2.6690	-2.9064
4 Dummy (Philippines)	-7.7769	2.5500	-3.0498
5 Dummy (Japan)	-10.0132 -0.10184	2.3756	-4.2854
6 Dummy (Pakistan)	-7.5452	2.5630	-2.9439

Dependent Variable: Price

Degrees of Freedom: 36

R²: .8738

DWT: 1.981

DWT (The Durbin-Watson Test) is a test for auto-correlation among the error terms. If e_t is the error in a statistic, auto-correlation occurs when $e_t = f(e_{t-1}, \dots, e_{t-n})$; e.g., $e_t = ae_{t-1} + u_t$, where u_t is a random term. When the errors in one period are related to the errors in previous periods then we say that the errors are "auto-correlated". Such errors are considerably reduced when we take changes in figures instead of their absolute sizes. The value of DWT obtained in our calculation is within the range of acceptance of no auto-correlation.

It is clear from Table 2 that:

(1) rates of change in real GNP are inversely related to rates of change in current prices; (2) rates of change in money supply (lagged one year) are directly related to rates of change in current prices; and (3) rates of change in money wages are directly related to rates of change in current prices. All the above relationships are statistically significant at the 5% level. Further, (4) whereas gains in terms of trade are likely to be price-dampening, this relationship is not significant; (5) it is hard to say what the future course of prices will be from an extrapolation of the behavior of prices in the past (three years); and finally, (6) price intercepts for Japan and Indonesia differ from the rest of the countries included in this study.

In view of (6) above, and in view of the peculiarities of the Indonesian data, we next tried to analyze the data by providing a separate price intercept for Japan, and also by separately estimating the coefficients for Indonesia simultaneously with the rest. The model basically remains the same. The results are given in Table 2-A.

Table 2-A

Results of the Temporal Cross-Section Study of Ceylon, India,
Indonesia, Japan, Pakistan, and the Philippines
(1952-62)

Name of the Independent Variable	Coefficient	Standard Deviation	't' Test
Constant (Ceylon, India, Pakistan, and the Philippines)	-.10826	1.1225	-.095453
Real Income	-.19937	.10749	-1.8518
Money Supply (lagged one year)	.29579	.11466	2.5796
Price Expectations	.12154	.13010	.93421
Terms of Trade	-.012710	.051554	-.24653
Money Wage	.18865	.19588	.96312
1 Dummy (Indonesia)	-1.2263	7.3857	-.16604
5 Dummy (Japan)	-1.7890	2.1404	-.83580
Indonesia -- Real Income	.060808	.41329	.14713
Indonesia--Terms of Trade	-.47138	.36910	-1.2750
Indonesia--Money Wage	.23819	.38292	..62204
Indonesia--Money Supply (lagged one year)	.43099	.33433	1.2500

Dependent Variable: Price
Degrees of Freedom: 35
 R² : .9013
 DWT: 1.857

When we isolate the Indonesian case, we get greater insight into the problem of price behavior. The significant relationship between changes

in real GNP and current prices is much less sharp (indeed, it is now highly doubtful). Wage rate changes are no longer significantly correlated with changes in prices. Terms of trade further lose their edge. Only money supply (lagged one year) continues to be significantly related to changes in current prices. Furthermore, these observations are far more pronounced for Indonesia than for the rest of the countries. This suggests that in the previous case (when we pooled Indonesia with the rest and estimated the coefficients for all the countries together), the Indonesian data was weighted more heavily than the rest.

Next, we eliminated the Indonesian data, kept the model in tact, and estimated the coefficients. The results are given in Table 2-B.

Table 2-B
Results of the Temporal Cross-Section Study of Ceylon,
India, Japan, Pakistan, and the Philippines
(1952-62)

Name of the Independent Variable	Coefficient	Standard Deviation	't' Test
Constant (Pakistan)	1.3430	1.5721	.85428
Real Income	-.14525	.10052	-1.4450
Money Supply (lagged one year)	.30991	.10429	2.9735
Price Expectations	.28101	.13117	2.1423
Terms of Trade	-.006424	.046619	-.12961
Money Wage	.082756	.18709	.44233
2 Dummy (India)	-1.3112	1.5883	-.82554
3 Dummy (Ceylon)	-1.9765	1.6402	-1.2051
4 Dummy (Philippines)	-2.6834	1.7132	-1.5663
5 Dummy (Japan)	-3.5237	2.1575	-1.6317

Dependent Variable: Price
Degrees of Freedom: 31
R²: .4309
DWT: 2.196

Table 2-B strengthens the findings in 2-A. Whereas real income, terms of trade, and wage rate all lose in significance still further, only money supply (logged one year) retains its significance. However, for the first time, the price expectations becomes a significant variable in explaining the behavior of current prices. This suggests that, in these countries, the past behavior of prices is a good proxy for extrapolating the behavior of prices in the future. Also, the course of prices in the case of Indonesia is far more erratic than it is elsewhere among the countries under observation.

The findings above indicate that the relative marginal significance of the variables included in our regression is sensitive to the nature of the data. The latter differs from country to country. This is so because the total environment of countries differs according to the policies being followed by them--the monetary policy, the fiscal policy, and the commercial policy, the attitudes of the labor unions, etc.

The effect of changes in terms of trade, for instance, will vary according to (1) the ratio of foreign trade to the gross national product; (2) the elasticity of demand for the exports (and imports) of the country; (3) the pattern of utilization of the gains from the terms of trade, which would depend upon (a) the marginal tax rate, and (b) the direction in which the disposable income (made possible by such gains) is spent.

The effect of a rise in money wages will depend upon whether such a change precedes or succeeds a corresponding rise in marginal productivity of labor. In either case, it is not inflationary. On the other hand, if such a rise completely disregards the changes in marginal productivity of labor it might be inflationary. In the case of Indonesia, for example, it is not hard to infer that the marginal productivity of labor is actually

falling because of what Hawkins calls "job inflation."²⁶ A rise in the total money wage bill, accompanied by a falling marginal productivity of labor, is a good fuel for the inflationary process.

The rate and direction of change in prices in the past will explain the course of prices in the future only if the relationships among crucial variables are more or less stable. The more unstable these relationships, the more precarious the forecasting. Our study shows that for Indonesia forecasts of price behavior are harder to make than for other countries.²⁷

IV

Conclusion

A. General Observations

The analysis has given us some insight into the phenomenon of price-change. We have found that there is considerable variety of experience among countries, and that the magnitudes of the coefficients are sensitive to the specification of the model. No single-variable approach to an explanation of the behavior of prices is sufficient. Thus, whereas money supply is a very significant variable for some countries in explaining the course of prices, in others it is less so. Whereas gains in the terms of trade do exert a downward pressure on prices in certain countries, in

²⁶ Everett D. Hawkins, "Job Inflation in Indonesia," University of Wisconsin, Madison (mimeo). Hawkins defines "job inflation" as the tendency toward "...securing an extra job or ...several additional jobs" as a method "...of raising additional money income" (p.2).

²⁷ Professor Hawkins tells me that during the period covered in this study, two factors might have been responsible for the erratic movement of prices: (1) the rebellion in 1958, and (2) the demonetization of the Indonesian currency in August, 1959.

others they do so less. Whereas a rise in money wages tends to be price-stimulating, it is more true in certain countries. It is possible to say broadly what the course of prices will be in certain countries by extrapolating from the past behavior of prices, while in others this approach is too hazardous.

It is important to bear in mind that in LDC's there is so much inter-connection between the so-called "monetary" and "structural" variables, that it is rash to give the credit of explaining price behavior or the discredit of generating price inflation to either one or the other. As pointed out above, the monetary causes of inflation may themselves be an effect of structural causes. The former, similarly, may aggravate the latter. No clear-cut dichotomy should be made or even anticipated between these two sets of factors. Particularly when we take account of the "behavioral" causes affecting both the "monetary" and the "structural" variables, the situation becomes too complex to be put in a simple cause-effect form.

Despite these insights (or, perhaps because of them), there is every reason to be skeptical. When we add to the difficulty of conceptual definitions²⁸ of the variables used in explaining certain phenomena the difficulty of precise measurement of data, our skepticism grows. Yet all important economic problems (if there are any unimportant economic

²⁸For instance, the assumptions that one must make about the behavior--both cyclical and secular--of the velocity of circulation of money; or, the assumptions about the number and the relative magnitude of the constituents of the "liquidity" of an economy; or, the alternative definitions--in terms of stock and flow of resources, human and non-human, aggregate and per capita--of economic growth; and so on.

problems!) such as inflation have to be met squarely. An explanation of the phenomenon of inflation must be provided and the identification of the explanatory variables made. It is equally important to lay out procedures for precisely estimating their relative magnitudes. But in view of the tremendous heterogeneity among countries (even among the LDC's, which are often wrongly considered to belong to a monolithic group), it is necessary to provide for as much variation and flexibility in our procedures as possible. No two countries are identical, just as no two situations are. And hence no single explanation of inflation is adequate for all countries and for all situations. "In our modern, highly complicated economic order," said Alvin Hansen, "we are continually in danger. It is not easy to keep the system in balance. That involves not only fiscal and monetary controls, but also wage and price policy, control of monopoly, promotion of high productivity, technical progress, and, above all, social unity and cohesiveness. Stability, maximum production, and full employment are not easily achieved goals. We are perhaps out of the kindergarten, but we have a long way to go."²⁹

B. Policy

To have economic growth without inflation we need a composite policy. In the LDC's particularly, where precise estimation of the relative magnitudes of the relevant variables of the phenomenon of inflation is not possible, the need for certain rules of thumb becomes imperative. For that matter, even in the DC's, governments do follow the so-called "guidelines" of policy. Perhaps in the latter case such guidelines are more scientifically determined, because of the readily available data of an

²⁹ Alvin Hansen, Economic Policy and Full Employment (McGraw-Hill Book Company Inc., 1947), p.vii.

integrated economy. In the LDC's, where a substantial chunk of the economy is non-monetized and several structural bottlenecks (for example, in transport) reduce factor and product mobility, there is greater reason to formulate such rules of thumb. Because of the multiplicity of objectives the LDC's generally happen to have, constrained maximization of growth rates becomes unavoidable. This is so even if we cannot establish empirically the threshold of inflationary rates of growth of an economy.

In the LDC's, there is another serious problem, which arises from the lack of integration and coordination among various policies--monetary, fiscal, and commercial. For instance, whereas stringent controls on the banking sector might be exercised, on the one hand, it is not infrequent to find huge budget deficits side by side. Similarly, the drive for self-sufficiency of the economy might lead the country into trade and tariff policies that are essentially inflationary. Such policies might also distort the cost structure of the domestic economy and hinder the prospects of earning the foreign exchange so vitally needed because of the import-oriented investment policy. Another glaring instance of the lack of integration of the economy is the divergence between the wage rate of the urban sector and the opportunity cost of labor in the rural sector. Even if the marginal productivity of rural labor is not zero or negative, the urban wage rate may be far in excess of the opportunity cost of rural labor. This may be due to the lack of labor mobility, or in spite of it, if the labor-unions in the urban sector are militant and politically important. But this does weaken and perhaps even explode the myth of cheap labor in the LDC's. It should not be surprising to find, on the contrary, that comparable categories of labor are priced higher in some of the LDC's than in the DC's. The existence of rapid growth rates, high

wages, and unemployment side by side in many LDC's only vindicates our view that these economies are not well-integrated, nor are their policies well-coordinated.

Part of the problem that the JEC's experience may be of their own making. Their defective tariff-rate structures, their over-valued exchange rates, their excessive zeal for attaining economic self-sufficiency which causes them to follow autarkic policies, their impatience and the tendency to shift the responsibility to the outsiders (e.g., the DC's) are greatly responsible for the inflationary impact of their growth policies. This is not to deny that there are certain real bottlenecks in these economies, e.g., the lack of savings and skills and a very thin base of infra-structure. It is not difficult, however, to accept that partly, at least, the confusion has been confounded and the problem of accelerated growth turned into a nightmare, as a result of their own policies.

One of the ways in which cost structures and investment patterns could be rationalized is through intra-regional economic cooperation. With resulting economies of scale, richer resource availability, greater factor and product mobility, and lesser autarky in trade and tariff policies, it should be possible to minimize the cost of economic growth in terms of inflation.

We may have just graduated from kindergarten, to rephrase Alvin Hansen, and we do have a long way to go, but this does not absolve us of the responsibility of choosing the best of the available alternative paths.

APPENDIX

Appendix
Table 1

Inflation (Measured by Rate of Increase in Cost of Living)
and Economic Development¹

(In percent per annum, compounded; Base: 1948 = 100)

Country	Period	Rate of Inflation	Rate of Growth	Rate of Growth Per Capita	No. of Observations	Coefficient of Correlation of Least Squares Fit for Rate of Growth
Burma (1953=100)	1950-53	- 3.1	17.9	16.7	4	.91
Ceylon	1947-51	1.5	12.2	8.6	5	.91
	1951-54	0.2	2.2	-0.5	4	.41 ²
India	1948-51	1.3	2.9	1.2	6	.939
Japan	1948-51	10.1	19.1	17.2	4	.972
	1951-54	5.9	4.5	2.9	4	.869 ²
Malaya	1949-51	18.0	21.0	18.2	3	.998
	1951-53	-0.4	-9.0	-12.0	3	.973
Pakistan (1949=100)	1950-53	5.3	-1.2	-3.2	4	-.635 ²
Philippines	1947-54	-1.2	6.0	3.9	8	.988
Thailand	1947-50	-1.3	18.6	11.7	4	.995
	1950-53	12.6	-1.0	-1.4	4	-.513 ²

¹ Inflation measured by the rate of increase in the cost of living index; economic growth measured by the rate of increase in the national income deflated by the cost of living index.

² (r) is not significant at the 5 percent level.

Sources: (a) IMF International Financial Statistics, (b) UN Statistics of National Income and Expenditure (Statistical Papers, Series H), (c) UN Monthly Bulletin of Statistics, (d) UN Statistical Yearbook, (e) UN Yearbook of International Trade Statistics, (f) UN Economic Survey of Asia and the Far East, (g) Economic Developments in the Middle East, (h) Central Statistical and Economic Department of Burma: Quarterly Bulletin of Statistics, (i) Central Bank of Ceylon: Bulletin.

Continued from U Tun Wai's study "A Relation Between Inflation and Economic Growth--A Statistical Inductive Study," IMF Staff Papers, Vol. VII (October 1959), pp.302-310.

Appendix
Table 2

Economic Growth and Inflation: Latin America, 1946-55

	Increase in real Product per Capita % p.a.	Rise in Cost of Living % p.a.
Argentina	0.5	44
Brazil	4.0	28
Chile	0.5	120
Colombia	3.5	13
Cuba	2.8	Prices fell
Dominican Republic	3.5	1
Ecuador	2.8	3
Guatamala	2.3	4
Honduras	2.0	5
Mexico	2.3	10
Paraguay	1.5	120
Peru	4.1	22
Venezuela	4.0	3

Sources: UN Statistical Yearbook, 1957; UN Statistics of National Income and Expenditure (Statistical Papers, Series H, No. 9), UN Economic Survey of Latin America.

Appendix
Table 3

Growth of Output and Changes in Prices

<u>Decade</u>	<u>Output Growth in %</u>	<u>Price Change %</u>
<u>United States</u>		
1874-83	-----	-----
1884-93	54.8	-16.0
1894-1903	45.2	-7.1
1904-13	50.6	20.7
1914-23	29.0	64.0
1924-33	29.1	-----
1934-43	26.0	-7.1
1944-53	52.0	84.8
<u>United Kingdom</u>		
1875-84	-----	-----
1885-94	37.6	-15.0
1895-1904	29.2	-.9
1905-14	16.5	9.6
1915-24	-.8	106.0
1925-34	21.1	-16.6
1935-44	30.2	17.1
1945-54	22.7	51.3

Source: U.S. Congress, Joint Economic Committee, Hearings, Washington, 1959, p. 12.

Appendix
Table 4

Increase in Consumer Price Levels in Real Production

	Percent Increase in Real Product Per Capita 1948-56	Average Annual Increase 1948-56	Percent Increase in Real Product Per Capita 1948-57	Average Annual Increase 1948-57	Percent Increase in Consumer Price Index 1948-57	Average Annual Increase 1948-57
Austria	93.9	11.7	106.1	11.8	124.0	13.8
Germany	53.8*	9.0	60.0***	8.6	14.0	1.6
France	47.4	5.9	30.1***	4.3	76.7	8.5
Italy	32.6*	5.4	41.9***	6.0	27.9	3.1
Spain	34.5**	4.9	34.5**	4.9	55.7	6.2
Finland	31.4**	4.5	33.7	3.7	87.5	9.7
Netherlands	20.2*	3.4	39.3	4.4	46.2	5.1
Belgium	23.0**	3.3	20.4***	2.9	12.6	1.4
U.K.	22.7	2.8	25.0	2.8	50.6	5.6
Canada	20.7	2.6	18.8	2.1	26.2	2.9
Sweden	14.6*	2.4	18.6***	2.7	46.8	5.2
United States	18.4	2.3	19.8	2.2	16.7	1.9
Switzerland	16.3**	2.3	30.0	3.3	9.4	1.0
Norway	12.6*	2.1	15.8***	2.3	51.4	5.7
Denmark	16.1	2.0	21.8	2.4	43.2	4.8
Ireland	8.6*	1.4	12.9***	1.8	41.8	4.6

* 1950-1956

** 1948-1955

*** 1950-1957

Source: United Nations, Statistical Yearbook, 1957 and 1958.

Note: This table has been reproduced from Arthur W. Moger, "Inflation: Some Lessons of Recent Experience," American Economic Association, Papers & Proceedings, May, 1960, p.211. The table is a modification of Professor Slichter's table.

Appendix
Table 5

Index Numbers in Percentage Terms

(1958 = 100)

$$\left(\frac{P_t - P_{t-1}}{P_{t-1}} \cdot 100 \right) \quad \left(\frac{Y_t - Y_{t-1}}{Y_{t-1}} \cdot 100 \right) \quad \left(\frac{M_{t-1} - M_{t-2}}{M_{t-2}} \cdot 100 \right)$$

Pakistan	1955	-4.5	10.6	9.5
	1956	44.7	12.8	14.5
	1957	9.0	-1.9	13.9
	1958	3.1	-3.9	5.5
	1959	-3.0	15.0	5.3
	1960	6.2	1.7	8.0
	1961	1.9	6.8	7.4
Japan	1956	1.1	12.2	20.0
	1957	3.1	8.7	21.7
	1958	1.0	.0	15.1
	1959	1.0	15.0	19.0
	1960	4.0	13.0	21.0
	1961	5.7	13.9	22.3
	1962	6.3	6.8	22.3
Philip- pines	1953	-3.1	11.4	3.3
	1954	-1.1	3.8	4.8
	1955	-1.1	8.6	3.8
	1956	2.2	5.7	10.5
	1957	2.1	3.2	12.2
	1958	3.1	4.2	10.8
	1959	-1.0	7.0	8.7
1960	4.0	3.7	10.0	
1961	1.9	4.5	6.4	
Ceylon	1953	2.1	-1.2	-5.0
	1954	-1.1	7.0	-6.6
	1955	.0	13.0	14.1
	1956	-1.1	-4.8	11.1
	1957	3.1	-4.1	7.8
	1958	2.0	5.3	-3.1
	1959	.0	8.0	6.4
	1960	-1.0	3.7	10.0
	1961	1.0	.9	6.4
	1962	1.0	2.7	4.3
India	1953	2.2	3.4	-1.6
	1954	-4.4	-4.4	3.7
	1955	-5.8	10.3	6.3
	1956	9.8	4.2	17.9
	1957	5.5	.0	5.1
	1958	5.2	6.0	9.6
	1959	4.0	-1.0	9.9
1960	1.9	8.8	12.0	

Table 5 (Continued)

	1954	5.1	4.9	13.0
	1955	34.1	-3.1	46.1
Indo-	1956	12.7	3.2	10.5
nesia	1957	11.3	7.0	9.5
	1958	44.9	-27.5	41.3
	1959	26.0	-7.0	53.8
$\left[\left(\frac{P_{t-1} - P_{t-2}}{P_{t-2}} - \frac{P_{t-2} - P_{t-3}}{P_{t-3}} \right) \cdot 100 \right] \left(\frac{T_t - T_{t-1}}{T_{t-1}} \cdot 100 \right) \left(\frac{W_t - W_{t-1}}{W_{t-1}} \cdot 100 \right)$				
	1955	-13.0	-8.7	3.2
	1956	-3.0	-11.6	3.1
Pakistan	1957	4.0	-1.0	-2.0
	1958	-6.0	-17.0	2.0
	1959	-3.0	-3.0	.0
	1960	-1.0	17.5	13.0
	1961	-5.0	36.0	1.8
	1956	-3.0	1.1	5.5
	1957	-1.0	-4.4	5.2
	1958	2.0	13.6	.0
Japan	1959	-2.0	6.0	6.0
	1960	.0	.0	5.0
	1961	3.0	-1.0	7.1
	1962	3.0	-1.0	10.8
	1953	2.0	28.3	2.1
	1954	4.0	-7.7	1.0
	1955	2.0	-9.2	.0
	1956	.0	.0	.0
Philip-	1957	1.0	-2.0	.0
pines	1958	4.0	2.0	3.1
	1959	1.0	6.0	2.0
	1960	-4.0	-3.8	.0
	1961	5.0	-8.9	-1.0
	1953	5.0	12.8	1.1
	1954	3.0	27.2	2.2
	1955	-3.0	3.9	4.3
	1956	.0	16.8	.0
Ceylon	1957	-1.0	5.6	1.0
	1958	4.0	6.4	2.0
	1959	-1.0	2.0	.0
	1960	.0	.0	-1.0
	1961	-1.0	-7.8	.0
	1962	2.0	4.3	1.0

Table 5 (Continued)

	1953	-4.0	.0	.0
	1954	3.0	10.1	5.6
India	1955	-6.0	-5.5	.0
	1956	-2.0	.0	1.1
	1957	16.0	-7.9	3.2
	1958	-5.0	6.4	2.2
	1959	.0	2.0	3.0
	1960	-1.0	2.8	6.8
	1954	.0	-5.6	6.3
	1955	.0	13.2	13.1
Indo-	1956	29.0	4.7	6.2
nesia	1957	-21.0	-11.2	.0
	1958	-1.0	-17.0	10.0
	1959	34.0	32.0	.0

Sources:

1. United Nations: International Monetary Fund, International Financial Statistics, Supplement to 1963-64 Issues.
2. United Nations: International Monetary Fund, International Financial Statistics, December, 1964, Vol XVII, No. 12.
3. United Nations: Economic Commission for Asia and the Far East, Economic Survey of Asia and the Far East, 1964 and 1963.
4. Government of India: Planning Commission, Report of the Committee on Distribution of Income and Levels of Living, Part I, February, 1964.
5. Everett D. Hawkins, "Job Inflation in Indonesia." (mimeo), Table II.