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THE GOVERNMENT'S REVENUE FROM MONEY CREATION AND THE INFLATIONARY EFFECTS OF A DECLINE IN THE RATE OF GROWTH OF G.N.P.*

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This paper studies the inflationary consequences of an exogenous decline in the rate of growth of G.N.P. The Government's insistance on keeping its revenue from money creation unaffected results in a compensating increase in the inflation tax, due to the loss of revenue stemming from the decline in growth. It is shown that the magnitude of the necessary compensating increase in the rate of inflation depends crucially on the specification of the demand for money. Based on a Cagan type demand for money, we present the inflationary consequences of a decline in the rate of growth for Israel, six O.E.C.D. countries, and Argentina.

1. Introduction

The analysis of a government's revenues from money creation has played a major role in the discussions dealing with the inflationary effects of deficit financing.[1] This issue is typically treated within the framework of a steady state growing economy, where two sources of revenue from printing money are identified. The first is the inflation tax which is equal in steady state to the product of the rate of inflation and the stock of real money balances held by the public.[2] The second source stems from the increase in people's demand for real money balances as a result of an increase in their incomes.

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[1]See Bailey (1956), Blinder and Solow (1973), Marty (1967, 1973), Tobin and Buiter (1979), Liviatan (1980), Smith (1979), Turnovsky (1978).

[2]To be more precise, the inflation tax is the real quantity of high-powered money times the rate of inflation less interest paid on reserves at the central bank. If there is an effective prohibition on the payment of interest on deposits, then issuers of deposits gain real revenues equal to their real deposits, less reserves times the rate of inflation. This study assumes that these gains are taxed away by the government.

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Thus, a government's real revenues from money creation measured as a percentage of G.N.P. may be expressed, in a steady state growing economy, as in Friedman (1971),

$$R = \mathrm{d}M/Py = m\Pi + mg_y, \tag{1}$$

where m and g_y are, respectively, the ratio of money balances to G.N.P. (M/Py) and the rate of growth of real G.N.P. (y). It is assumed that the long-run income elasticity of the demand for money is unity.

The purpose of this paper is to analyze the inflationary consequences of an exogenous decline in the rate of growth of national income where it is assumed that the government attempts to maintain its revenue from printing money as a constant share of G.N.P. (hereafter referred to as the revenue share). Thus, in contrast with the standard analysis of governments' revenue from money creation, we do not assume that governments attempt to maximize their revenues from money creation.[3]

The analysis is motivated by several empirical observations summarized in table 1. First, we note that since the energy crisis of 1973, the rates of growth in many industrialized countries (as well as in many developing countries) have slowed down considerably, thus reducing one source of revenue from money creation. Second, during the period 1973–78, as compared with 1965–72, the ratio of revenue from money creation to G.N.P. seems to have remained fairly stable in industrialized countries, and to have risen somewhat in a number of developing countries.[4] The loss of seignorage resulting from the decline in the rates of growth, coupled with the fact that revenue shares have not declined as a whole, have increased *ceteris paribus* the need to rely more on the inflation tax and hence on higher rates of inflation as a means of financing governments' deficits.[5] This need has become even more pronounced in light of the increased

[3]It should be stressed that neither the assumption of a constant revenue share, nor the assumption of maximizing revenues from money creation implies, in general, an optimal taxation policy on the part of the government. Attempting to keep a constant revenue share would be optimal only if the welfare loss of using other taxes (in the face of an exogenous decline in the rate of growth of the economy) is even higher than the welfare loss of using the inflation tax.

[4]The average revenue share for the six O.E.C.D. countries listed in table 1 is about 1.2 percent. This figure is similar to the one reported by Fischer (1982) for the average of all industrialized countries during the periods 1960–73 and 1973–78. For a group of eleven developing Asian and Latin American countries used in a study by Kahn (1980), the average revenue share rose from about 2.6 percent during 1965–72 to about 3.8 percent during 1973–78. The calculated revenue share is the change in 'Reserve Money' (line 14 in the IMF's International Financial Statistics divided by line 99a in the same source).

[5]Throughout the paper it is assumed that the elasticity of the demand for money with respect to the expected rate of inflation is always less than unity. This assumption insures that the government can always rely on higher rates of inflation to generate higher proceeds from the inflation tax so as to compensate for the loss of revenues due to slower rates of growth. That is, it is assumed that the maximum revenue from money creation is not a binding constraint.

Table 1

Summary statistics of inflation rates, rates of growth, revenue shares and budget deficits.[a]

	Inflation rates		Growth rates		Revenue shares (government revenue from money creation as a fraction of G.N.P.)		Government deficit as share of G.N.P.	
	(B)	(A)	(B)	(A)	(B)	(A)[b]	(B)	(A)
Germany	3.2	5.1	4.3	2.4	0.9	0.7	1.7	3.5
Canada	3.7	6.9	5.6	3.2	0.5	0.7	1.4	3.2
France	4.6	10.1	5.4	3.1	1.2	0.3	0.8	1.7
Japan	5.6	11.5	10.8	3.8	1.4	1.2	6.5	9.9
U.K.	5.6	15.0	3.1	1.4	0.6	1.0	2.3	6.7
Italy	3.8	15.5	5.2	2.7	2.0	3.9	6.5	12.7
Israel	7.1	39.1	8.8	2.7	2.2	2.4	5.0	13.2
Argentina	30.4	178 [c]	4.6	0.0	6.5	14.0	2.7	6.8

[a]*Source:* International Financial Statistics, several issues, for the six industrialized countries and Argentina; Statistical Abstract of Israel, C.B.S. and Annual Report of the Bank of Israel, for Israeli data. (B) stands for the average values of the relevant variables for the period 1965–72, except in Argentina in which the average values were calculated for the period 1965–74. (A) stands for the relevant averages for the period 1973–78, except in Argentina in which the average values were calculated for the period 1975–78.

[b]The revenue share for the six O.E.C.D. countries in period A was taken from Fisher (1982).

[c]This average omits the unusually high rate of inflation in 1976 (443.2 percent).

budget deficits (measured as a percentage of G.N.P.) experienced by many countries since 1973. It should be stressed at the outset that the following analysis is in no way a complete and full explanation of the simultaneous decline in the rates of growth and the increases in the rates of inflation experienced in many countries. Rather, it intends to demonstrate one aspect of downward rigidity of governments' deficits in the face of slower rates of growth.

The plan of this paper is as follows: Section 2 provides the analytical framework. In it, we derive the necessary compensation increase in the rate of inflation (to keep the government's revenue share from money creation unaffected) in response to an exogenous decline in the rate of growth of G.N.P. It is shown that the magnitude of this compensating increase in the rate of inflation depends crucially on the specification of the demand for money.

In section 3 we estimate a Cagan-type demand for money based on Israeli quarterly data. In estimating this equation, we use the transformation of variables developed by Box and Cox (1962) in order to determine the appropriate specification of the demand for money.[6] The regression results are

[6]Since the overwhelming majority of the empirical studies on the demand for money employ either a logarithmic or a semilogarithmic specification, the Box and Cox procedure was not used to compare the simple linear specification with either the logarithmic or the semilogarithmic one.

then used to illustrate numerically the order of magnitude of the necessary compensating increase in the rate of inflation in Israel during the decade 1970–80. In section 4 we compare this to the required compensating increase in the rate of inflation in each of six O.E.C.D. countries and in one developing country, Argentina, which, like Israel, has experienced both a sharp acceleration in the rate of inflation and a significant decline in the rate of growth. These comparisons are based on estimates of the demand for money in two studies – Boughton (1979) for the six O.E.C.D. countries and Baez (1979) for Argentina.

2. The analytical framework

Assume that in a steady state fully employed growing economy some fraction of the government's budget deficit relative to G.N.P. is financed by the government's proceeds from money creation as expressed in eq. (1). We assume that the rate of growth is independent of the expected rate of inflation (this point will be discussed more fully later). Suppose that as a result of an exogenous shock, there is a decline in the rate of growth g_y. Such a decline will necessitate, under reasonable conditions, a compensating increase in the steady state rate of inflation in order to keep the government's revenue share unaffected.[7]

It turns out, as will be demonstrated below, that in order to keep the real revenue share unchanged, a given decline in g_y may not only call for an increase in the rate of inflation (an increase greater than the decline in the rate of growth), but it may also imply that the necessary compensating increase in the rate of inflation is a positive function of the existing rate of inflation. This will be the case if the elasticity of the demand for money with respect to the expected rate of inflation increases as the rate of inflation rises, i.e., if the demand for real balances is a semilogarithmic function of the expected rate of inflation. Such a function was used by Cagan (1956) and more recently by Black (1975), Currie (1980), Chappel and Peel (1979), Kahn (1980) and others, who studied the demand for money in countries which experienced high rates of inflation.

If, on the other hand, the elasticity of the demand for money with respect to the expected rate of inflation is constant, that is, if the demand for money is a linear logarithmic function of the expected rate of inflation (or the rate of

[7]The relationship between an exogenous change in the rate of growth and the government's revenue from money creation is also examined by Marty (1973). In his study Marty demonstrates that if the demand for money is a semilogarithmic function in the rate of inflation, then the ratio of the welfare costs to the government's revenue from money creation is independent of the autonomous change in the rate of growth. This result, however, is obtained under the assumption that the government attempts to maximize its revenue from money creation.

interest)[8] as in Goldfeld (1973, 1976), Laidler (1976, 1980), Friedman (1978) and many others, then the required compensating increase in the rate of inflation is a decreasing function of the existing rate of inflation. Thus, in order to be in a position to assess the long-run inflationary impact of a slowdown in the rate of growth of G.N.P., it is important to determine whether the logarithmic or semilogarithmic specification is the appropriate one.

Independently of the specification of the demand for money, the required compensating increase in the rate of inflation can be derived analytically by solving for $d\Pi/dg_y$ which satisfies $d(dM/Py) = 0$. This yields[9]

$$d\Pi/dg_y = -1/\big(1 + \eta(1 + g_y/\Pi)\big). \tag{2}$$

A necessary and sufficient condition for $d\Pi/dg_y < 0$ is $-\eta < \Pi/(\Pi + g_y)$. This condition will be satisfied for any reasonable values of the above parameters and variables.[10] It is quite clear that if $\eta = 0$, then $|d\Pi/dg_y| = 1$. Since normally $n < 0$, one might expect that in general $|d\Pi/dg_y| > 1$. Moreover, if the demand for money is a semilogarithmic function of the expected rate of inflation, that is, $\eta = -b\Pi$, then the value of $|d\Pi/dg_y|$ depends positively on the existing rate of inflation. This can be seen from eq. (2) which can be written in the semilogarithmic case as $d\Pi/dg_y = -1/(1 - b(\Pi + g_y))$.

This means that at higher rates of inflation, a given exogenous decline in the rate of growth of G.N.P. necessitates a larger compensating increase in the rate of inflation (so as to keep the revenue share unchanged) than is called for at lower rates of inflation. In other words, given that the government insists on maintaining a constant (relative to G.N.P.) deficit, financed entirely by money creation, the inflationary consequences of a given slowdown in the rate of growth of national income become more severe the higher the rate of inflation. This result is not very surprising. If the demand for money is a semilogarithmic function of the expected rate of inflation (which in steady state is equal to the actual rate), then the necessary increase in the rate of inflation must not only compensate for the loss of g_y, but also for the fact that the absolute value of the η increases with the rate of inflation.

[8]The steady state is defined as a situation where the real rate of interest is constant and where the nominal rate fully reflects inflationary expectations. In such a case, the nominal rate of interest and the expected rate of inflation may be used interchangeably.

[9]By differentiating totally dM/Py and equating it to zero, we obtain $d(dM/Py) = (\Pi(dm/d\Pi) + m)d\Pi + (dm/d\Pi)g_y\,d\Pi + m\,dg_y = 0$. This expression may be rewritten as follows: $d(dm/P_y) = m(\eta + 1)\,d\Pi + g_y(m/\Pi)\eta\,d\Pi = -m\,dg_y$. By rearranging and collecting terms we obtain expression (2). η is the inflation elasticity of the demand for money (a negative number).

[10]For any value (less than 1) of η, the probability that the above condition will be satisfied increases as Π grows relative to g_y. Even the case where $\Pi = g_y$ means that $\eta < 0.5$.

Suppose, on the other hand, that the demand for money is a linear logarithmic function of Π, i.e., $\eta = \text{const}$. It then follows from eq. (2) that $d\Pi/dg_y$, while still negative in general (and in most cases greater in absolute value than one), is a negative function of the rate of inflation.

The intuition behind this result is clear. If $\eta = dm\Pi/d\Pi m = \text{const.}$, then as Π increases the proportional change in m (resulting from a point percentage increase in Π) must decrease. This in turn means that the proportional decrease in the inflation tax base becomes smaller the higher the rate of inflation. As a result, the necessary compensating increase in the rate of inflation is also smaller.

3. The estimation

The discussion in the previous section has demonstrated the importance of determining whether the appropriate specification of the demand for money is logarithmic or semilogarithmic in the rate of inflation. In this section, we use a simple maximum likelihood test to determine the proper functional relationship between real money balances and the rate of inflation. The test is performed by allowing the rate of inflation to vary as an explanatory variable according to the Box and Cox transformation.

The Box and Cox transformation is defined as

$$\begin{aligned} X(\lambda) &= (X^{\lambda} - 1)/\lambda, \quad \lambda \neq 0, \\ &= \ln X, \qquad\quad \lambda = 0. \end{aligned} \tag{3}$$

The advantage of this transformation is that it is continuous at $\lambda = 0$ since

$$\lim_{\lambda \to 0} (X^{\lambda} - 1)/\lambda = \ln X.$$

We perform the test to a Cagan-type function for the demand for money.[11] The estimated equation is

$$\ln m_t^* = \alpha + \beta \ln y_t + \gamma \Pi(\lambda)_t + \theta R_t + \delta \ln m_{t-1}^* + \varepsilon_t, \tag{4}$$

where

$$\Pi(\lambda) = (\Pi^{\lambda} - 1)/\lambda,$$

and where ε_t is zero mean normally distributed disturbance with constant variance and serially independent.

[11] In this simple setting the likelihood ratio test coincides with maximizing the multiple correlation coefficient of the regression.

Table 2

Regression results of estimating eq. (4).[a]

	α	β	γ	θ	S	λ	$L(\lambda)$	R^2	h
(1) semilogarithmic									
	-0.68	0.09	-1.16	-0.13	0.89	1.0	90.27	0.99	1.3
	(10.2)	(1.8)	(-10.8)	(-1.8)	(32.7)				
(2) maximum likelihood									
	-0.53	0.10	-0.92	-0.13	0.90	0.9	90.42	0.99	1.2
	(-8.8)	(2.0)	(10.8)	(-1.8)	(33.3)				
(3) logarithmic									
	0.01	0.11	-0.08	-0.10	0.97	0	80.41	0.98	0.47
	(0.1)	(1.8)	(-7.7)	(-1.1)	(31.7)				

[a] $L(\lambda)$ is the log of the likelihood function conditional on the parameter λ. The values in parentheses are the t-values.

Eq. (4) was estimated using Israeli quarterly data covering the period 1970–80. The variables are defined as follows: m_t^* is the real stock of money defined as currency plus demand deposits; y_t stands for the real value of G.N.P.; Π is the quarterly percentage change in the C.P.I.; and R_t is the real rate of return on dollar denominated assets, which stands for the effect of the real interest rate on the demand for money.[12] In addition the lag dependent variable was included in the estimated equation. Its inclusion captures (to some extent) the presence of short-run dynamic adjustments such as partial adjustment of quantities, expectation lags and other adjustments.

Before proceeding to report the results of estimating eq. (4), it should be noted that no rate of interest on local assets is included in the regression. The main reason for this omission is that most financial assets in Israel are government obligations of various maturities linked institutionally to the cost of living. Since the nominal return on these assets is highly correlated with the rate of inflation, the latter is a sufficiently good measure of the opportunity cost of holding money. The regression results appear in table 2.

The maximum likelihood estimate is obtained for a value of $\lambda = 0.9$. We see from table 2, however, that the log likelihood value for $\lambda = 1$ (the semilogarithmic relationship) is very close to the maximum likelihood value of λ. In fact, using the likelihood ratio test statistics, we are unable to reject the hypothesis that the value of λ which maximizes the likelihood function is equal to one.[13] In other words, we are unable to reject the hypothesis that the appropriate specification of the demand for money is the semilogarithmic one. On the other

[12] The inclusion of such a rate of interest is particularly appropriate for a highly opened economy like the Israeli one.

[13] The calculated likelihood ratio is $X^2 = 0.3$. The critical values for rejection at 5% and 1% are, respectively, 3.84 and 6.63.

Table 3

The compensatory inflationary effect in Israel.

	1970–72	1973–78
$\lvert d\Pi/dg_y \rvert$	2.2	6.4
Long-run inflation elasticity	−0.30	−0.71

hand, the same test clearly rejects the logarithmic specification.[14] We will now use the results obtained from estimating the semilogarithmic specification [eq. (1) in table 2] to calculate the inflationary impact of the sharp decline in the rate of growth of G.N.P. in Israel in 1973. Since the analysis is carried out in the framework of steady state, the basis for the calculations are the implied long-run elasticities of the demand for money with respect to the income and inflation variables. Although we did not impose any restrictions on the coefficients of the regression, the estimate of the long-run income elasticity is not significantly different from unity, thus being consistent with the theoretical framework of this paper.

The implied long-run parameters obtained from the estimation are used to illustrate the steady state inflationary implications of an exogenous decline in the rate of growth.

It is quite clear that the inflationary consequence in this study refers to the long-run. This long-run impact is obtained after a relatively extended period of learning and adjustment. The length of the period of adjustment is directly related to the large size of the lag-dependent variable coefficient obtained in our study as well as in other studies.

The numerical calculations are performed using long-run averages for two periods, where the long-run inflation and the rate of growth are represented by the corresponding averages in those years.

Table 3 presents two different long-run elasticities of the demand for money with respect to inflation and the corresponding compensatory increases in the steady state rates of inflation. The periods for which $d\Pi/dg_y$ has been evaluated are 1970–72 (just before the sharp decline in the rate of growth of G.N.P.) and 1973–78 (the time span characterized by relatively low rates of growth which preceded the second oil shock of 1979).[15]

The results in table 3 clearly show the quantitative magnitudes of the long-run compensatory increases in the rate of inflation. While in 1970–72 a decline of one percentage point in the rate of growth of G.N.P. would imply an

[14] The calculated value of the likelihood ratio is in that case $X^2 = 20.02$, and hence the hypothesis is rejected at any relevant significant level.

[15] For the three-digit rate of inflation experienced by the Israeli economy in recent years, the long-run inflation elasticity of the demand for money is greater than unity.

increase of 2.2 percentage points in the steady state rate of inflation, the same decrease in growth would require, on average, 6.4 percentage points during 1973–78.

4. An extension of the analysis to six O.E.C.D. countries and Argentina

We emphasize that one should not regard the above quantitative result as an absolutely accurate description of the inflationary consequences of a decline in the rate of growth. Rather, the result should be viewed as demonstrating the strong inflationary impact of a decline in the rate of growth in an economy already suffering from a relatively high rate of inflation. In order to further highlight this point, we use the results of a study by Boughton (1979) on the demand for money in six major O.E.C.D. countries. This study is based on quarterly data and covers the period 1960–77. Boughton employs a demand for money similar to the semilogarithmic one used in this study except that for some countries he adds two nominal rates of interest. Since, however, in steady state the nominal rate of interest fully reflects the expected rate of inflation, we may sum the implied long-run elasticity of the inflation and interest rate variables and use them to calculate long-run elasticities of the demand for money with respect to the rate of inflation.[16] These long-run elasticities are used to calculate the values of $|d\Pi/dg_y|$ for the six countries used in Boughton's study (see table 4).[17]

What is particularly striking about these results is the perfect rank correlation between the required compensating increase in the rate of inflation and the actual increases in the average rates of inflation in the six countries between the two periods, 1965–72 and 1973–78. In addition, column 4 presents the implied increase in the steady state rates of inflation evaluated by formula (2) for the actual decline in the average rates of growth of the six countries (see table 1). It is remarkable that, with the exception of Japan, the implied increases in the rates of inflation seem to account for a significant portion of the actual increases. Moreover (again with the exception of Japan), the implied increases in the rates of inflation are ranked in the same order as the actual increases. Clearly, then these results give further support to our argument that the inflationary pressures, resulting from a decline in the rate of

[16]In a recent study Boughton (1981) examines the stability of the demand for money in six O.E.C.D. countries and reaches the conclusion that only for the U.S. and possibly Canada do the results indicate definite instability of the demand for money. We prefer to use the results of his original study since it includes estimates for Italy, whereas the later study does not. The difference in the estimates between the two studies is negligible.

[17]Boughton's long-term elasticities of the demand for M_1 appear in table 2 of his study. In three of the six countries – France, Japan and the U.K. – the long-run income elasticity is not significantly different from one. In Germany and Canada it is 1.08 and 0.79, respectively. Only for Italy is a high value of 2.43 reported.

Table 4

The compensating inflationary effect in six O.E.C.D. countries.[a]

Country	$\lvert d\Pi/dg_y \rvert$	$\eta_{m\Pi}$	1965–72 : 1973–78 $\Delta\Pi$	$\tilde{\Delta}\Pi$
Germany	1.3	−0.17	1.9	2.5
Canada	1.5	−0.21	5.2	3.6
France	2.1	−0.40	5.6	4.8
Japan	1.7	−0.47	5.9	18.9
Italy	4.5	−0.66	11.7	11.2
United Kingdom	3.7	−0.68	9.4	6.3

[a]$\Delta\Pi$ is the actual increase in the average rates of inflation and $\tilde{\Delta}\Pi = (d\Pi/dg_y)(\Delta g_y)$, where Δg_y is the actual change in the average rates of growth (see table 1).

growth, are stronger the higher the existing rate of inflation. Put differently, governments' insistence, in the face of a decline in the rate of economic expansion, on keeping its share of revenue from printing money unaffected becomes more inflationary, the higher the existing rate of inflation.

These results were obtained despite the fact that, on average, revenue from money creation in these six countries constitutes only about one percent of their G.N.P.s and only about 1.5 percent of total government revenues. The fact that revenues from this source are relatively small does not mean, however, that the motive for raising revenue through money creation is weak. In fact, the revenue motive for using this method of finance might be quite strong if, at the margin, financing budget deficits through other means in the face of a decline in the rate of growth is even more difficult.[18]

The inflationary consequences of an exogenous decline in the rate of growth of G.N.P. were also examined in one developing country – Argentina. The analysis is based on a recent study by Baez (1979) on the demand for money in that country. Baez's study, which uses quarterly data covering the period 1968-II to 1977-IV, employs a specification of the demand for money similar to ours and Boughton's.[19] The reason for choosing Argentina is that, like Israel, it has experienced in recent years a marked decline in its rate of growth and a sharp acceleration in the rate of inflation. In addition, the revenue share in Argentina is one of the highest in the world, averaging about 14 percent during the period 1975–78[20] (see table 1). Thus Argentina seems to be an appropriate country to test the hypothesis advanced in this paper.

[18]One should remember that even after the sharp increases in the rates of inflation in these six countries, during 1973–78, the average rate of inflation for the groups is only about 10.5 percent.

[19]Kahn (1980) estimated a demand for money for eleven developing countries including Argentina. His results, however, are not suitable for the present analysis since the definition of money which he used is broader than M_1 and hence less applicable to the inflation tax analysis.

[20]In fact, according to Fischer (1982), who examined the revenue from money creation as a proportion of G.N.P. in over a hundred countries, the revenue share in Argentina is second only to the one reported for Yemen Arab Republic.

The calculation for Argentina shows that the term $|d\Pi/dg_y|$ calculated for the average quarterly rate of inflation during 1975–78 is about 6.4.[21] The average rate of growth between the two periods 1965–74 and 1975–78 fell by about 4.6 percentage points. This would imply, according to our hypothesis, an increase of about 30 percentage points in the (steady state) rate of inflation. While this implied increase in the rate of inflation is only about 20 percentage points of the actual increase (from 30.1 percent during 1965–74 to 178 percent during 1975–78), it is by no means an insignificant proportion.

5. Summary

This paper attempted to demonstrate the inflationary effect of an exogenous decline in the rate of growth of national income. It was argued that if, in the presence of a decline in the growth rate, the government attempts to keep its revenues from printing money as a constant share of G.N.P., there would be a rise in the rate of inflation so as to compensate for the decline of the revenues from money creation which stem from growth. The necessary compensating increase in the rate of inflation was shown to depend critically on the specification of the demand for money. If the demand for money is specified as a semilogarithmic function in the inflation rate, then the necessary compensating increase in the rate of inflation depends positively on the existing rate of inflation. It was shown that the shift to lower growth paths of G.N.P., in the face of downward rigidity of governments' budget deficits, was an important factor in the sharp increases in the rates of inflation experienced, since 1973, in Israel as well as in six other industrial nations, and one developing country.

A final issue which needs to be addressed concerns the assumption of this study that changes in the rates of growth are exogenous. One way to generalize the present analysis is by extending the model so as to allow for the rate of growth to be in part affected by changes in the rate of inflation or by the uncertainty associated with the future course of inflation.

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[21] The term $|d\Pi/dg_y|$ for Argentina was calculated by using the average rate of inflation in the period covered by Baez (1968-II to 1977-IV). Using the average rate of inflation corresponding to period A in table 1 (as was done for other countries) would here mean a change in the sign of the term $d\Pi/dg_y$, which is not a sensible result

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