

Stagflation and Shortageflation: A Comparative Approach

GRZEGORZ W. KOLODKO* and WALTER W. MCMAHON**

Contemporary inflation is a worldwide phenomenon in the sense that it occurs, but in different forms, in western market economies and socialist countries alike. The worldwide character of modern inflation is also revealed in its international transmission¹.

This paper gives primary attention to the basic differences and similarities between inflation in highly developed largely capitalistic market economies, generally those of the western nations, and in centrally planned economies (CPE's) such as those of the eastern European socialist countries. In the case of the market economies, inflation is more open, in the sense that prices generally rise until they almost exceed a new equilibrium level, eventually restrained by excess supplies in some products and labor markets, a combination that is well known as stagflation. On the other hand, in the socialist countries it is generally believed that inflation is virtually always partly *repressed*². In these centrally planned economies there is also not a fully efficient mechanism balancing the quantities demanded with the quantities supplied. As a consequence the usual administrative central control of prices of many commodities frequently amounts to periodic price jumps for some commodities, but a continued repression of the price rise for the others which is indispensable for reaching a price equilibrium. There remains an overall unrealized effective demand and shortages of many commodities, a combination which we will define here to be 'shortageflation'.

There is a large literature on repressed inflation in Soviet-type economies. Nuti's [1986] paper on 'Hidden and Repressed Inflation in Soviet-Type Economies' for example, contains nearly a hundred references. But the rather remarkable 'mirror image'³ analogies between stagflation and shortageflation have not been developed elsewhere, nor has the analytical concept of an unhappiness index applicable to each. Such an index is a more comprehensive basis for comparisons than are inflation rates alone, since the latter do not reveal the partial repression of inflation in some countries, much less the problems with shortages and with unemployment that also need to be reflected in a somewhat more comprehensive welfare index.

There is some literature that takes exception to the existence of repressed inflation in

* Associate Professor of Economics, Central School of Planning and Statistics, Warsaw, and Adviser to the President of the National Bank of Poland.

** Professor of Economics, Department of Economics, University of Illinois at Urbana-Champaign, Illinois.

The work for this paper was carried out while Prof. Kolodko was a Senior Fulbright Research Scholar at the Department of Economics, University of Illinois at Urbana-Champaign.

¹ For a survey of the literature and of the theory concerning this subject of worldwide inflation see Choi [1985]. See also Krause and Salant [1977], Lindberg and Maier [1984] and Bruno and Sachs [1985].

² For evidence consistent with this belief involving the USSR economy, including the relatively large effect on saving, see Howard [1976b], including his reply to comments [1979]. For a list of those holding it, see Howard [1976a, pp. 57-59] and Nuti [1986]. A dissenting view is presented by Fortes and Winter [1978, 1980].

³ We should also emphasize that these 'mirror image' analogies are quite different from the description of the centrally planned economies as a symmetrical, 'reversal' system to the KEYNESian scheme. On this approach see Barro and GROSSMAN [1971, 1974].

Soviet-type economies, as well as to the related position that we take in this paper that without rationing, this leads to chronic shortages. Fortes and Winter [1978,1980] do this, for example. But while estimates of consumer demand and savings functions in Soviet-type economies are of interest in their own right, it is not clear that this is a sufficient basis for refuting evidence of shortages and low-supply response, particularly in food and agriculture, a fairly widely recognized phenomenon in African as well as Eastern European countries. In any event, this denial of the existence of repressed inflation and shortages is clearly not a mainstream view. It also overlooks some of the more dramatic recent evidence in Poland, for example, of long queues and bare shelves in shopping for butter, fish, meat, and other staples. It takes 12 years to get most apartments, and 5-6 years to get a car by those who have the purchasing power.

In the sections that follow, we will develop three aspects. *First*, we will develop how stagflation is analogous to shortageflation, which is its near mirror image in the socialist countries. *Second*, we will consider the similar pressures or sources that give rise to each. *Third*, since comparing either inflation rates, unemployment rates, or shortages in isolation is relatively meaningless, we will then seek to find a conceptual framework for a common denominator that can be used for intersystem comparisons. A few 'first approximation' misery indices are offered. But an empirical survey collecting detailed data in the many eastern European socialist economies is beyond our scope and is not the main thrust of this paper. Finally, we will turn to some of the implications for economic efficiency, in both types of economies. These include effects on incentives, on labor productivity, on unemployment, on the efficiency of resource allocation, and on growth.

I. THE BASIC ANALOGY BETWEEN STAGFLATION AND SHORTAGEFLATION

A fundamental feature on which we propose to focus is that prices are not perfectly flexible either in western economies, where some are subsidized or partly inflexible for other reasons - at least in the short run - or in the socialist economies where they are centrally planned and adjusted only infrequently. Markets therefore are not in price equilibrium in the short run in either type of economy.

In western economies, product and labor surpluses appear. Agricultural prices are held above their equilibrium level for example by government agricultural price supports in the United States, the European Common Market, and many other western countries. Surpluses of wheat, butter, cheese, tobacco, corn, and other supported commodities appear and fill up the warehouses. In markets for manufactured goods, where suppliers have a degree of monopoly power, such as in electric and gas utilities in the US, in some durables, and certainly in markets dominated by international cartels, inventories persist as prices are held somewhat above a purely competitive equilibrium. In labor markets, whether there are errors and misperceptions in planning, as the new classical economists would have it, or minimum wage laws, multiple year labor contracts, instinctive resistance to being made worse off, unions, or other sources of delay as other economists would conclude, wages are not fully flexible downward and periods of unemployment are apparent. In contrast, centrally planned economies typically hold *down* prices, especially of food and other necessities. The Soviet Union, for example, is proud of the fact that the price of food has not increased since 1957. In Poland, although there have been periodic jumps, there have also been long periods in between where the consumer prices have been held at stable and at lower levels than is consistent with the purchasing power available. The result is repressed inflation, unsatisfied excess demand, and persistent shortages.

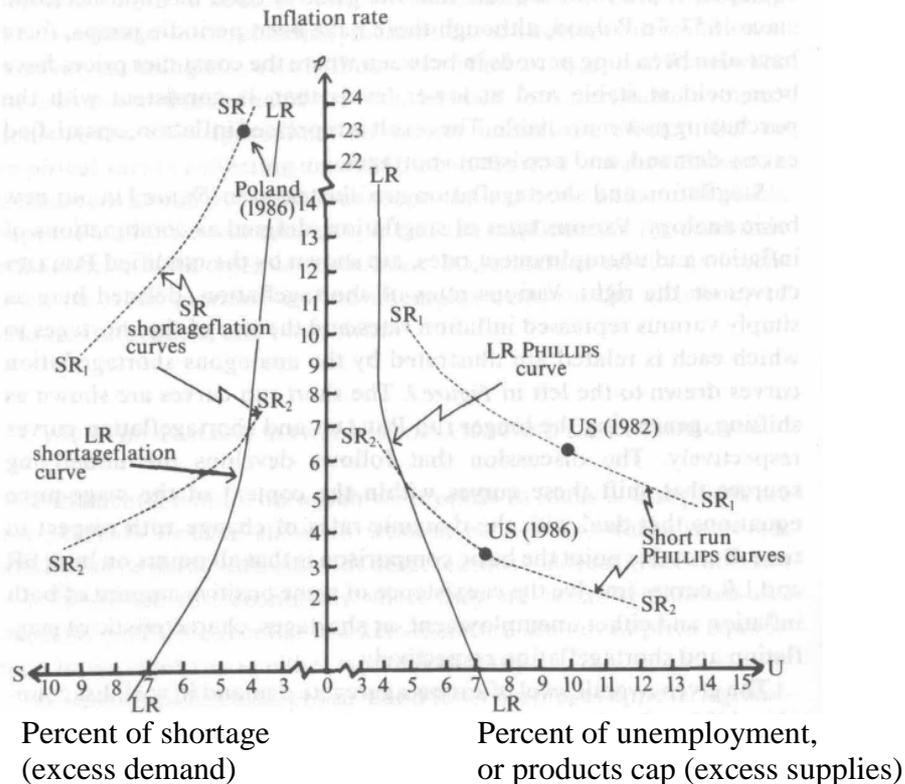
Stagflation and shortageflation are illustrated in *Figure 1* in our new basic analogy. Various rates of stagflation, defined as combinations of inflation and unemployment rates, are shown by the modified phillips curves on the right. Various rates of shortageflation, defined here as simply various repressed inflation rates and the size of the shortages to which each is related are illustrated by the analogous shortageflation curves drawn to the left in *Figure 1*. The short run curves are shown as shifting, generating the longer run phillips and shortageflation curves respectively. The discussion that follows develops the underlying sources that shift these curves within the context of the wage-price equations that deal with the dynamic rates of change with respect to time. But at this point the basic comparison is that all points on both SR and LR curves involve the coexistence of some positive amount of both inflation and either unemployment, or shortages, characteristic of stagflation and shortageflation respectively.

The given overall level of excess aggregate demand in socialist countries shifting the short run curves upward can be due to oil price shocks as well as to major public investment, defense, and social service efforts that are not fully financed with turnover and income taxes. The same phenomena have occurred in the western economies⁴. But in the socialist countries, governmental repression of the inflation rate means that price cannot perform its normal rationing function, and the result is larger shortages and longer queues. Other things the same, the wider the deviation of prices from the equilibrium price the longer the queues. In the western economies, rather than wage controls and rationing, the response to high inflation rates has been tighter monetary policies followed by unemployment and unsold durable goods inventories -surpluses in factor and products markets rather than shortages. In both cases the inflation rate acts temporarily as a tax, albeit a somewhat cruel and capricious one.

⁴ Repressed inflation has not been common in the western economies except in extreme cases such as in World War II and the years immediately following the war. On repressed inflation under capitalism see Hicks [1947], Paish [1953] and Charles-Worth [1955]. On inflation in the LDC's see Cline [1981].

Figure 1

Stagflation and shortageflation, 1986



a. Centrally planned economies
(Poland as an example)

b. Western market economies
(US as an example)

II. SOURCES OF SHORTAGEFLATION AND STAGFLATION

The sources of shortageflation will be considered first, followed by a more formal analysis of the wage-price interaction process and sources of shifts in the generalized phillips curves for both types of economies. The shortage-inflation trade-off in shortageflation economies explains the slope of the short run shortageflation curves in *Figure 1*. This slope then becomes the first parameter in a set of wage-price equations in the subsequent more formal analysis. The wage-price equations then explain shifts in the short run stagflation and shortageflation curves and the generation in the longer run generalized phillips curves in *Figure 1*.

1. Shortageflation

The fundamental feature of an inflation under socialism is its dual character. On one hand inflation is revealed in the 'classic' way, i.e., through a rise in the price level, and on the other hand, through additional unsatisfied excess demand which reveals itself in market shortages and hence in continuing market disequilibrium. (See Kolodko [1984, 1986] and for an opposing view see Portes and Winter [1978, 1980].) The more or less permanent existence of the unspent idle money and savings account balances somewhat like those in the US at the end of World War II is a persistent tendency toward excess demand and a repression of the potentially inflationary price increases. The consequence for the economy is chronic *shortage* which then leads to inefficient resource allocation and other problems.

2. *The effects of repression of inflation*

Although holding prices down is intended to encourage investment and raise labor incentives, the result of the shortages and other problems is to reduce the effectiveness of investment and reduce labor productivity, which in turn finally *slows* economic growth as has been developed by Wove [1981]. Under the circumstances of repressed inflation prices do not reflect relative scarcities. In most cases they are not set on the basis of the relation between supply and demand but on a cost-based reimbursement basis, or cost-plus pricing. On this basis the price structure is distorted away from one which reflects the resource costs of production and relative demands for their alternate uses, and therefore the price signals are false. In such a situation the allocation of factors - both of capital and labor - is far away from an optimal allocation. Eventually this leads to reduced economic efficiency.

The repression of the inflation also can affect labor productivity negatively. The shortage is accompanied by a set of negative phenomena in the relation between the market and households, for example. The waste of time standing in long lines, forced substitution of products, involuntary savings, administrative rationing of goods in short supply, and bribery unequivocally affect household satisfaction and labor productivity in a negative way.

Therefore, what are the *real* reasons for repressing inflation in the centrally planned economies, since the intended results do not seem to respond to reality? We can indicate two essential reasons: one is economic and the other political. The key economic reason is an excess investment demand, which then leads to excess aggregate demand. Kornai [1982, p. 53] has observed that:

The volume of investment does not depend on the financial state of the firms' sector, its present and future profits, accumulated or additional savings, the condition of the state budget, or (the constraint of) expected sales. It would be a mistake to omit these factors from a growth model of a capitalist economy - just as it would be a mistake to include them in the present model (of a socialist economy).'

As a consequence the expansion drive causes many bottlenecks, disequi-libria, and chronic shortages. The purchasing power generated by this investment results in excess demand, and price controls and shortages of consumer goods follow as the direct result of the repression of the resulting inflation.

The key political reason for this continuing use of repressed inflation lies not in its popularity since no government relishes shortages and dissatisfied workers⁵. But it lies in the conviction in West and East alike that government is better and more efficient if the rate of price growth is lower. There is a long term force of habit in the CPE's of a relatively stable price level, and there are large reactions when discrete price changes are made. This key reason for repressing inflation links to a deep conviction that the price level does not depend on production costs and market relations, but on 'good' or 'ill' behavior in central planning by the State. This is not surprising since the basic responsibility for price formulation is not diffused but concentrated at the central level, i.e., in the hands of the State. Therefore a government is always under political pressure not to pass the price increases through.

These considerations lead to the interesting conclusion that the existence of repressed inflation, excess demand, and shortages are possible in an economy even though monetary

⁵ The inflation also reflects various political aspects, so the complete explanation of this complicated process on a purely economic basis is simply impossible. See, for instance, Hankel and Issak [1983].

policy does not perform an active role. In a centrally planned economy there is no monetary policy as it is known in the West. Instead the supply of money for the firms' sector is automatically adjusted to the uses for funds for transactions. That is, the firms' expenditures are constrained by the *physical* quantities of inputs supplied, not by interest costs or by the effective demand for output. The financial flows adjust to these real production processes - not the contrary. The financial resources for effective demand and the interest rates charged for funds are *not* a constraint, and the inputs and physical commodities - on the other hand - are scarce.

To explain the slope upward to the right of the shortageflation curve in *Figure 1a*, starting with a given level of excess demand, due in part to public investment demand, defense, and/or welfare programs, increased prices for consumption goods act partly as a tax, partly as a rationing device, and partly as an incentive to increase supplies, all of which operate to reduce the excess quantities demanded. Conversely, further repression of price increases without rationing moves the short run tradeoff downward and to the left, increasing the quantities demanded, but not the supplies, and hence increasing the shortages.

3. *Conflicting Viewpoints*

Kornai [1980, p. 498] tries to discount this inflation-shortage trade-off, suggesting that:

There is a causal relationship in one direction: the shortage strengthens the tendency towards (upward) price drift. But there is no casual relationship in the opposite direction (...). A constant price level, a fall in price, and a rise in price are equally compatible with the permanent maintenance of the normal intensity of shortage. Norms of shortage are not eternal, but no price change, in either direction can on its own alter them in the long run.'

But are the price elasticities of demand on supply both zero? Certainly in the short run there is the possibility of choosing higher relative consumption goods prices and lesser consumption goods shortages. In the longer run, under socialism, just as in market economies, any such rise in the price level implies expectations that get built in, and a wage increase that supports further inflation. Since prices go up faster than real output, the long run shortageflation curve (*Figure 1a*) also becomes almost completely vertical. Therefore, in the longer run, some shortage persists (a mirror image of Friedman's 'normal' rate of unemployment in the West). It is in this sense that we refer to the condition as 'chronic'.

III. UNDERLYING SOURCES OF STAGFLATION AND SHORTAGEFLATION

To analyze the sources of *shifts* in the short run generalized phillips curves illustrated in *Figure 1*, a set of structural wage-price equations such as those shown below in equations (1)-(5) deal with the wage-price interaction process. All variables are the same for either market or centrally planned economies except the interpretation of the products gap, $(Y_p - Y)/Y_p$, and factor gap, U , terms. In market economies, the products gap, which in many periods registers slack demand or surplus inventories at existing prices is usually measured by use of Okun's law [equation (3) below]. In centrally planned economies, the factor gap is usually assumed to be zero, and the products gap becomes a negative excess supply, and needs to be measured as a weighted average of the shortages, unfilled orders, or queues in various products markets.

Official statistics are not collected on these shortages or queues for the seven socialist countries considered in this paper, so it is not possible for us to estimate this system of equations for the centrally planned economies. We must limit the scope of this paper therefore to its focus on developing the theory, to presentation of simultaneous equation estimates of

equations (1)-(4) for the US and for the OECD countries, to presentation of the rates of inflation in the CPE countries, and finally to a conceptual method and a first approximation of the rates of shortage and the rates of shortageflation in the eastern European countries.

1. A structural analysis of sources of stagflation and shortageflation

Equation (1) below shows the price equation, equation (2) is the wage equation, equation (3) is Okun's law, equation (4) lets expectations get fully built in, and equation (5) is the resulting reduced form solution for this wage-price-employment sector or modified Phillips equation obtained by combining equations (1)-(4). Equation (5) generates the 'modified' Phillips curves that have been illustrated in *Figure 1*.

$$\begin{aligned}
 p &= \beta_1 \left(\frac{Y_p - Y}{Y_p} \right) + \beta_2 w + \beta_3 (y - n) + \beta_4 p_E & \begin{cases} \beta_1, \beta_3 < 0 \\ \beta_2, \beta_4 > 0 \end{cases} & (1) \\
 w &= \alpha_1 (U) + \alpha_2 \pi + \alpha_3 (y - n) & \begin{cases} \alpha_1 < 0 \\ \alpha_2, \alpha_3 > 0 \end{cases} & (2) \\
 (Y_p - Y) / Y_p &= \gamma_0 (U) & \gamma_0 > 0 & (3) \\
 \pi &= \alpha_0 p & \alpha_0 = 1 & (4) \\
 p &= \frac{\beta_1 \gamma_0 + \beta_2 \alpha_1}{1 - \beta_2 \alpha_2} (U) + \frac{\beta_3 + \beta_2 \alpha_3}{1 - \beta_2 \alpha_2} (y - n) + \frac{\beta_4}{1 - \beta_2 \alpha_2} (p_E) & & (5)
 \end{aligned}$$

where:

p = the price inflation rate,

w = the wage inflation rate, here the hourly wage increase in manufacturing,

Y = real GDP, and Y_p = potential GDP, so that $(Y_p - Y) / Y_p$ = the products market gap. This is negative in socialist economies in the sense that effective demand (Y) exceeds potential output, and is positive in most years in market economies,

$(y - n)$ = labor productivity growth, measured here as the percent change in real GDP (y) less the percent change in employment (n),

p_E = the percent change in energy and/or import prices,

U = unemployment, and

π = the expected inflation rate. All other terms are parameters.

In socialist economies, Okun's law would be revised eliminating the unemployment term and replacing the products market gap with a measure of shortages, e.g., $(Y_p - Y) / Y < 0$. Then all the short run Phillips curves and shortageflation curves are generated by equations (1)-(5) so long as $\alpha_0 < 1$. But even in the long run with $\alpha_0 = 1$, since J_2 is known to be close to one, and α_2 to be significantly less than one by most econometric estimates (see *Table 1* below, for example, as well as Goodman and McMahan [1979], Paldam [1980], McMahan [1987] and Eckstein and Girola [1978]), the longer run empirically relevant Phillips curve is not vertical but is steeper than the short run Phillips curves as shown in *Figure 1*. Furthermore, since the absolute value of the negative parameter (β_3) is larger than the absolute value of $\beta_2 \alpha_3$ in the empirical estimates for the US shown in *Table 1*, faster productivity growth will help to shift the short (and long run) Phillips curves downward. By analogy, faster productivity growth would shift the shortageflation curves downward, and vice versa.

Table 1 Empirical estimates of sources of stagflation: US, and OECD Nations
Two-stage least squares-simultaneous equation estimates¹

<i>For the United States: 1952-1983, McMAHON²</i>													
(1a)p	=	-0.036	+	0.15U ₋₁	+	1.29w	+	0.05pE	-	0.25 (y-n)	DW	=	1.76
		(-2.52)		(0.78)		(6.15)		(2.63)		(-1.79)	R ²	=	0.91
(2a)w	=	0.089	-	0.67U	+	0.27p	+	0.05 (y-n)			DW	=	2.01
		(6.37)		(-4.30)		(4.74)		(0.88)			R ²	=	0.90
<i>For 13 market economies: Unweighted averages of estimates for 13 OECD countries, 1953-1972, Paldam [1980, p. 229]</i>													
(1b)p	=	1.52	-	0.61U ₋₁	+	0.36w	+	0.19pE			DW	=	1.85
		(4)		(4)		(11)		(7)					
(2b)w	=	3.34	-	0.50U	+	0.47p	+	0.57z			DW	=	1.92
		(7)		(6)		(5)		(7)					

t-statistics in parenthesis for equations (1a) and (2a). The number of OECD countries out of 13 for which each t-statistic is significant is shown in parentheses below equations (1b) and (2b).

¹ *Definitions of all variables* appear in the text except: z = the average unweighted percentage change in the internal nominal wage rate in other countries. Paldam's [1980, p. 227] 'z' is 'a link in wages among countries influencing p through the cross-term (in equation 1b)'.

² Annual data from the *President's Economic Report*, February 1986. 2SLS estimates are corrected for possible bias due to first order social correlation in the residuals. See also earlier work by Goodman and McMahon [1979] and by Bruno and Sachs [1985].

Estimates of these equations containing estimates of the empirical significance of each source of shifts in the short run Phillips curves in western market economies are presented in *Table 1*.

In the market economies, the negative coefficient for the first variable on the right in the wage equation indicates that surpluses in the factor markets restrain wage inflation and hence price inflation through the wage term in the price equation. In the centrally planned economies, although the same sources can contribute to inflation (excess demand, wage pressures, oil price shocks, in this case to earn foreign exchange, and slower productivity growth), repression of consumer price increases contributes to unsatisfied demand at that price level. The line of causation is not necessarily two way - larger excess demand may or may not cause greater repression of prices, but clearly greater repression of prices causes larger unsatisfied demand.

IV. A MISERY INDEX FOR COMPARISONS OF STAGFLATION AND SHORTAGEFLATION

Another interesting kind of comparison can be made by comparing the familiar 'unhappiness index' for western market economies, which is merely the sum of the inflation rate and the unemployment rate, with an analogous misery index consisting of the sum of the overall rate of shortage and the residual open inflation rate in each socialist economy.

Is it justified to identify shortages only with repressed inflation, or should the hidden costs of the shortages also be counted and added to the (repressed) prices in some kind of a welfare (or misery) index? To the extent that a shortage persists, the actual real prices of the goods in short supply are higher than their *money* prices because the situation is accompanied by the queuing costs born for purchase of particular goods that can be measured in *lost job time* (during which time a real wage that should be added to the money price could have been earned), plus the value of *lost leisure time* which is wasted during the search. The repressed

inflation - even under a hypothetical situation of totally constant prices - therefore is attended by a depreciation of the value of money not because each unit of money will purchase a smaller quantity of goods, but instead because there is the complete impossibility of spending part of one's disposable income.

In sum, the repression of price increases does not eliminate the costs of inflation, including the sporadic price increases that are not repressed, the time-costs of queuing, the redistribution of income and wealth, and the depreciation of money in the sense that it cannot buy goods.

Table 2, Inflation, unemployment and stagflation rates in Western market economies 1984 and 1980-1984 average

	Inflation rate ^a	Unemployment rate	Stagflation rate	Rank of stagflation	
				1984	1980-1984
Italy 1984	10.7	10.4	21.1	1	
1980-1984	16.4	9.0	25.4		1
France 1984	7.4	10.0	17.4	4	
1980-1984	11.2	8.2	19.4		2
Other industrial countries ^b 1984	6.5	11.4	17.9	2	
1980-1984	8.9	9.2	18.1		4
Great Britain 1984	5.0	12.7	17.7	3	
1980-1984	6.0	10.6	16.6		5
Canada 1984	4.4	11.3	15.7	5	
1980-1984	8.7	9.9	18.6		3
USA 1984	4.3	7.5	11.8	6	
1980-1984	7.5	8.3	15.8		6
West Germany 1984	2.4	8.1	10.5	7	
1980-1984	4.5	6.3	10.8		7
Japan 1984	2.2	2.7	4.9	8	
1980-1984	3.9	2.4	6.3		8

Source: World Economic Outlook, International Monetary Fund, Washington, D.C., April 1985, pp.209, 213.

^a Consumer Price Index.

^b Composites of the country groups are in the relevant percentages for each country weighted by the average dollar value of that country's GNP over the preceding three years.

1. The rate of stagflation in the west

For western market economies, the inflation rate, the unemployment rate, and their sum in an unhappiness index, or *stagflation rate*, are shown in columns 1, 2, and 3 of *Table 2*. The countries are ranked by the size of their inflation rate in 1984 as shown in the first column. The highest stagflation rates for the 1980-1984 period as a whole are seen in the last column on the right to occur in Italy, France and Canada, whereas the lowest stagflation rates are found in Japan, West Germany, and the US.

2. The rate of shortageflation in the CPE's

For the centrally planned economies, a new misery index which we will refer to as an analogous *rate of shortageflation* can be developed theoretically. It is simply the sum of the rate of the residual open inflation plus the rate of shortage.

To construct this, although theoretical disequilibrium models dealing with the repressed inflation in centrally planned economies have been estimated (see, for example, Howard [1976b, 1979], Katz [1979] and Pickersgill [1980]), they do not produce an estimate of the magnitude of the shortages for the countries under discussion). In the absence of consistent direct measures which as mentioned above are impossible to secure, it is possible to use unspent money balances to develop a reasonable *first approximation* of the size of the shortage in each country. These are consistent with observations of the length of waiting time for an apartment in each country (in Poland about 12 years for example), for a car (about ten years in Romania for example), and queuing time for food and staples as reported in surveys of housewives. This estimate of the rate of shortage deducts the sum of the stock of savings held for retirement and of liquid asset balances held for transaction and precautionary purposes from the population's total liquid asset balances:

$$r_{SH} = \frac{R_m - (S_v + T_r)}{Y} \quad (6)$$

where r_{SH} = the rate of shortage, expressed as a fraction of GNP, (Y),
 R_m = population's total liquid asset balances,
 S_v = financial assets other than money and savings accounts, assumed to be held largely for retirement,
 T_r = money and savings account balances desired for transaction, and precautionary (and speculative) purposes.

To illustrate for Poland, of the total liquid asset balances in column 1 of *tables*, the desired fraction S_v assumes that longer term liquid assets in Pension funds and the like are all desired for retirement. With respect to the desired shorter term money and near money balances, T_r , we assume that special-purpose and longer-term savings deposits are desired for transactions and precautionary purposes as are one-third of all demand deposits. This one-third held for transactions is an amount equal to the average weekly income earned in the three major groups of the population times the length of their respective pay periods. The length of the pay period is two weeks for wage earners and social-benefit recipients, and six weeks for private farms and private businesses [Kolodko, 1985]. Excess balances then are compulsory due to the shortages and are simply the difference between total demand deposits and that part desired for transactions and precautionary purposes as indicated above.

Table3 Population's liquid assets, inflationary overhang, and the rate of shortage in Poland in 1982-1986 (in billion of zlotys)

Year	Population's total liquid assets	Financial assets other than money	Money balances held for transactions and precautionary purposes	Inflationary overhang	Households' total demand	Rate of shortage
	R_m	S_v	T_r	$R_m - (S_v + T_r)$	Y	$\frac{R_m - (S_v + T_r)}{Y}$
1982	1445	658	540	247	3293	7.5
1983	1739	804	656	279	4083	6.8
1984	2024	946	770	308	4848	6.4
1985	2650	1316	965	369	5987	6.2
1986 ^a	3270	1727	1074	469	7005	6.7

Source: Total Liquid Assets (R_m), Longer Term Pension Funds (S_v), and Demand Deposits (one-third of which are shown) are data published by the National Bank of Poland.

^a Preliminary estimate.

Table 4 Rate of inflation and the estimated rate of shortage in socialist countries in 1977-1984

Country		1977	1978	1979	1980	1981	1982	1983	1984	Average rate
Bulgaria	Inflation	1	1	5	14	0	1	3	1	3.2
	Shortage	4	4	3	3	3	4	3	4	3.5
Czechoslovakia	Inflation	2	2	4	2	1	4	1	1	2.1
	Shortage	3	3	3	3	3	3	3	3	3.0
East Germany	Inflation	0	0	0	1	0	0	0	0	0.1
	Shortage	3	3	3	3	3	3	3	3	3.0
Hungary	Inflation	4	5	10	9	5	7	7	8	6.8
	Shortage	2	2	2	2	2	2	2	2	2.0
Poland	Inflation	6	8	7	9	21	101	20	15	23.4
	Shortage	2	3	4	6	12	8	7	6	6.0
Romania	Inflation	1	1	1	2	2	17	5	8	4.6
	Shortage	4	4	4	4	4	2	3	4	3.6
Soviet Union	Inflation	0	1	1	1	1	4	1	-1	1.0
	Shortage	4								3.6

Sources: Inflation: 'Rocznik Statystyczny' ('Statistical Yearbook'), GUS, Warszawa, various issues, and the national statistical yearbooks of each of the other countries.

Shortages (by the method shown in Table 3): Monetary data for Poland and Hungary, *International Monetary Statistics*, IMF various issues, and for other countries from various issues of the *Statistical Yearbook of the Member Countries of the Council of Mutual Economic Assistance*, published only in Russian, as *Staticheskoy Jezegodnik Stran Chlenow Sovieta Ekonomicheskoy Wzaimopomosti* [1985, p. 70]. These sources are supplemented by central bank data, and confirmed less comprehensively by observations during visits to these countries during 1984.

This estimate of the rate of shortages in Poland in Table 3 then is shown in Table 4, together with estimates for each of the other CPE countries. The latter use the same method as that shown for Poland in equation (8) and in Table 3. These have been cross checked with observations of shortages during visits to all of these countries by Kolodko in 1984. Data on liquid assets and demand deposits for Poland and Hungary, the only two CPE countries that are members of the International Monetary Fund, are from *International Monetary Statistics* various issues, published by the IMF, supplemented by data published in their national statistical yearbooks and by data obtained from their central banks. Monetary data for the other CPE countries is from the *Statistical Yearbook of the Member Countries of the Council of Mutual Economic Assistance*, which is published only in Russian.

The rates of shortage that result for each country in each year is shown in Table 4. They suggest that the shortages are largest for the 1977-1984 period as a whole in Poland, Romania, and the Soviet Union, and the smallest in Hungary.

Table 5 Average rate of shortageflation in socialist countries in 1977-1984

Country	Shortageflation rate
Bulgaria	6.9
Czechoslovakia	5.1
East Germany	3.1
Hungary	8.9
Poland	29.4
Romania	8.3
Soviet Union	4.6

Source: Sum of elements in *Table 4*.

3. The shortageflation rate

Adding the inflation and shortage rates from *Table 4*, the shortageflation rates for these socialist countries are shown in *Table 5*. The rate of open inflation is the official price index. It is very likely that actual rates of inflation are slightly higher than those shown in the official indices. Adirim [1983] believes that the rate of open inflation in Soviet Union over the last thirty years has been 2-3% per year. The other studies - for instance Howard [1976a], Steiner [1982] and Wiles [1982] - also estimate the rate of open inflation, at 1-2 percentage points higher than the official data. Although the results of their estimates are not directly comparable since they have been calculated by various methods, using different data and considering different composition of consumer goods and services, we do realize that the official indices somewhat understate the true rate especially in Bulgaria, Czechoslovakia, East Germany, Romania, and the Soviet Union. Hence the resulting **shortageflation rate** in *Table 5* will be underestimated by 1-3 percentage **points for these countries**.

The most acute rates of shortageflation based on these estimates are in Poland, followed by Hungary, Romania, and Bulgaria. East Germany has had both a lower official inflation rate and a relatively lower rate of shortage than most of the others. Hungary, however, has had considerably less acute shortages, although this has been accompanied by a higher rate of open inflation.

Comparing these shortageflation rates to the stagflation rates shown in *Table 2 for the western market economies* is interesting, if the appropriate qualifications are stressed. To compare open inflation rates alone, or unemployment rates alone, clearly is misleading since it ignores the understatement in the official price indices in the CPE's and also ignores the effects of the shortages. In *Table 2*, Italy had the worst average stagflation rate (25.4%), somewhat comparable to Poland's shortageflation rate in the east in *Table 5* (29.4%). West Germany had the best stagflation rate (10.8%) in *Table 2*, most comparable to the relatively lower rates of shortageflation in *Table 5* for East Germany, Czechoslovakia, the USSR, or Hungary.

V. CONCLUSIONS, AND SOME IMPLICATIONS

This paper has developed a new concept of shortageflation, explained by a trade-off as excess investment demand generates inflation, which then is repressed, followed by shortages. Shifting short run phillips curves are generalized to apply both to stagflation in western market economies and to shortageflation in centrally planned economies. Inflation is curtailed by unemployment in the west and by repression of price increases in Eastern Europe, of which the shortages are a symptom.

Second, this paper develops a new analysis of the more basic sources of inflation, unemployment, and shortages. These sources are contained in the variables in the wage-price equations which are offered as a theory that will generate both short and long run generalized phillips and shortageflation curves. New simultaneous equation estimates of these wage price equations are presented for the US, and shown to be similar to the estimates of a similar theoretical structure for the 13 western market economies. These sources of stagflation are then discussed descriptively as also being sources of shortageflation in the centrally planned economies.

The third new element developed in this paper is the concept of a misery index or shortageflation rate, for the centrally planned economies. This is developed as the simple sum of the official inflation rate, plus a shortage index, producing a conservative total index because there appears to be some underreporting of the true inflation rate. The empirical implementation of misery indices for stagflation and shortageflation is not the primary object of this paper. But a stagflation index (summing inflation and unemployment) for seven western market economies and a shortageflation index (summing official inflation and a first pass at a shortage index) for seven eastern European centrally planned economies is constructed and shown for illustrative purposes.

Excess inflation, whatever sets it off, must of course be brought under control. But there are some implications for efficiency when either unemployment or price repression are heavily used. Allocative inefficiency is one implication when prices are held down, and queuing time increases in the CPE's. Inefficiency also is increased by use in the west of high agricultural price supports, import licenses conferring monopoly power, and wage rigidities that hold product and factor prices above their equilibrium in the US and in the European Common Market countries. It is not just the queuing time, the lost job time, and the lost leisure in the CPE's. It is also that the depression of agricultural prices for example, similar to the pattern in Africa, does not provide the means or the incentives for agriculture to modernize, introduce new technologies, and raise output per worker. Similarly, prices that are artificially high in private or government sponsored monopoly pricing in western markets also give incorrect signals about relative scarcities and contribute to misallocation. Adverse effects on growth can be one result.

A case can be made for curtailing inflation, as well as for making corrections to the income distribution within market economies and socialist economies alike. But rather than making such heavy use of the price system, there would seem to be better means. When the price system is not allowed to signal shortages, bottlenecks, relative intensity of demands and relative surpluses, there is also a price to be paid in the form of allocative inefficiency and slower growth.

REFERENCES

- Adirim, I.: *Stagflation in the U.S.S.R.*, Falls Church, Va.: Delphic 1983.
- Barro, R.-J. and Grossman, H.I.: 'A General Disequilibrium Model of Income and Employment', *American Economic Review*, Vol. 61 (1971), pp. 82-93.
- Barro, R.J. and Grossman, H.I.: 'Suppressed Inflation and the Supply Multiplier', *Review of Economic Studies*, Vol. 41 (1974), pp. 87-104.
- Bruno, M. and Sachs, J. D.: *Economics of Worldwide Stagflation*, Cambridge, Mass.: Harvard University Press 1985.
- Charlesworth, H.K.: *The Economics of Repressed Inflation*, London: University Press of America 1955.
- Choi, J.J.: *International Transmission of Inflation*, Lanham/New York/London: University Press of America 1985.
- Cline, W.R. and Associates: *World Inflation and the Developing Countries*, Washington, D.C.: The Brookings Institution 1981.
- Eckstein, O.: *The DRI Model of the US Economy*, New York: McGraw-Hill 1983.
- Eckstein, O. and Girola, J. A.: 'Long-Term Properties of the Price-Wage Mechanism in the United States, 1891 to 1977', *The Review of Economics and Statistics*, Vol. 60 (1978), No. 3, pp. 323-333.
- Goodman, D. E. and McMAHON, W. W.: 'Predicting Inflation Rates with Changing Oil Prices', *Quarterly Review of Economics and Business*, Vol. 19 (1979), pp. 35-46.
- Hankel, W. and Issak, R.: *Modern Inflation: Its Economics and Its Politics*, Lanham/New York/London: University Press of America 1983.
- Hicks, J. R.: 'The Empty Economy', *Lloyds Bank Review*, New Series, No. 5, London: Lloyds Bank Limited, July 1947.
- Howard, David H.: 'A Note on Hidden Inflation in the Soviet Union', *Soviet Studies*, Vol. 28 (1976a), pp. 599-608.
- Howard, David H.: 'The Disequilibrium Model in a Controlled Economy', *American Economic Review*, Vol. 66 (1976b), pp. 871-879.
- Howard, David H.: 'The Disequilibrium Model in a Controlled Economy, Reply and Further Results', *American Economic Review*, Vol. 69 (1979), pp. 733-738.
- Katz, Z.: 'The Disequilibrium Model in a Controlled Economy', *American Economic Review*, Vol. 69 (1979), pp. 721-725.
- Kolodko, Grzegorz W.: 'Alternatywa inflacyjna', ('Inflationary Alternative'), *Zycie Gospodarcze*, No. 9 (translated in: *Polish News Bulletin of the British and American Embassies Economic Review*, 18-84, Warsaw, March 1984, pp. 14-22).
- Kolodko, Grzegorz W.: 'Nawis inflacyjny, zasoby pieniezne ludnosi a rownowazenie rynku', ('The Inflationary Overhang, the Population's Money Reserves, and the Balancing of the Market'), *Nowa Drogi*, October 1985, 98-109 (translated in: *Polish News Bulletin of the British and American Embassies Economic Review*, 15/18-85, Warsaw, February 1985, pp. 2-14).
- Kolodko, Grzegorz W.: *Polska w swiecie inflacji, (Poland and the Worldwide Inflation)*, Warszawa: Ksiazka i Wiedza 1986.
- Kornai, J.: *Economics of Shortage*, Amsterdam/New York/Oxford: North-Holland 1980.
- Kornai, J.: *Growth, Shortage and Efficiency: A Macrodynamics Model of Socialist Economy*, Oxford: Basil Blackwell 1982.

- Krause, L.B. and Salant, W.S., (eds.): *Worldwide Inflation: Theory and Recent Experience*, Washington, D.C.: The Brookings Institution 1977.
- Lindberg, L. and Maier, C. (eds.): *The Politics and Sociology of Global Inflation*, Washington, D.C.: The Brookings Institution 1984.
- McMAHON, Walter W.: 'Sources of the Slowdown in Productivity Growth: A Structural Interpretation, in: Kendrick, John W., (ed.), *International Comparisons of Productivity Growth and Causes of the Slowdown*, Cambridge, Mass.: Ballinger 1984, pp. 93-108.
- McMahon, Walter W.: 'The Relation of Education and R&D to Productivity Growth', *Economics of Education Review*, Vol. 3 (1984), pp. 299-313.
- McMAHON, Walter W.: 'The Theory of Productivity Growth in the Medium Term', *Working Paper Series*, Bureau of Economic and Business Research, University of Illinois, March 1987, p. 43.
- Nove, A.: 'Note on Growth, Investment, and Price Indices', *Soviet Studies*, Vol.33 (1981), pp. 142-145.
- Nuti, Mario: *Hidden and Repressed Inflation in Soviet-Type Economies: Definitions, Measurements, and Stabilization*, Paper presented at 1986 AAASS Meetings, European University Institute, Florence, Italy, 1986.
- Paish, F.W.: 'Open and Repressed Inflation', *The Economic Journal*, Vol.63 (1953), pp. 527-552.
- Paldam, Martin : 'The International Element in the Phillips Curve', *The Scandinavian Journal of Economics*, Vol. 82 (1980), pp. 216-239.
- Pickersgill, W.: 'Recent Evidence on Soviet Household Saving Behavior', *Review of Economics and Statistics*, Vol. 62 (1980), pp. 628-633.
- Portes, R. and winter, P.: 'The Demand for Money and for Consumption Goods in Centrally Planned Economies', *Review of Economics and Statistics*, Vol. 60 (1978), pp. 8-18.
- Portes, R. and winter, P.: 'Disequilibrium Estimates for Consumption Goods Markets in Centrally Planned Economies', *Review of Economic Studies*, Vol.47 (1980), pp. 137-149.
- Stitcheskoj Jezegodnik Stran Chlenow Sovietsa Ekonomicheskoy Wzaimopomosti*, Finansy i Statistika, Moskava, 1985.
- Steiner, James E.: 'Disguised Inflation in Soviet Industry', *Journal of Comparative Economics*, Vol.3 (1982), pp.278-287.
- Wiles, P.: 'Soviet Consumption and Investment Prices, and the Meaningfulness of Real Investment', *Soviet Studies*, Vol. 34 (1982), pp. 289-295.

SUMMARY

This paper compares inflation and unemployment in western market economies with the repressed inflation and persistent shortages common in centrally planned economies. Stagflation and shortageflation, the latter defined as inflation accompanied by shortages, have much in common, and a similar, albeit inverse, theoretical structure is offered. Measures of stagflation for the western economies and development of a conceptual framework for measuring shortageflation for the eastern European socialist countries leads to a new 'misery index' facilitating comparisons that are not as misleading as comparison only of inflation rates. They suggest that Italy and Poland have the most severe unhappiness index, and West Germany and East Germany have the lowest unhappiness index. Furthermore, where relative prices fail to reflect relative scarcities, then the failure of production to fully respond, and the time and other resources wasted through queuing, gluts, and other allocative inefficiencies can slow growth.

ZUSAMMENFASSUNG

In diesem Aufsatz werden Inflation und Arbeitslosigkeit in westlichen Marktwirtschaften mit der zurückgestauten Inflation und anhaltenden Mangelscheinungen in sozialistischen Planwirtschaften verglichen. Die Stagflation und die Mangelflation (das heisst Inflation von Mangelscheinungen begleitet) haben viele gemeinsame Eigenschaften. Die Bestimmung von Stagflationsraten in westlichen Marktwirtschaften und die Entwicklung eines theoretischen Konzepts für die Messung von Mangelflation in sozialistischen Planwirtschaften führt zu einem „Armutindex“. Dieser „Armutindex“ erleichtert internationale Vergleiche und bringt bessere Ergebnisse als die Analyse der Inflationsraten. Die statistische Untersuchung zeigt, dass Italien und Polen die höchsten, die BRD und die DDR die niedrigsten Unzufriedenheitsindizes haben. Es wird auch gezeigt, dass wenn die relativen Preise den relativen Knappheiten nicht entsprechen, die beschränkte Reaktion der Produktion auf Nachfragesteigerungen, die Zeitverluste durch Schlangestehen und sonstige Ineffizienzen das Wirtschaftswachstum senken können.

RÉSUMÉ

Cet article compare d'une part l'inflation et le chômage des économies occidentales, et d'autre part l'inflation contenue et les pénuries persistantes communes aux économies planifiées. La stagflation et la pénurieflation (définie comme l'inflation accompagnée de pénuries) ont beaucoup en commun, et l'auteur en propose une analyse théorique similaire, mais inverse. Il mesure la stagflation des économies occidentales et la pénurieflation des économies socialistes de l'Est. Ceci l'amène à élaborer un «indice des détreesses» facilitant les comparaisons de façon moins erronée que les comparaisons basées sur le seul taux d'inflation. Ces calculs amènent à penser que l'Italie et la Pologne ont l'indice de tristesse le plus fort et que les deux Allemagnes ont l'indice de tristesse le plus faible. De plus, quand les prix relatifs ne peuvent plus refléter les pénuries relatives, la croissance se ralentit, du fait de l'absence de réponse de la production aux besoins, et des pertes de temps ou d'autres ressources dans les files d'attente et autres allocations inefficaces.