

Inflation and Growth: The International Evidence

In the present climate of inflation when everyone, quite understandably, is preoccupied with the deleterious repercussions of rising prices, it may seem a little perverse to provide a reminder that it was once fashionable to extol the virtues of inflation as a means of growth. Reaction to the inter-war depression and the influence of Keynes undoubtedly had something to do with this. But way back in 1922 Sir Dennis Robertson was advocating a progressive rise in the price level as a stimulus to the production of goods: ¹ "So long as the control of production is in the hands of a minority, rewarded by means of a fluctuating profit, it is not impossible that a gently rising price level will in fact produce the best attainable results not only for them (the controllers of industry) but the community as a whole. And it is tolerably certain that a price level continually falling, even for the best of reasons, would prove deficient in those stimuli upon which modern society, whether wisely or not, has hitherto chiefly relied for keeping its members in full employment and getting its work done". Kaldor powerfully and persuasively revived the doctrine in two lectures at the London School of Economics in 1959, and provided an alternative explanation of the Phillips curve at the same time: ² "... a slow and steady rate of inflation provides a most powerful aid to the attainment of a steady rate of economic progress"... "price stability is only consistent with steady growth when the rate of productivity and/or the working population is sufficiently large to give a relatively high rate of growth to the total national product. In a weakly growing economy price stability will mean stagnation unless the propensity to consume

¹ D. ROBERTSON, *Money*, Nisbet and Co. Ltd., London, 1922.

² N. KALDOR, "Economic Growth and the Problem of Inflation", *Economica*, August and November 1959.

is raised sufficiently to offset the effect of a lower rate of growth of profits...". In the same year, in the same vein, Rostow categorically asserted, in his historical interpretation of the growth process, that inflation had been important for several "take-offs": "In Britain of the 1790's, the U.S. of the 1850's and Japan of the 1870's, capital formation was aided by price inflation which shifted resources from consumption to profits".³ Here, apparently, was some empirical backing for the inflation thesis, suggesting a general applicability of the doctrine to developed and less developed situations alike. The notion of growth via inflation certainly became an attractive proposition to less developed countries during the 1950's in their desire to accelerate the growth of output in the face of inadequate voluntary saving and inelastic tax revenue.

There are many reasons why at least mild inflation may be conducive to growth. First, a mild demand inflation keeps resources fully employed and therefore maintains a high *level* of saving for investment. It encourages manufacturers to maintain production at the full capacity level and not to cut back output for fear of deficient demand which would reduce real growth. Secondly, inflation tends to redistribute income from low savers to high savers raising the savings *ratio*. Thirdly, inflation encourages the use of saving for investment in physical assets such as manufacturing plant and machinery, on which growth through technical progress largely depends, by maintaining the profitability of investment in physical assets relative to money assets and more speculative activities. Fourthly, inflation reduces the real burden of debt and the real rate of interest. Interest rates are generally slow to adjust to inflation, and enterprise benefits at the expense of rentiers. Lastly, if inflation is allowed to manifest itself, bottlenecks in an economy, which may act as a barrier to growth, can be more speedily overcome. The only potential threat to growth from inflation comes from the balance of payments if foreign exchange is a scarce resource. But if all countries are inflating mildly, or foreign exchange is not particularly scarce, the balance of payments worries of an inflation are less serious.

Rapid inflation is another story, however. "Excessive" inflation can seriously retard growth. High rates of inflation may

³ "Rostow on Growth", *The Economist*, 15th August 1959.

discourage saving; investment in physical plant and equipment becomes unattractive relative to speculative investments in inventories, overseas assets, property, and artifacts traded by the wealthy classes. Moreover the balance of payments may suffer severely necessitating import substitution, exchange controls and devaluation, all of which give a further twist to the inflationary spiral. The question is, what is the critical rate of inflation beyond which the advantages of mild inflation turn into growth liabilities? This can only be answered empirically.

The hypothesis that inflation is conducive to real growth has never been put to a thorough, satisfactory empirical test. What evidence there is tends to be sketchy and inconclusive. An early cross section study for 31 less developed countries found no systematic relation,⁴ and an examination by Bhatia of Rostow's thesis found conflicting evidence between the five countries examined.⁵ Eckstein had earlier reviewed the statistics for eight countries over nearly a century and concluded that: "periods of rapid growth occurred with and without inflation and that periods of stagnation also saw a very wide range of price changes. Thus, as a long-run phenomenon, there is no historical association between growth and inflation".⁶ The most comprehensive study to date is by Dorrance,⁷ but unfortunately he takes per capita income as the measure of growth. It is unfortunate because while it is possible to advance good theoretical reasons for expecting a positive association between inflation and growth there is no obvious reason why population growth should be systematically related to inflation, and there is no reason to expect, therefore, any definitive relation between inflation and per capita income (as a measure of growth). Although Dorrance's cross-section evidence seems, in fact, to support the mild inflation argument, he ends his study by saying: "on the basis of these data, it is not possible to conclude that the rate of price change will determine the rate of growth".

⁴ U. TUN WAI, "The Relation between Inflation and Economic Development: A Statistical Inductive Study", *I.M.F. Staff Papers*, October 1959.

⁵ R. J. BHATIA, "Inflation, Deflation and Economic Development", *I.M.F. Staff Papers*, November 1960.

⁶ O. ECKSTEIN, "Inflation, the Wage-Price Spiral and Economic Growth", in *The Relationship of Prices to Economic Stability and Growth*, U.S. Gov. Printing Office, Washington, 1958.

⁷ G. DORRANCE, "Inflation and Growth: The Statistical Evidence", *I.M.F. Staff Papers*, March 1966.

The purpose here is to take an even larger sample of countries than Dorrance (51 to be precise), and to look again at the international evidence of the relation between inflation and growth, taking real growth unadjusted for population change, and cross-classifying countries according to their level of development and rate of inflation. We shall also relate the analysis directly to growth theory by examining the relation between inflation and two important determinants of growth: (a) the investment ratio and (b) the balance of payments situation. We discover three interesting things which can be stated with some confidence. First, that for countries with relatively high productivity (per capita incomes exceeding \$800 p.a. in 1963) there is a distinct positive association between inflation and growth. Secondly, that countries with a mild inflation of prices of between 3 and 10 per cent per annum invest a higher proportion of their gross national product than countries with price stability. Thirdly, that inflation in excess of 10 per cent per annum is positively detrimental to growth, investment and the balance of payments. The conclusion is that the protagonists of mild inflation have the evidence on their side.

No distinction is made here between the origins or "types" of inflation. The reason is simply that most of the stimuli to growth from mild inflation do not, in general, depend on the initial causes of inflation. Real interest falls, the burden of debt is reduced and savings and investment will remain high whether inflation is demand induced or cost induced, *provided a full employment level of real output is maintained*. The only major difference is that profits tend to rise faster than other costs in demand inflations and lag behind during wage inflations. But provided demand is maintained there is no reason for the growth of profits to fall. Moreover, cost inflation, emanating from rising wages, can be an independent source of growth in the long run by encouraging the use of more capital intensive techniques which raise productivity, wages and profits simultaneously. Wage inflation will be a hindrance to growth only if demand is not maintained and the level of employment and capacity utilisation is allowed to fall. It is exactly this situation that some parts of the world, including Britain, have been experiencing recently and which has led to the false inference that inflation is damaging to growth.

Inflation and growth

Fifty-one countries were taken from the *United Nations Yearbook of National Accounts Statistics 1968*, and most of the analysis is cross-section taking averages of variables for the period 1958-1967. This procedure has the obvious advantage that it eliminates the influence of special factors that might attach to any one particular year. Growth is measured by the rate of increase of G.N.P. at constant prices and inflation is measured by the rate of change of consumer prices as computed by the International Monetary Fund in their publication *International Financial Statistics* (see Appendix 1 for data).

Plotting the observations for growth and inflation for each of the countries under review produced a random scatter showing, if anything, a negative relation between inflation and growth. But to treat countries at very different stages of development, with different degrees of inflation, as if from the same sample, is clearly unsatisfactory. It has already been argued that the effect of inflation on growth can be expected to differ according to the magnitude of inflation, and that a profile of growth in relation to inflation might be expected showing a rise to some maximum and then falling (some have suggested 10 per cent inflation as the critical turning point).⁸ Several reasons can also be advanced why the impact of inflation on growth may also be expected to vary with the level of development. Specifically, the hypothesis is advanced that the favourable effects of inflation on growth are likely to be less pronounced and predictable the poorer the country. First, inflation's role in highlighting bottleneck areas must be more obvious in poor countries where entrepreneurial talent is lacking. Secondly, the poorer the country the less the expertise in handling the repercussions of inflation, and the less the flow of resources released into productive investment. In poor countries, the wealthy tend to have higher propensities to consume, and taxes on profits tend to be lower. Thirdly, the resources available for investment are more limited the poorer the country, and the greater will be the degree of inflation required to release resources. Lastly, the poorer the country the

⁸ e.g. A. HARBERGER, "Some Notes on Inflation", in W. BAER and I. KERSTENETSKY, *Inflation and Growth in Latin America*, New Haven, 1964.

less may growth depend on capital investment and the more on factor reorganisation and improved efficiency.

In the light of these considerations (and others) the 51 countries were divided into five groups according to the level of per capita income, as in table 1 below. First, the growth-inflation ratio was calculated for each group (column 4). Except for the countries with per capita incomes in the range \$300-\$799 p.a., containing four very high inflation countries, the results do suggest that the poorer the country the lower the growth-inflation ratio.

TABLE I

| Per Capita Income | No. of Countries (1) | Av. Rate of Inflation % (2) | Av. Rate of Growth % (3) | Growth-Inflation Ratio (4) |
|-------------------------|----------------------|-----------------------------|--------------------------|----------------------------|
| >\$1,650 | 7 | 3.0 | 4.7 | 1.5 |
| \$800-\$1,650 | 10 | 3.4 | 4.9 | 1.4 |
| \$300-\$799 | 14 | 13.5 | 5.3 | 0.4 |
| \$200-\$299 | 10 | 3.7 | 4.9 | 1.3 |
| <\$200 | 10 | 4.6 | 5.5 | 1.2 |

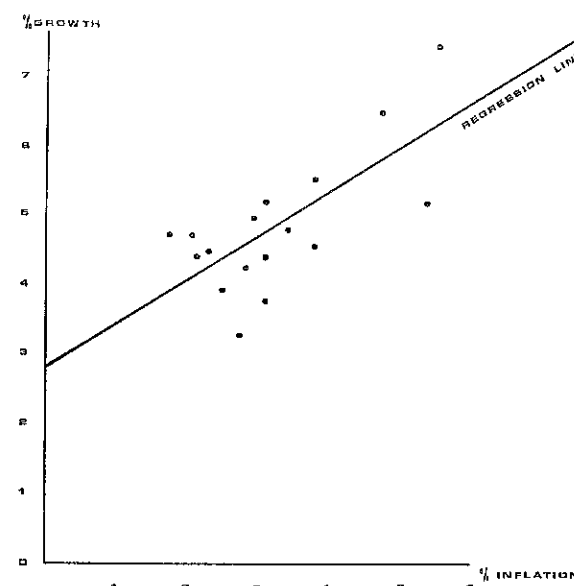
Secondly, we looked more closely at the relation between inflation and growth according to the level of per capita income by plotting the observations for each group separately. In both groups of countries with per capita incomes in excess of \$800 p.a. a significant positive relation was found. In the groups below \$800 p.a., however, no significant relation emerged, largely due to the wide diversity of inflationary experience. Taking all the countries with per capita incomes in excess of \$800 and regressing the growth rate on the rate of inflation the following result was obtained: Y (growth) = $2.793 + 0.612 X$ (inflation): $r^2 = 0.48$. The relation is depicted graphically in figure 1. The equation tells us that within the range of inflation experienced by the countries examined a deviation of one percentage point from the average rate of inflation tends to have been associated with a 0.6 percentage point excess of growth above the average.

In a paper written by Thomas Wilson some time ago⁹ the same pattern emerges for a smaller number of countries over the period

⁹ T. WILSON, "Inflation and Growth", *Three Banks Review*, September 1961.

FIGURE 1

INFLATION AND GROWTH IN COUNTRIES WITH PER CAPITA INCOMES > \$800 p.a.



1950-1960, except for two deviant observations which led Wilson to conclude that: "Clearly statistics of the kind presented do little to support or rebut the view that inflation is favourable to growth". Had Wilson actually plotted the data it is doubtful whether he would have been so agnostic. The two deviant observations were Germany and Italy which grew very fast over the period 1950-1960 due to rapid growth of the labour force. There is here some support for Kaldor's stress on inflation in the absence of a rapid growth of the working population to keep demand and profits buoyant.

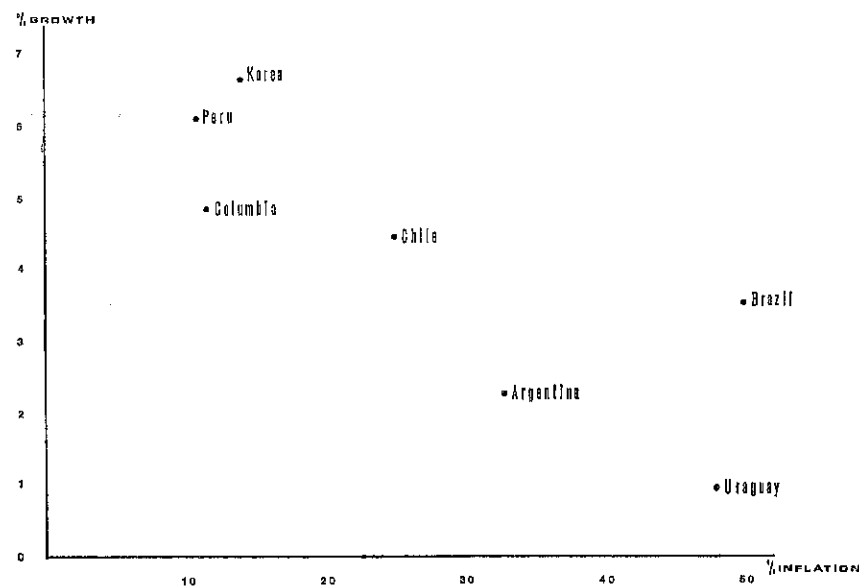
Apart from the theoretical considerations mentioned earlier there are further reasons for believing that the association found is a causal relation leading from inflation to growth, and not the other way round. If growth is a supply phenomenon, higher growth should lower inflation not exacerbate it. Real growth by itself cannot be the cause of inflation unless it sets in motion forces which themselves generate rising prices and persist e.g. bottlenecks in the product and factor markets. This is a possibility. The common

view that growth is inflationary, however, stems from the mistaken association of the growth of demand with the growth of supply. Inflation can certainly result from attempting to expand demand in excess of the rate of growth of productive potential; but it is a non-sequitur to argue from this that inflation is causally related to real growth.

Turning now to countries with per capita incomes less than \$800 p.a., the major reason for a lack of any apparent association between growth and inflation seems to have been the diversity of inflationary experience, ranging from zero inflation in Guatemala to an average rate of price increase of 49.7 per cent in Brazil. Since inflation can both stimulate and retard growth, the countries concerned were divided up according to the degree of inflation. Just two groups were distinguished: those with rates of inflation in excess of 10 per cent p.a. and those with rates below 10 per cent. For countries with less than 10 per cent inflation no particular relation emerged, but for the seven countries with inflation in excess of 10 per cent a significant negative association is apparent (figure 2).

FIGURE 2

INFLATION AND GROWTH IN HIGH INFLATION COUNTRIES (1958-1967)



It would appear that once the rate of inflation exceeds 10 per cent p.a. the negative aspects of the effects of inflation on growth tend to come to the fore. Any causal connection could possibly be the reverse but it is difficult to see how moderately inferior growth could cause such excessive inflation as recorded in figure 2. The overall conclusion must be that mild inflation up to 10 per cent p.a. may be an aid to growth, especially in countries with fairly high levels of productivity. Inflation in excess of 10 per cent, however, appears to be very damaging on the limited evidence available.

Now let us view these results in relation to two of the major determinants of growth: domestic investment, and foreign exchange availability measured by the balance of payments on current account.

Inflation and investment

Investment is measured by the average level of gross fixed domestic capital formation over the years 1958-1967 expressed as a percentage of the average level of G.N.P. over the same period. The hypothesis that inflation is beneficial to growth hinges on the stimulus of inflation to saving and productive investment, so that we should expect to find a positive relation between rates of inflation and investment ratios. In fact, no positive overall relation was discernable, mainly due again, however, to the diversity of inflationary experience. But when the countries were grouped according to the rate of inflation an interesting pattern emerged. Three groups were distinguished: countries with inflation in excess of 10 per cent p.a.; countries with inflation rates between 3 and 10 per cent p.a. and countries with less than 3 per cent inflation. The average investment ratios of countries within these groups is shown in table 2 below.

TABLE 2

| Countries with Average Rate of Inflation (1958-1967): | Average Investment Ratio 1958-1967 (%) | Change in the Investment Ratio 1958-1967 |
|---|--|--|
| > 10% | 16.88 | +2.15 |
| 3-10% | 20.22 | +3.15 |
| < 3% | 17.84 | +2.40 |

The table speaks for itself. Inflation in excess of 10 per cent appears to be a positive discouragement to productive investment relative to milder rates of inflation; so, too, does relative price stability. These findings certainly lend support to the theoretical expectations voiced by such economists as Robertson and Kaldor which we mentioned at the outset. Again there are good reasons for believing that the association found is a causal relation leading from inflation to investment and not the other way round. First, investment expands capacity and is technically deflationary. Secondly, if investment was the cause of inflation, how could low investment be the cause of both high and low rates of inflation? To explore the relation a little further, the change in the investment ratios for each group of countries between 1958 and 1967 was also computed. As table 2 shows the investment ratio rose the most in those countries inflating mildly and the least in those countries with very rapid inflation. We conclude that there seems to be a rough causal relation running from inflation to investment which supports the argument for mild inflation.

Inflation and the balance of payments

The balance of payments is measured on current account and expressed as a percentage of the average level of G.N.P. over the period 1958-1967. Only less developed countries were considered here (i.e. countries with per capita incomes less than \$800 in 1963), where imports are a strategic factor in the growth process and where foreign exchange is particularly scarce. The evidence is very much what one would expect. The higher the inflation rate the greater the balance of payments deficit as a proportion of G.N.P. Dividing the countries into three groups as before, according to the degree of inflation, the pattern that emerges is shown in table 3.

TABLE 3

| Countries with Average Rate of Inflation (1958-1967): | Average Balance of Payments Deficit as a % of G.N.P. 1958-1967 | Change in the Balance of Payments as a % of G.N.P. 1958-1967 |
|---|--|--|
| ► 10% | 2.8 | -0.64 percentage points |
| 3-10% | 1.2 | -1.86 percentage points |
| ◄ 3% | 0.9 | +0.90 percentage points |

Although the balance of payments position deteriorates progressively with the rate of inflation, the disparity between countries with high and low rates of inflation is perhaps not so great as one might have expected a priori. There are two main reasons for this. First, some high inflation countries have kept their export prices down by continual currency devaluation. In 1967 the I.M.F. index of export prices (1958 = 100) stood at 120 for countries with inflation in excess of 10 per cent; 110 for the mild inflation group of countries, and 101 for the countries with relative price stability. The second point is that we have already seen that high inflation countries tend to grow slower than average, and this curbs the growth of imports. The fact that growth was faster in the mild inflation countries presumably accounts for the fact that it was these countries which experienced the greatest deterioration in their balance of payments over the period 1958-1967.

Conclusion

The hypothesis that mild inflation can react favourably on growth is not a new one, but to our knowledge it has not been comprehensively tested before taking a broad cross-section of countries with growth as the dependent variable. For 17 developed countries, all of which experienced mild inflation within the range 3-8 per cent p.a. over the period 1958-1967 (see figure 1), the hypothesis is supported by the evidence. For the less developed countries the evidence is equivocal, except that there is a definite negative relation between inflation and growth for countries which experienced annual rates of inflation in excess of 10 per cent. Over all countries, mild inflation tends to be associated with the highest rates of investment, and in the less developed countries this favourable impact probably more than compensates for the marginally less favourable balance of payments position of mildly inflating countries compared to countries with price stability.

Two questions arise. First, if the control of inflation means stifling growth, what level of inflation should countries tolerate as the price of growth? The answer must ultimately emerge from a consideration of the relation between what the growth-inflation "trade-off" actually is and a society's preference curve relating inflation and growth. The second question is: should the less

developed countries be quite so frightened of inflation as they appear to be? The experience of Latin America has perhaps made them unduly, but understandably, cautious. In the face of decelerating growth and rising unemployment perhaps the time has come for them to allow the price mechanism to work more freely and to indulge less conservatively in inflationary finance. The fact is that most less developed countries outside South America have inflated by slightly less than the developed industrialised countries over the post war period.¹⁰

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¹⁰ According to Adekunle the average rate for 13 industrialised countries has been 3.70 per cent p.a. The average rate for 30 less developed countries, excluding six high inflation countries, has been 3.63 per cent p.a. See J. ADEKUNLE, "Rates of Inflation in Industrial, Other Developed and Less Developed Countries, 1949-1965", *I.M.F. Staff Papers*, November 1968.

APPENDIX 1

DATA ON PER CAPITA INCOMES, INFLATION AND GROWTH 1958-1967

| Country | Per Capita Income in 1963 (\$U.S.) | Annual Average Growth Rate (%) (1958-1967) | Annual Average Rate of Inflation (%) (1958-1967) | Country | Per Capita Income in 1963 (\$U.S.) | Annual Average Growth Rate (%) (1958-1967) | Annual Average Rate of Inflation (%) (1958-1967) |
|------------------------|------------------------------------|--|--|------------------------|------------------------------------|--|--|
| U.S.A. | 3,166 | 4.7 | 1.7 | Portugal | 343 | 6.1 | 2.4 |
| Sweden | 2,187 | 4.5 | 3.8 | Chile | 324 | 4.6 | 24.4 |
| Canada | 2,121 | 4.7 | 2.1 | Columbia | 315 | 4.9 | 11.1 |
| Switzerland | 1,996 | 4.9 | 3.0 | Nicaragua | 303 | 6.4 | 1.3 |
| Australia | 1,810 | 4.5 | 2.3 | Brazil | 300 | 3.6 | 49.7 |
| New Zealand | 1,756 | 4.2 | 2.8 | Dominican Rep. | 288 | 2.7 | 2.1 |
| Denmark | 1,689 | 5.1 | 5.4 | Guatemala | 287 | 4.7 | 0.0 |
| Germany | 1,639 | 3.9 | 2.5 | Malaysia | 275 | 5.9 | 0.8 |
| U.K. | 1,603 | 3.3 | 2.8 | Turkey | 259 | 6.4 | 6.6 |
| Norway | 1,564 | 4.8 | 3.4 | Philippines | 254 | 5.3 | 4.8 |
| Belgium | 1,502 | 4.4 | 2.2 | Peru | 236 | 6.2 | 10.4 |
| Finland | 1,408 | 6.4 | 4.8 | Ghana | 227 | 3.1 | 6.0 |
| Netherlands | 1,220 | 5.1 | 3.1 | Tunisia | 226 | 3.0 | 1.6 |
| Israel | 1,101 | 7.4 | 5.5 | Iran | 210 | 7.2 | 3.0 |
| Austria | 1,087 | 4.3 | 3.1 | Honduras | 203 | 4.5 | 1.5 |
| Italy | 954 | 5.5 | 3.8 | China | 187 | 9.2 | 4.8 |
| Ireland | 808 | 3.7 | 3.1 | Ecuador | 186 | 4.5 | 3.8 |
| Venezuela | 768 | 4.7 | 0.8 | Morocco | 186 | 2.4 | 2.3 |
| Japan | 684 | 10.9 | 5.2 | Korea | 145 | 6.8 | 13.2 |
| Argentina | 562 | 2.3 | 32.0 | Ceylon | 144 | 4.2 | 1.5 |
| Greece | 554 | 6.9 | 2.0 | Bolivia | 134 | 4.5 | 6.5 |
| Uruguay | 520 | 0.9 | 47.0 | Thailand | 115 | 7.8 | 1.6 |
| Spain | 517 | 6.0 | 6.3 | Sudan | 104 | 6.7 | 1.4 |
| South Africa | 470 | 5.9 | 2.1 | Pakistan | 94 | 5.5 | 4.4 |
| Jamaica | 446 | 4.6 | 2.9 | India | 90 | 3.2 | 6.8 |
| Mexico | 386 | 6.1 | 2.4 | | | | |

Sources: U.N. Yearbook of National Accounts Statistics 1968. International Financial Statistics (various volumes), I.M.F.