Swiss Inflation and the Two Versions of the Monetary Approaches to the Balance of Payments

By: Stuart D. Allen

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Abstract:

The framework for this study is provided by the monetary approach to the balance of payments (MABP) whose major precepts are discussed in Section 1. The Swiss case provides an excellent counterexample to the conclusions which may arise from the MABP and the closely related global monetarist view of world inflation. Therefore, the initial thrust of the paper is to distinguish between a strong version and a weak version of the MABP from the basic assumptions of the monetary approach.[1] While the MABP is not a theory of inflation, the two versions of the MABP suggest different trans-mission mechanisms by which world inflation can be transmitted to a small, open country like Switzerland. Empirical results are reported in Section 2 which suggest that excessive monetary growth resulting from balance-of-payments surpluses and a direct price effect were the principle causes of Swiss inflation. Therefore, the strong version of the MABP and the closely related global monetarist approach are incorrect in concluding that international inflation is transmitted by a direct price effect. The question of the appropriate exchange-rate policy for Switzerland and other concluding remarks follow in Section 3.

Article:

The Monetary Approach to the Balance of Payments[2]

The essential characteristics of the monetary approach for fixed exchange rates can be summarized by the following four equations:[3]

$$M_d = P \cdot h(y, i) \qquad (1)$$

$$\frac{dM_d}{M_d} = \frac{dP}{P} + \frac{\frac{\partial h}{\partial y}}{h(y, i)} dy + \frac{\frac{\partial h}{\partial i}}{h(y, i)} di \qquad (1')$$

$$M_s = s(D + R) \qquad (2)$$

$$\frac{dM_s}{M_s} = \frac{dD + dR}{(D + R)} \qquad (2')$$

$$BP = dR/dt \qquad (3)$$

$$M_d = M_s \qquad (4)$$

$$\frac{dM_d}{M_d} = \frac{dM_s}{M_s} \qquad (4')$$

where

M = demand for money
M = supply of money
P = price level of the domestic currency
D = domestic assets held by the central bank
R = international reserves currency + gold + SDRS held by the central bank
y = real income
i = nominal interest rate
BP = balance of payments

There are three basic assumptions of the monetary approach which pertain to the case of the small, open economy. First, the demand-for-money function must be stable (Equation 1). Second, the money supply is assumed to be endogenously determined by the demand for money. Third, output grows at some domestic constant *k* in the long run. While the first assumption is self-explanatory, the second and third assumptions need clarification.

Gordon [1977, p. 413] develops the second assumption by assuming that capital is perfectly mobile "so that international reserves tend to flow in or out as necessary to set a nation's money supply equal to its demand for money, which depends primarily on its price level, real output and interest rate."[4] However, implicit to this assumption is the proposition that the rest of the world is not imposing a disturbance upon the small, open country. The rest of the world is in equilibrium prior to the disturbance in the small, open country which produces a domestic excess demand or supply of money. Only when this implicit assumption holds can it be said that the nominal domestic money supply is demand determined. The strong version of the MABP always makes this implicit assumption which can be shown by a consideration of Equation (3).

Equation (3) defines the balance of payments as a monetary phenomenon since *BP* is equal to the change in international reserve holdings. This does not mean that the monetary approach to the balance of payments is exclusively a monetary theory, but rather that equilibrium is restored from either a monetary or real disturbance by a stock adjustment in a country's international reserve holdings. Equation (3) can only be greater than or less than zero when equations (4) and (4′) which represent the money market are not in equilibrium. According to Johnson [1973, p. 235] :

> "[d] eficits and surpluses represent phases of the stock adjustment in the money market and not equilibrium flows ... since the demand for money is a demand for a stock and not a flow, variations of the supply, of money relative to the demand for it associated with deficit or surplus must work towards an equilibrium between money demand and money supply with a corresponding equilibration of the balance of payments."

A continuous deficit or surplus must represent continuous disturbances of real or monetary nature. A crucial distinction must be made at this juncture as to the interpretation of Johnson's quote. In the strong version of the monetary approach to the balance-of-payments, a surplus $(dR/dt > 0)$ is always associated with a domestic excess demand for money$(dM_d/M_d) > (dD/(D + R)$ while a balance-of-payments deficit $(dR/dt < 0)$ is always associated with a domestic excess supply of money $(dD/(D + R)) > (dM_d/M_d)$.[5] Rabin and Yeager [1979] discuss the distinction between a strong and a weak version of the MABP by offering counter-examples where foreign disturbance can cause a balance-of-payments surplus and a domestic inflation (a domestic excess supply of money) or cause a balance-of-payments deficit and a domestic recession (a domestic excess demand for money).[6] Therefore, not every balance-of-payments surplus results from a domestic excess demand for money and not every balance-of-payments deficit results from a domestic excess supply of money.

The third assumption of the monetary approach maintains that output grows by some constant *k* in the long run. Output may be greater than or less than potential full employment output in the short run but there is no long run tradeoff between inflation and unemployment. Suppose *dP* and *di* are held equal to zero and the economy is growing at a rate *k.* By Equation (1′)

$$\frac{dM_d}{M_d} = \frac{\frac{\partial h}{\partial y}\, dy}{h(y, i)} = k \qquad (5)$$

if the income elasticity of the demand for money is equal to one. In the context of growth, an excess demand for money will result if the central bank does not expand its domestic holdings of foreign reserves at a sufficient rate such that $dMs/M_s = k$. If $dM_s/M_s < k$, then the excess demand for money is relieved by a balance-of-payments surplus $(dR > 0)$ sufficient to cause $dM_s/M_s = k$. A balance-of-payments surplus in this context is not inflationary since the surplus is an equilibrating stock adjustment which satisfies a growing domestic demand

for money. Therefore, a central bank of a small, open country can gradually buy domestic assets in a growing economy without creating a balance-of-payments surplus as monetary growth equals the growth of real income.

The strong version of the MABP often lapses into a monetary view of world inflation where the rate of world inflation is determined by the growth of the world money supply in a fixed exchange-rate system. Whitman [1975, p. 498] notes that the assumptions of a stable demand-for-money function and of the real growth of output being determined outside the system reflects the simple quantity theory of money where there is a proportional relationship between the money supply and the level of prices. This formulation would deny the potency of fiscal policy to affect the price level. The economists who hold this monetary view of world inflation have been coined by Whitman [p. 494] , as global monetarists.

> "'Monetarists' because of their belief that macroeconomic phenomena can be analyzed best in terms of the relationship between the demand for and the supply of money, and 'global' because of their conviction that, as a first approximation, the world consists, not of separable national economies, but of a single, integrated, closed economy."

However, there is a fourth assumption, which is crucial to the understanding of the global monetarists' position and a distinguishing characteristic of the strong version of the MABP. According to Whitman [p. 498] , "In the absence of barriers to trade, the 'law of one price' must hold in integrated world commodity markets."[7] Gordon [1977, p. 413] notes that:

> "commodity arbitrage maintains the tradable-goods portion of the domestic price level fairly close to the world price level of tradable goods, while labor mobility communicates change in prices of tradable goods to the non-tradables sector. Thus any event that raises the foreign price level tends to push up both the domestic price level and the domestic money supply, irrespective of the reaction of the domestic monetary authorities ... First, the direct price influence working through commodity arbitrage raises the prices of tradable goods everywhere which pushes up the marginal value product of labor and of other factors of production and hence domestic costs, raising the prices of non-tradable goods."[8]

In this case, an excess demand for money has arisen from an increase in the world price level which has caused a higher domestic price level in the domestic country. If interest rates are held constant and the domestic central bank was buying domestic assets to keep $dM_s/M_s = k$, then:

$$\frac{dP}{P} + \frac{\partial h}{\partial y} dy/h(y, i) = \frac{dM_d}{M_d} > \frac{dM_s}{M_s} = k \quad (6)$$

and a balance-of-payments surplus would arise to increase reserves holdings sufficiently to choke off the excess demand for money arising from the higher domestic price level to equilibrate the money market.[9]

The above example is consistent with the strong version of the monetary approach which sees balance-of-payments disequilibrium arising from only a domestic monetary disequilibrium. The strong version of the MABP tends to be sympathetic with the viewpoint of the global monetarist that a direct price mechanism is the key link in the worldwide inflation process. There is a tendency to suggest by the law of one price that higher foreign prices are a sufficient condition for higher domestic prices, given the downward rigidity of the price of non-traded goods and services, regardless of whether there is a balance-of-payments surplus or not.

The weak version of the monetary approach would suggest a second possible transmission mechanism of world inflation. Suppose there is domestic equilibrium in the money, bonds and commodity markets but a continuous excess supply of money in the rest of the world. By Walras' law, the worldwide excess supply of money would be matched by an excess demand for bonds and commodities of the small, open country. Such a foreign excess demand would result in a balance-of-payments surplus and a domestic excess supply of money. If the resulting growth of the money supply is excessive (greater than *k)* and the central bank is not or cannot sterilize the inflow of foreign reserves, then the balance-of-payments surplus is dis-equilibrating. The resulting domestic

excess supply of money cannot be eliminated by a deficit, since the rest of the world is still attempting to eliminate its excess supply of money through short-run adjustments of real output growth and long-run adjustments of inflation rates. The imposed excess demand for bonds and commodities and the corresponding excess supply of money within the small, open country is eliminated by domestic price adjustments. Given the fact that domestic rates of economic growth may vary from *k* and the speed of adjustment may vary between countries, domestic inflation rates may vary from world inflation rates. Domestic inflation rates may be higher than or lower than inflation rates in neighboring countries. Therefore, the weak version of the MABP would suggest that both the direct price effect and a liquidity effect imposed by the rest of the world are possible conduits through which world inflation was transmitted. The question of which effect is stronger is an empirical question.

Empirical Results

A reduced-form price equation which includes six key economic variables is estimated to provide evidence as to the variables contributing to Swiss inflation.[10] The exogenous variables includes the quarterly growth rates of the monetary base *(B)*, real government expenditures, *(G)*, real tax receipts, *(T)*, import prices faced by the Swiss, *(Pm)*, a world consumer price index based upon ten major industrialized countries, *(Pw)*, and an Okun gap variable, *(X)*.[11] A log-linear relationship is assumed along with a distributed lag structure for the domestic variables which affect aggregate demand. Equation (1) with $\dot{P}_t$ as the quarterly growth rate of the average Swiss cost-of-living index is the equation to be estimated.

$$\dot{P}_t = \alpha + \sum_{i=0}^{n} \beta_i \dot{B}_{t-n} + \sum_{i=0}^{n} \lambda_i \dot{G}_{t-n} \qquad (1)$$

$$+ \sum_{i=0}^{n} \xi_i \dot{T}_{t-n} + \delta X + \psi \dot{P}m + \theta \dot{P}w + u_t$$

The strong version of the MABP which is sympathetic with and often indiscernable from the global monetarist position would expect the coefficient for world prices and/or import prices to be positive and statistically significant while the other coefficients would be insignificant from zero. However, the weak version of the monetary approach is compatible with a more eclectic view of the inflationary process. The direct price mechanism is not the only manner in which inflationary pressure can be transmitted to or internally manifested in a small, open economy according to the weak version of the MABP. The signs of the coefficients according to the weak version are expected to be Σ_β, Σ_λ, δ , ψ, θ, >, 0 and $\Sigma\delta < 0$ with the statistical significance of each remaining an empirical question. The empirical results of estimating equation (1) over two separate time periods are presented in Table 1. The appropriate distributed lag is determined by minimizing the standard error of the regression and eliminating the final coefficients which individually are insignificant (via a *t*-test) and collectively are insignificant (via an *F*-test).

The results do not provide empirical support for the strong version of the MABP and the global monetarist view of world inflation. Though the coefficient of the world consumer price variable is positive and significant, other variables are also significantly related to the Swiss rate of inflation. The sum of the monetary base coefficients is positive and significant which suggests that the large and continual balance-of-payments surpluses caused excessive expansion of the monetary base.[12] The domestic fiscal variables, real government expenditures and real tax receipts are also significant and the correct sign. The evidence is consistent with the view that Swiss inflation was primarily, but not exclusively, imported from abroad through both a direct-price effect and a liquidity mechanism via balance-of-payments surpluses. While the weak version of the MBOP is not a theory of world inflation, the evidence is compatible with the weak version's openness to various transmission mechanisms of the inflationary process.

A comparison of the empirical results for the two tested periods provides evidence of the importance of maintaining a floating exchange rate. The size of the world consumer price coefficient drops by 50 percent when the period of floating exchange rates is included. This evidence attests to the positive impact upon domestic prices provided by an appreciating currency.[13] The Swiss National Bank (SNB) has also been able to

maintain tight control over the monetary base since the central bank abandoned the fixed exchange rate system in February 1973. The monetary base actually declined by three-and-one-half percent from 1973/I to 1975/I and grew by less than 4 percent from 1975/I to 1978/I. The empirical results show the continued significance of the sum of the monetary base coefficients which also has the strongest impact of any variable for the 1961-1976 period. Swiss inflation has been reduced from a 10.6 percent annual rate for the twelve months ending 1974/III to a less than 2 percent annual rate since 1976/II. The empirical evidence shows the importance of controlling the base in order to control inflation.

Summary and Conclusion

The paper has discussed the distinction between a strong and a weak version of the MBOP first made by Rabin and Yeager. Empirical evidence has been provided to refute the strong version of the MBOP and the closely related global monetarist school of thought contention that the law of one price is the major conduit through which worldwide inflation is transmitted. Switzerland provides a case of a country which imported inflation via both a direct price effect from abroad and continuous balance-of-payments surpluses. The evidence does not explicitly confirm the weak version of the MBOP because it is not a theory of worldwide inflation. The evidence does suggest that there are at least two transmission mechanisms for worldwide inflation. Economists should be careful not to interpret the MBOP as a uni-causal theory of world inflation.

TABLE 1

ESTIMATES OF SWISS INFLATION

	Fixed Exchange Rates 1961–1973/I		Fixed and Managed Exchange Rates 1961–1976	
$\sum_0^6 B$	.341	(6.34)	.362	(7.38)
$\sum_0^{14} G$	.169	(1.87)	.063	(0.94)
$\sum_0^3 T$	−.004	(−2.38)	−.050	(−0.74)
X	.028	(−0.38)	−.044	(−0.69)
Pm	−.033	(−0.66)	−.047	(−1.33)
Pw	.495	(3.23)	.249	(3.31)
α	−.013	(−1.89)	−.002	(−0.43)
$\bar{R}^2$	.758		.757	
DW	1.75		2.21	
$S.W.$	.00293		.00342	

Notes:

[1] The distinction between a weak and strong version of the MABP is developed by Rabin and Yeager [1979].

[2] See, for example: Harry G. Johnson [1973, pp. 229-49], Marina V.N. Whitman [1975, pp. 491-555] , Robert J. Gordon [1977, pp. 409-68] and M. E. Kreinin and Lawrence Officer [1978] .

[3] See Swoboda [1976, pp. 4-8] for a treatment of equations (1-4). The money multiplier is assumed to be constant.

[4] The endogeneity of the money supply means that the central bank cannot sterilize inflows or outflows of foreign reserves in the long-run. However, Takayama [1969] and Roper [1971] have shown that the ineffectiveness of monetary policy will hold for cases of perfect or even imperfect capital mobility given the assumption that sterilization is not successful.

[5] Rabin [1979] notes two more quotes which further substantiate this point. See Johnson [1976, pp. 282-3] and Johnson and Frenkel [1976, pp. 21-2] .
[6] The strong version of the monetary approach to the balance of payments does not consider the possibility that a surplus (or deficit) may be *imposed* on a country. See also Allen [1977, pp. 104-05] and Rabin [1977, Chapter VII].
[7] See also Johnson [1973, p. 235]. Evidence of integration of the world economy and the adherence to the law of one price is summarized and provided by Laffer [1975] , "From a theoretical standpoint, the concept of a fully integrated world market, assuming utility maximization, leads one directly to the view that only one market price should hold," [1975, p. 42]. Laffer then cites evidence from Genberg's 1973 dissertation [1976] , Laffer and Ransom [1972] , and Lee [1974] to support this view.
[8] Gordon notes that foreign cost-push factors are the primary transmission mechanism in the Scandinavian inflation models.
[9] David Laidler develops a model in which the world inflation rate can effect domestic output and inflation in the short-run [1977, p. 333] . Laidler notes that his [p. 327] "results have been produced in the presence of a foreign exchange market that maintains purchasing power parity even in the short run, and in the absence of any interference from inappropriate speculative activity." He suggests that a "direct" 'price transfer mechanism,' justified in earlier analysis by making the small, open economy a price-taker in world markets, at least for tradable goods, and in more recent work by having inflation expectations, and hence domestic price setting, influenced by the behavior of inflation in the rest of the world, is instead regarded as the important channel whereby inflation is transmitted between open economies operating fixed exchange rates." Empirical evidence of the importance of a direct price transmission mechanism is provided by Cross and Laidler [1976] and Parkin, Sumner and Ward [1976].
10 A model is developed in Allen [1980] from which this reduced form equation is obtained.
11 Data is taken from the IMF's *International Financial Statistics.* The monetary base data are the February, May, August and November figures to avoid end-of-the-quarter window dressing operations. The data for the Okun gap variable was obtained from OECD *Occasional Studies* [1973].
12 There is nearly a one-to-one relationship between changes in the base and foreign reserves. For the 1962/IV to 1973/I period, the average quarterly changes were .392 billion SF for foreign reserves and .384 billion SF for the base. The Spearman coefficient of rank correlation was computed to be .88 for the quarterly change of foreign reserves and the monetary base. Domestic asset holdings of the SNB increased from .54 to 1.18 billion during this period.
13 A subset of the global monetarist school of thought is the Mundell-Laffer hypothesis which suggests that due to a ratchet effect flexible exchange rates contribute to worldwide inflation [Kreinin and Officer, 1978, pp. 13-4]. Laffer notes that "if the degree of correlation among individual countries' shocks is less than unity, i.e., if the existence of deflationary (inflationary pressure) in one country implies that at least one other country had pressures in the opposite direction, deflation and unemployment definitely will be less under a fixed exchange rate system than under flexible rates." Furthermore, flexible exchange rates "impose a severe cost on the arbitrage of money across national boundaries" [Laffer, 1973, pp. 31-331. However, the empirical evidence for Switzerland suggests that the relative impact of foreign inflation on domestic inflation was considerably lessened during the period Switzerland floated the Swiss franc.

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