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ABSTRACT

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Favorable conditions existed for world economic growth during the 1980s and early 1990s. Yet real GDP growth rates for 76 out of 87 countries included in this study decreased during this time, relative to the 1968-80 period. The middle income countries experienced the greatest decline in growth rates, followed by the low income group. Theory and evidence suggest that an increase in the instability of the growth rate of the money supply, largest in the middle income countries and next largest in the low income nations, contributed to this decline.

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If one could have been assured in the late 1970s of a number of favorable circumstances for growth that came to pass in the 1980s and early 1990s, it would have been reasonable to predict an increase in world economic growth, or at least a continuation of the 1970s growth rates. These circumstances include (1) a decrease in the real price of energy to pre-1970 levels, (2) the end of the cold war and easing of world tensions, (3) a lowering of trade barriers and expansion of world trade, (4) the widespread adoption of computer technology in manufacturing, transportation, commerce, finance, and communications, (5) large investments in development assistance during the 1960s and 1970s that should have started to bear fruit by the 1980s and 1990s, and (6) an increase in the world literacy rate from about 60 percent in 1980 to over 70 percent in 1990.

The data, however, tell a different story. If we divide the 1968-92 period in two equal parts, we see that in 76 out of the 87 countries included in this study, the rate of real GDP growth decreased in the 1980-92 period compared to 1968-80. The principal objective of this study is to investigate the circumstances contributing to this decline.

The Data

Except where noted, the data are from World Tables, various editions, published by the World Bank. The main selection criteria for countries included in this study is data availability. Notable exclusions are the Peoples Republic of China and the former Soviet Union. Also countries at war (on their soil) during this period are excluded.

Real GDP growth is estimated from domestic currencies in constant 1980 prices. Growth rates are the annual percentage change in real GDP calculated as $((Y_t - Y_{t-1})/Y_{t-1}) \times 100$ where Y is total GDP. Countries are grouped into three income classes based on 1980 per capita GDP in

U.S. dollars, 1980 exchange rates. The three classes and number of countries in each are listed below.

Income Group	1980 Per capita GDP	Number of Countries
High	>$6000	17
Middle	$1000-$6000	30
Low	<$1000	40

GDP Growth Rates

As shown in Table 1, average real GDP growth rates declined in all three groups, with the middle income countries exhibiting the sharpest decline. In the high income group, only Switzerland increased its rate of growth, from 1.85 to 2.06 percent. Growth rate gains in the other 10 countries that exhibited an increase also were modest. In three of the eleven countries (Benin, Malaysia and Swaziland) the increase in population growth exceeded the increase in total GDP growth resulting in a decrease in per capita growth.

Per capita real GDP growth rates obtained by subtracting population growth from total GDP growth are shown in column (3) of Table 1. The rate of population growth in the low income countries comes close to offsetting the rate of real GDP growth, resulting in virtually no gain in real per capita GDP from 1980 to 1992. United States per capita growth rates were lower than the high income group average in both periods.

The figures in Column (4) of Table 1 present real per capita GDP growth in terms of U.S. dollars. The figures for each period are obtained by multiplying the country's per capita GDP

Table 1

Real GDP and Population Growth Rates

	Annual Percent Change			
Income Group	Real GDP	Population	Real GDP per capita	*Annual Growth in U.S. dollars per capita
	(1)	(2)	(3)	(4)
High				
1968-80	3.71	.59	3.12	272
1980-92	2.15	.55	1.60	180
United States				
1968-80	2.83	1.03	1.80	178
1980-92	2.19	1.02	1.17	139
Middle				
1968-80	6.44	2.18	4.26	59
1980-92	2.52	2.11	.41	2
Low				
1968-80	4.26	2.60	1.66	6
1980-92	2.81	2.80	.01	.61

*Constant 1980 dollars and 1980 exchange rates.
High income countries: >$6000 per capita GDP in 1980.
Low income countries: <$1000 per capita GDP in 1980.
Growth rates are obtained as follows: $((Y_t - Y_{t-1})/Y_{t-1}) \times 100$ where Y is the variable under consideration. Unweighted averages of country growth rates.

growth rate times the average of the beginning and ending per capita GDP in U.S. dollar equivalents using 1980 exchange rates and 1980 prices. Because of their higher absolute values,the high income group of countries increased their per capita GDP by more than the middle or low income countries, especially the latter. The end result was a widening of the absolute per capita income gap between the developed and less developed nations over the 1968-92 period.

GDP Components Growth

Growth rates of gross domestic investment (GDI), agriculture, industry, and services are presented in Table 2. The sharp decline in GDI growth, especially for the middle and low income countries, is noteworthy because of the implied slowing down of the growth rate of their capital stocks. A possible reason for the decline in the growth of investment spending is put forth in a later section.

The only sector that increased its growth from the first to the second period was agriculture in the high income countries, especially the United States. On the plus side, both the middle and low income countries had a higher growth rate of agricultural output than the high income group. However in the low income countries the population growth in the second period exceeded the growth in agricultural output, reducing their per capita domestic food supply. Of course, imports could make up the difference between population and domestic agricultural output growth. However, imports are largely out of the reach of the poorest people in the poorest countries. Because of their meager incomes, the poor are unable, to pay prices that cover the cost of production in the high income, food surplus countries.

Table 2

*GDP Components Growth
(percent per year)

Income Group				
High	GDI	Agriculture	Industry	Services
1968-80	2.74	1.16	3.07	3.49
1980-92	2.18	2.39	2.12	2.39
United States				
1968-80	4.19	1.59	1.89	3.27
1980-92	1.87	3.55	1.81	2.96
Middle				
1968-80	9.64	3.57	7.54	6.67
1980-92	1.54	2.53	2.40	2.82
Low				
1968-80	8.46	2.96	6.17	5.07
1980-92	2.82	2.50	3.18	2.90

*Income groups and growth rate computation are defined in Table 1

The relatively high growth rates of services in the middle and low income groups, compared to the high income countries, is somewhat unexpected. Services growth is commonly associated with higher income economies.

GDP and Inputs

If one accepts the proposition that output depends on (or is a function of) inputs, then it follows that GDP growth depends on input growth. Since GDP is a value added figure, its value depends on the inputs of land, labor, and capital. Land is relatively fixed in quantity, and labor depends largely on the economically active population. This leaves capital as the controllable input, dependent on investment.

In this study, stocks of reproducible physical capital for a given year are constructed by summing gross domestic investment over the years T-15 to T-1. This procedure implies a 15-year "one-hoss-shay" depreciation pattern, whereby the service flow of capital is assumed to be constant over 15 years, and then fall to zero. While assets such as tools or machines may have shorter lifetimes than this, other capital such as buildings and infrastructure last longer. Thus 15 years is not an unreasonable number.

This procedure should yield a more accurate estimate of a nation's capital stock than market or book values of capital. Market value, which is the market's assessment of the discounted present value of future income streams, declines faster than service flow declines because of the decrease in years of life remaining as an asset ages. Thus market value will decline even if annual service flow does not. There is a danger, therefore, of understating the capital input if market or book values of capital are used as a measure of capital stock. In this case, one is likely to observe unexplained output, commonly labeled as "technical change." At

least part of this unexplained output can be due to depreciating capital too fast, thereby understating the capital input.

The "one-hoss-shay" procedure measures capital by its cost of production. To the extent that higher quality capital costs more to produce, this measure captures capital quality. However, it does not reflect the lower real price of new forms of capital. In order for newer capital to be adopted it must have a lower real, quality adjusted price. This phenomenon would show up as a higher rate of return. Thus the marginal rate of return on capital need not decrease as the capital stock increases relative to labor.

To facilitate comparisons among countries, GDP and capital are converted to U.S. dollars, 1980 prices and 1980 exchange rates. Also GDP, capital, and land are divided by labor. Land is measured as hectares of cropland including land in permanent crops. Labor is measured as the economically active population, defined as "all persons engaged or seeking employment in an economic activity, whether as employers, own-account workers, salaried employees or unpaid workers assisting in the operation of a family farm or business." (United Nations, FAO Production Yearbook, various issues).

Figures on GDP, capital, and land per unit of labor in U.S. dollars for 1968, 1980, and 1992, are presented in Table 3. In 1968, GDP per unit of labor was about 17 times greater in the high income nations than in their low income counterparts. In 1992, the difference was 23- fold, reflecting the growing absolute per capita income gap between the high and low income countries. The simple correlation coefficient between GDP per unit of labor and GDP per capita across countries and over the three years is .987. Hence labor productivity is a good reflector of per capita income. Consistent with the growth rate figures presented earlier, the largest

Table 3

*GDP and Inputs per unit of Labor, $1000
(Constant 1980 dollars and exchange rates)

*Income Group	GDP/labor	Capital/labor	Land/labor(ha.)
High			
1968	17.3	53.7	1.38
1980	23.8	81.2	1.18
1992	25.8	85.4	.988
United States			
1968	21.0	44.3	2.20
1980	23.9	55.8	1.83
1992	26.2	61.9	1.50
Middle			
1968	4.57	10.4	1.39
1980	6.78	18.6	1.48
1992	7.02	20.8	.842
Low			
1968	1.04	2.22	1.68
1980	1.23	3.22	1.07
1992	1.14	2.88	.746

*Income groups are defined in Table 1

increase in GDP/labor came between 1968 and 1980. The low income nations suffered a decrease from 1980 to 1992 because the economically active population grew more rapidly than total GDP.

Capital per worker was about 24 times greater in the high income countries than their low income counterparts in 1968. In 1992, the difference was about 38-fold. Over the 1968-1992 period, capital per worker increased by nearly 32 thousand dollars in the high income countries, versus $660 in the low income group.

Among the high income group of countries, the United States, with $61.9 thousand per worker, ranked close to the bottom in 1992, just slightly above the United Kingdom and Australia. Switzerland ranked highest in this group with over $139 thousand in capital per worker in 1992. The 1992 Swiss GDP per worker of $33.5 thousand (1980 prices and exchange rates) also ranked first among all nations.

The amount of arable and permanent crop land per unit of labor is surprisingly similar among the three income groups. For most countries population growth reduced the figure over time, decreasing it by more than half from 1968 to 1992 for the low income group. The slight increase in the land/labor ratio for the middle income group from 1968 to 1980 is due largely to the increase in cropped land in South America, particularly Brazil. The United States land/labor ratio is well above the income group averages, but still ranks below countries such as Argentina, Australia, and Canada.

Production Functions

The large decline in growth rates of GDI from the first to the second period and the subsequent slow down in growth of capital per worker are sufficient to cause a decrease in the

GDP growth rate. Economic growth occurs as capital per unit of labor increases. However a decrease in the marginal rate of return on capital also can contribute to the decline in GDP growth, and can be an explanation for the GDI growth rate decline.

Marginal rates of return on capital by income groups for 1968, 1980, and 1992 are estimated by a Cobb-Douglas production function of the form:

$$Y = A X_1^{b_1} X_2^{b_2} e^{\varepsilon}$$

or $\log Y = \log A + b_1 \log X_1 + b_2 \log X_2 + \varepsilon \log e$

where Y is GDP per worker, X_1 is capital per worker, and X_2 is land per worker and e is the error term. The labor intensive form of the function is utilized to mitigate the problem of heteroscedasticity because of large differences in country size, and to reduce multicollinearity.

The production function results are presented in Table 4. Columns (1) to (3) report the results of running the regression on countries within the income group. In Column (4), all countries are pooled in one regression.

The land coefficient is not statistically significant at reasonable confidence intervals in all four equations. This result reinforces the view that natural resources are not a binding constraint on economic development. The capital/labor coefficient is highly significant in all four regressions and explains much of the variation in GDP/labor across countries and over time.

The variables DK/L68 and DK/L92 in regressions (1) through (3) are slope dummies on the capital coefficient, allowing it to take on different values for 1968 and 1992. The reference year is 1980. None of these is statistically significant, implying a constant capital coefficient over the three years for each income group. The D68 and D92 are shift dummies which allow the production function to take on different intercepts for the three years. Again, none of these is

Table 4

*Production Function Results
Dep. var: log GDP/labor

Ind. Var.	High (1)	Middle (2)	Low (3)	All (4)
Constant	.178(.325)	-.281(-1.26)	-.426(-5.35)	-.334(-2.87)
Log land/labor	.026(1.53)	-.030((-1.71)	.026(.535)	-.003(-.198)
Log capital/labor	.685(5.44)	.744(9.40)	.560(8.39)	.763(17.3)
DK/L68	.015(.089)	.051(.505)	.056(.626)	
DK/L92	-.077(-.423)	.061(.575)	.026(.254)	
D68	-.099(-.144)	-.062(-.238)	.024(.235)	
D92	.390(.486)	-.257(-.859)	-.050(-.432)	
DK/L low				-.182(-3.40)
DK/L high				-.053(-.410)
D low				-.106(-.875)
D high				.391(.738)
R^2	.810	.849	.679	.952

*Figures in parentheses are t-ratios.

statistically significant, indicating no unexplained shift in the production function from 1968 to 1992 among the three groups.

In regression (4), estimated from the pooled data, the variables DK/L low and DK/L high are slope dummies allowing the capital coefficient to vary among the three groups. As expected from regressions (1) through (3), the low income group exhibits a smaller capital coefficient than the other two.

The statistically nonsignificant coefficients on the variables D low and D high are noteworthy. These are shift dummies which allow the production function to take on different intercepts across income groups. The statistical insignificance of these two variables implies that there is no unexplained output moving from the low to middle, and middle to high income group. The increase in output per worker moving from the low to higher income countries is explained by higher levels of capital per worker. In these results, there is no unexplained residual. In fact, over the 1968-92 period, capital increased relative to real GDP in all three groups. As indicated by the R^2 in regression (4), over 95 percent of the variation in GDP per worker across countries with vastly different incomes is explained by capital per worker. This result is somewhat at odds with the view that capital is not the biggest problem, rather it is knowledge or know-how. (Landes). This is not to deny the importance of knowledge or human capital to growth.

The Dynamics of Human Capital

The absence of an unexplained shift in the production function across countries and over time is noteworthy because human capital, or some proxy for technology, is not included among the inputs. However, in one sense, the capital variable incorporates human capital. This can be seen by considering four effects of human capital on the national economy.

1. Worker effect: Human capital can increase labor productivity, given the stock of nonhuman capital, by increasing the ability of workers to perform tasks more efficiently. However, this effect is viewed as relatively unimportant (Welch).

2. The inventive effect: Human capital facilitates the invention and production of new products and/or new, more productive forms of physical capital. Both can cause an increase in the marginal rate of return on capital, at least temporarily. The production of new products and/or new forms of nonhuman, physical capital shifts the marginal product curve of this capital to the right, thereby offsetting diminishing returns. Without it, the rate of return on physical capital would be driven down to a low level, long run equilibrium, with a corresponding decline of investment, capital growth, and economic growth. For economic growth, the inventive effect is the most important of the four.

3. Short-run allocative effect: While the inventive effect creates disequilibrium, the short and long run allocative effects promote the movement towards long run equilibrium. In the short run, the production of new products and new forms of capital, increases the marginal rate of return on capital as the proportion of this production becomes a larger share of the total. Human capital should facilitate this adjustment and in turn increase the marginal rate of return on physical capital from what it would otherwise be.

4. Long-run allocative effect: As production of new products or capital increases, the average marginal rate of return on this capital declines. Essentially this is the same process described above for the short-run allocative effect, except in this case human capital helps to equalize rates of return on nonhuman capital. Thus human capital both increases and decreases the rate of return on nonhuman capital but at different times.

Rates of Return on Capital

Since capital enters as a stock in the production function, its VMP is also its marginal rate of return. In the Cobb-Douglas function estimated here, the marginal product (VMP) is:

$$\frac{dY}{dX_1} = b_1 A X_1^{b_1-1} X_2^{b_2}$$

$$= b_1 \frac{Y}{X_1}$$

The marginal products (marginal rates of return) on capital shown in Table 5 are computed from the capital coefficient in regressions (1) to (3) in Table 4. Although the estimates for the middle and low income groups are relatively high, they are in line with the 30 percent return to investment in equipment estimated by DeLong and Summers (1991). While the middle and low income countries exhibit higher rates of return on capital than the high income group, they experienced a larger decline in the rate of return over the 1968-92 period.

The relative similarity in estimated marginal rates of return on capital among the three groups of countries is somewhat at odds with what theory would predict. The small amount of capital per worker in the low and middle income countries should result in marginal products of capital several times higher than in the high income countries (Lucas). Possibly, the larger amount of human capital, resulting in new forms of physical capital, in the high income countries prevented the decline in its marginal rate of return in these countries far below the rate of return in the low and middle income countries.

The decline in the rate of return on capital is a plausible explanation for the decrease in the rate of growth of investment (Table 2). Moreover, the decline in rates of return was greatest in the middle and low income countries where the decrease in the growth rate of investment also was greatest.

Table 5

*Estimated Marginal Rates of Return on Capital
(percent per year)

	Year		
Income Group	1968	1980	1992
High	22.5	20.3	21.0
Middle	34.5	28.1	25.5
Low	33.0	25.7	25.1

*Calculated by multiplying the capital coefficients shown in regression (1) through (3) of Table 4 times the logarithmic mean of GDP divided by the logarithmic mean of the capital stock, both in U.S. dollar equivalents, 1980 prices and exchange rates.

The Theory

Even if the decrease in the rate of return on capital caused the decease in the growth rate of investment, the next question is, why did the rate of return decline? One explanation is that the rate of growth of new technology slowed down. However, the relative stability of the rate of return on capital in the high income countries where technology is most advanced is not consistent with this hypothesis.

Lack of "effective demand" leading to unsold goods, lower rates of return on capital, and subsequent decreases in investment spending is a popular explanation for increased unemployment and lower economic growth. But this argument is not supported by logic or evidence. In part it may stem from treating the total economy as if it were a firm or an industry. Individually each faces a limited demand for its product. But the total economy is not like this. What is true for each segment of the economy need not be true for the whole. The vast majority of people, even in the richest nations, are not satiated with goods and services.

The "effective demand" argument also is contradicted by evidence. During recessions, U.S. consumers typically spend a larger share of their disposable income (APC) than in years of relatively full employment (Peterson). In 1933 APC reached 1.00. Clearly this is not what one would expect if unemployment and slow (or negative) economic growth are due to lack of "effective demand" or desired spending.

It is unfortunate that the "effective demand" idea gained popularity and has now become dogma. That, along with attributing inflation to the actions of consumers, business people or labor unions, gave license to governments and central banks to portray themselves as "watchdogs" over their economies. There is little evidence to suggest that so called "stabilization

policies" have resulted in more stable economies.

To begin, it will be helpful to identify a common thread that runs through those countries which experienced a decrease in their growth rates in the second period. One such thread appears to be an increase in monetary instability. In all but five of the 76 countries that experienced a decrease in the rate of real GDP growth the second period, their rates of growth of the money supply decreased and/or their standard deviations of money supply growth rate increased. As we will see, both can retard growth.

The new quantity theory of money provides a framework for explaining this phenomenon (Friedman, 1956). Start with the Cambridge equation:

$$M = k \bullet Y$$

where M is money, Y is nominal income (GDP)and k is the equivalent proportion of income held as money. If for some reason M changes, and k remains unchanged, Y must change in the same direction; it is a mathematical necessity. But it also has an economic logic. The underlying assumption is that people have a desired, equilibrium level of k.

Starting with a static example, an increase in M causes people to be holding more money than they desire to hold at the initial level of Y. To draw down this excess M, people increase their rate of spending. In turn, this increases nominal Y, either by an increase in real output, prices, or both. At some point k is brought back down to its former equilibrium level, not by a decrease in M (all money must be held by someone), but rather by an increase in Y.

Conversely, a decrease in M leads to a decrease in the rate of spending as people attempt to build up their monetary assets. This in turn decreases Y. In this case the decrease in Y can be largely due to a decrease in real output, as occurred in the Great Depression of the 1930s.

Rarely is M decreased in absolute terms. But it is common for the rate of growth of M to decrease. Generally this occurs after a period of a rapid M growth and accelerating inflation. Now it is the rate of growth of M, not its absolute value that is important. For example, if M has been increasing at 100 percent per year, and then has its growth rate decreased to 50 percent per year, people will discover they are holding a smaller than desired k because of the initial imbalance between Y and M growth. To bring k up to its desired level, consumers decrease the growth rate of their spending. This reduces growth in the short run. In the longer run, as business firms experience a decrease in expected sales, their marginal rate of return on capital decreases. This in turn causes a decrease in the rate of investment spending which slows capital growth and long run real GDP growth.

The greater the monetary instability, the more frequent these downturns will occur as governments adopt austerity programs to reduce inflation. These average out to a lower overall growth rate for the country. Also a high level of monetary instability with widely fluctuating rates of inflation creates greater uncertainty over future returns on capital which dampens investment and capital growth. The uncertainty is compounded in countries which impose price and wage controls in attempts to control inflation.

Two countries with the same monetary growth at a point in time can exhibit quite different economic conditions if one has decreased M growth from a high level, say 100 percent, and the other has increased it from a lower level, say 25 percent. The second country would be predicted to experience an expanding economy while the first country's economy would be contracting to a lower growth rate. Thus for economic growth considerations, the absolute level of monetary growth is not as important as its current growth rate relative to its past growth rate.

Because of long and variable lags between changes in monetary growth and it affect on economic activity, the time difference between past and present cannot be known (Friedman, 1960). These lags can vary over time, between expansionary and contractionary phases of monetary growth, and from one country to another. Hence the effect of a change in M growth on economic growth need not be symmetrical between expansionary and contractionary growth periods, or among countries.

The complex relationship between monetary growth and economic activity makes it virtually impossible to accurately measure the impact of money on growth in any kind of regression model. It is conceivable that the money variable in such models has nearly as many true but unknown coefficients as there are observations. Perhaps this is why money has not shown up as being important in growth models, and why these models have not been very successful in explaining or predicting economic growth.

It has been argued that the direction of causation runs from Y to M, rather than from M to Y as in the quantity theory (Niggle). The argument is that as consumers or investors decide to increase their spending, the demand for bank loans increases, thereby increasing the money supply. Conversely a decrease in spending, decreases loans, and decreases the money supply. For this to occur, central banks must be passive in allowing reserves to expand (contract) as the demand for loans increases (decreases). But more importantly, it does not explain why unprovoked spending fluctuations should change the growth rates of the money supply by such large differences over time and among countries, 5 to 10 percent (or the reverse) in same, and 20 to over 100 percent (or the reverse) in others.

The Evidence

Growth rates of the money supply during each of the two periods along with the average standard deviation of the growth rates are presented in Table 6. Among the high income countries the growth rate of the money supply declined by nearly one third from the first to the second period. Also, the standard deviation of the year-to-year change in the growth rate increased. In all of the high income countries that experienced a decrease in real GDP growth, the rate of growth of the money supply decreased and/or the standard deviation of the money supply growth increased in the second period.

Compared to the middle and low income countries, the high income group still was a model of monetary stability. In the middle income group, the 34.8 percent average annual growth rate of the money supply in the first period more than doubled to 79 percent in the second period. And the standard deviation of the annual percent growth rate increased more than 5-fold. A similar pattern is observed for the low income group where the growth rate nearly doubled and the standard deviation increased nearly 4-fold. A 40 to 80 percent growth of the money supply and a 60 to 100 percent standard deviation of the growth rate introduced a level of instability into the economies of the middle and low income countries that would have been intolerable in the developed countries. In all but one of the middle income countries that experienced a decrease in their rate of real GDP growth, the rate of growth of the money supply decreased and/or the standard deviation of monetary growth increased.[1] This increase in monetary instability is a plausible explanation for the decline in marginal rates of return on capital and falling growth rates of GDI, capital, and real GDP.

Annual growth rates of agricultural and industrial prices shown in columns (3) and (4) of Table 6 conform to rates of growth of the money supply. The relatively slow growth of

Table 6

Annual Growth Rates of the Money Supply and Prices
(percent per year)

	Money Supply		Prices	
Income Level	Growth Rate (%)	Std. Dev.	Agricultural	Industrial
	(1)	(2)	(3)	(4)
High				
1968-80	13.6	4.44	9.71	9.04
1980-92	9.90	5.87	2.90	5.37
United States				
1968-80	9.28	3.53	10.4	7.03
1980-92	7.62	3.27	–.746	4.22
Middle				
1968-80	34.8	22.3	24.8	26.8
1980-92	79.4	112	63.5	63.7
Low				
1968-80	20.4	15.5	12.1	11.1
1980-92	39.0	61.2	53.5	55.4

*Money supply is money broadly defined. Agricultural and industrial prices are their corresponding price deflators. Source: World Bank, *World Tables*, respective issues.

agricultural prices in the high income group, and the decline in the United States, might be attributed to the relatively high growth of agricultural output in these countries where the supply of agricultural products increased more rapidly than population, the main demand shifter in these countries.

In the middle and low income countries, agricultural and industrial prices increased at similar rates. This finding is somewhat unexpected in view of the allegation that developing nations discriminate against agriculture in the policy arena. This is not to say, however, that levels of output/input prices are equal across income groups.

A sample of countries that experienced large reductions in their real GDP growth rates in the second period is shown in Table 7. This evidence suggests that economic growth can be diminished by various types of monetary instability. One type is a large increase in the rate of growth of the money supply coupled with a large increase in its standard deviation. Argentina, Brazil, and Bolivia are examples. In these countries high average monetary growth rates were interrupted by periods of slower growth of money as inflation became the central problem. In periods of monetary growth decline, the rate of growth of spending decreases as people attempt to re-establish their desired equilibrium k. If inflation subsides substantially, desired k also can increase, contributing to further declines in the rate of growth of spending. In this sense, inflation contains the seeds of increased unemployment and slower growth. Even less pronounced increases in the growth rate of the money supply (by developing country standards) coupled with higher standard deviations appear to be detrimental to growth as illustrated by Mexico and Venezuela.

The tendency of countries with rapidly expanding currencies to try to maintain fixed

Table 7

Selected Countries exhibiting a Substantial Decline
in GDP Growth from the First to the Second Period

	Annual GDP Growth (%)		Money Supply Growth		Std. Deviation of MS Growth	
Country	1968-80	1980-92	1968-80	1980-92	1968-80	1980-92
Canada	5.16	2.05	15.3	8.61	5.89	3.55
Italy	4.50	1.89	19.0	10.6	3.76	3.89
Argentina	3.65	.267	122	926	106	1936
Brazil	8.02	1.64	53.6	583	10.4	715
Mexico	6.27	2.08	25.2	59.3	20.0	37.0
Venezuela	3.84	1.53	23.6	25.1	10.4	16.3
Bolivia	3.95	–.341	25.0	719	12.4	1919
Cameroon	6.79	2.91	20.3	9.30	9.32	14.1
Guatemala	5.95	1.26	17.0	19.3	6.75	13.1
Nigeria	9.34	1.00	32.4	22.9	23.3	18.0
Philippines	5.62	1.82	18.7	18.6	6.54	5.51
Togo	3.35	1.53	23.0	8.51	28.0	12.7

exchange rates exacerbates the adjustment problem. When the inevitable happens and their currencies must be devalued, purchasing power in the world market drops abruptly. As borrowers default, banks close, and capital flees, the money supply can decrease even in absolute terms. The result is economic crisis with rising unemployment and a cessation of growth. Mexico is a repeated example of this phenomenon; more recent examples include Indonesia, Thailand, South Korea, Malaysia, and Russia. If countries with rapidly growing currencies allowed their exchange rates to adjust gradually and continually, their adjustment problems would be less severe. The recent experience of these countries ought to dispel any doubt that money is non-neutral in its effect on real GDP.

On the other hand, an abrupt decease in the growth rate of even a moderate money supply growth rate appears equally detrimental to growth because of the decrease in the growth rate of spending to re-establish equilibrium k. This situation is illustrated by Canada, Italy, Cameroon, Nigeria, and Togo in Table 7. The drop in the GDP growth rate in the Philippines is a bit of a puzzle in view of this country's stable but relatively high monetary growth over both periods. Possibly the downfall of the Marcos regime and the resulting political instability was a contributing factor here.

The eleven countries that experienced an increase in their rate of real GDP growth from the first to the second period are shown in Table 8. Switzerland, the only high income country to exhibit an increase in GDP growth, decreased its standard deviation from the first to the second period. India and Sri Lanka are examples of developing countries that increased their rate of GDP growth while maintaining a stable monetary growth and reducing the standard deviation.

Table 8

The Eleven Countries which Increased GDP Growth
from the First to the Second Period

	Annual GDP Growth (%)		Annual Money Supply Growth(%)		Std. Deviation of Money Growth (%)	
Country	1968-80	1980-92	1968-80	1980-92	1968-80	1980-92
Benin	2.59	2.64	18.2	13.2	20.0	16.9
Chad	–0.003	3.50	12.5	6.87	13.9	19.2
Chile	2.12	4.26	173	28.2	133	15.4
India	3.27	5.24	16.4	16.0	4.17	2.82
Malaysia	6.50	6.82	23.1	15.3	11.0	6.99
Pakistan	5.17	6.31	12.1	20.1	14.4	19.2
Senegal	2.08	2.56	17.4	7.19	14.5	7.76
Sri Lanka	3.96	4.32	18.8	17.4	13.3	6.74
Swaziland	3.63	3.86	19.6	14.0	15.7	6.96
Switzerland	1.85	2.06	7.70	6.04	6.54	4.82
Thailand	7.20	7.25	17.8	19.9	3.88	5.00

Pakistan increased its rate of money growth but also increased its year-to-year variability. It is unlikely that Pakistan's higher GDP growth can be sustained given its 20 percent monetary growth, and impending future inflation. However, a modest increase in the growth rate of the money supply appears to stimulate the rate of economic growth, at least in the short run as people increase their rate of spending to re-establish desired k, especially if unemployment is high. However, the sustainability of this growth is problematic if the money supply growth rate exceeds 4 to 5 percent because of the likelihood of a higher future inflation, followed by periods of lower monetary growth, or even absolute decline. As mentioned, this policy generally results in higher unemployment and lower economic growth as people adjust their rate of spending downward to restore equilibrium k.[2]

With the exception of hyper-inflation, the United States experience from 1930 to 1997, shown in Table 9, encompasses most of the situations illustrated in Tables 7 and 8. The absolute decline in the money supply in the early 1930s coincides with the onset of the Great Depression. The positive growth of the money supply during the second half of the 1930s is accompanied by a resurgence of growth, although the real GDP of the economy was about the same in 1939 as in 1930.

The 1950s can be viewed as the golden age of monetary policy in the U.S. A money supply growth of just over 5 percent coupled with a very low standard deviation yielded a sustainable 3.35 percent GDP growth. The increase in the growth rate of the money supply in the 1960s brought forth an increase in real GDP growth but the 4.37 percent rate was not sustainable. The slow down of monetary growth in the 1980s was accompanied by a slower rate of real GDP growth. The sharp reduction of monetary growth in the 1990-94 period brought

Table 9

United States Growth Rates

Years	Real GDP	*Money (M2+)	Std. Dev. M2+(%)
1930-34	–7.90	–9.40	4.71
1935-39	7.36	9.00	6.35
1950-59	3.35	5.37	1.40
1960-69	4.37	7.42	2.90
1970-79	3.19	10.9	2.04
1980-89	2.77	8.24	2.41
1990-94	1.76	.866	2.70**
1995	1.99	5.42	
1996	2.76	5.85	
1997	3.80	6.61	

*M2 plus large denomination time deposits.

**1990-97 period

Source: Economic Report of the President, respective years.

forth a reduction in GDP growth and higher unemployment in those years. Then as the monetary growth speeded up over the 1995-97 period, the economy responded with lower unemployment and higher growth. During the 1993-97 period the monetary growth rate increased each year. If this trend continues, inflation will increase. Then the ensuing recession will depend on how hard the Fed clamps down on the money supply growth .

Concluding Remarks

Widely fluctuating rates of growth of the money supply create conditions that decrease marginal rates of return on capital which in turn decrease investment spending, capital growth, and real GDP growth. The increase in monetary instability during the 1980-92 period relative to the preceding 12 years, particularly in the middle and low income countries, and the subsequent decrease in their growth rates are consistent with the above hypothesis.

This is not to say that monetary stability is all that matters to growth. Taxes and the tax rate structure affecting incentives to produce and invest along with the degree of government regulation, red tape, market intervention, and government by rule of law rather than men also appear to affect stability and growth. Barrow reports that economic growth is negatively correlated with share of government in consumption and positively correlated with political stability (Barrow). But as Harberger observed, there are no magic buttons a nation can push to ensure economic growth (Harberger). Yet the chances of achieving a sustainable 3 to 4 percent growth rate along with a stable society appear enhanced with a moderate, non-inflationary, and stable money supply growth in the 4 to 5 percent range. This in turn requires a disciplined fiscal policy where governments keep spending in line with tax revenue, eliminating the need to print money to finance deficits.

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Endnotes

1. Colombia

2. Chad appears to be an exception. It increased its real GDP growth rate in the second period in spite of a lower money supply growth rate and a higher standard deviation. A likely explanation is that in the second period Chad recovered from a prolonged drought that reduced real GDP growth in the first period. Periodic droughts likely influenced growth rates in other Sub-Sahara countries as well.