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Money and Prices in Sweden, 1871–1970. A Comment

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This comment arises from Wells' (1983) analysis of the causal relationship between money and prices in Sweden in this issue of the *Scandinavian Journal of Economics*. Wells uses data on the Swedish money stock and the Swedish price level compiled by me and my 1976 article as the starting points for his discussion. In that article, I examined the behavior of money and prices in Sweden during the period 1732–1972; see Jonung (1976).

My brief discussion of the line of causation between money and prices is based on a distinction between periods of fixed and periods of flexible exchange rates. Under fixed exchange rates, the purchasing power parity theory and its modern representation, the monetary approach to the balance of payments, states that for a small open economy like Sweden's, domestic inflation and domestic monetary growth are determined by international price and monetary developments.¹ Under regimes of flexible exchange rates, I suggest, on the basis of the historical record, that the Swedish money stock has been determined by the conduct of domestic monetary policy. Consequently, the rate of change of domestic prices has been influenced by the growth rate of the money stock.

There are two major approaches to the analysis of the line of causation between money and prices. One approach is based on a close examination of historical and institutional circumstances concerning the money supply process and the behavior of the monetary authorities. The prime example of this approach is Friedman & Schwartz's (1963) study of US monetary history. My discussion of the causal link between money and prices in Sweden rests on this methodology.

The other approach relies on statistical techniques developed by Granger (1969) and Sims (1972), where timing relationships in observed data are

* I have received valuable suggestions from Bengt Assarsson, Johan Myhrman and Björn Thalberg. The usual disclaimer applies. Keith Ingham has significantly improved my English.

¹ The monetary approach to the balance of payments should be regarded as an application of the modern quantity theory of money to the case of the open economy.

used to reveal causality patterns (Granger causality).² Wells (1983) adopts the Granger-Sims procedure "to isolate a causal relationship between monetary expansion and inflation using annual Swedish data from 1871 to 1970". He finds that "price increases lead monetary expansion" and asserts that this is an expected result "as the period is dominated by pegged exchange rates". Wells claims that "the data tend to confirm the hypothesis that, given a small open economy with pegged exchange rates, inflation causes monetary expansion". Basically, Wells is of the opinion that the issue of causality can be settled by investigating solely the timing relationship between annual money stock changes and annual changes in the price level.

I see three major objections to Wells' analysis. First of all, although Wells states that inflation should lead money, this assertion as well as his econometric calculations are not based on a theory of the transmission process of international disturbances into the domestic economy under fixed exchange rates, which explicitly accounts for the timing relationships between domestic price movements and domestic money stock movements. He refers to a theory that most probably should be interpreted as the monetary approach to the balance of payments. However, this theory does not imply a specific timing relationship between money and prices in the domestic economy.

According to Cassese & Lothian (1982), the monetary approach to the balance of payments states that the domestic money supply may lead, lag or move concurrently with domestic prices depending on the specific assumptions made about the adjustment process, i.e., concerning the speed of adjustment of prices for tradeables and nontradeables, the process of generation of expectations and the role of asset markets.³ They conclude that "the lead or lag of money and prices, in what appears to be an open economy, is an uncertain guide to settling questions of causation and more importantly the international transmission of inflation". This remark pertains to Wells' calculations. In fact, he does not present a firm theoretical foundation for his view that a lead of prices over money should be expected for Sweden under fixed exchange rates.

My second objection concerns Wells' analysis of causality. He regards a lead of prices over money in a small open economy under fixed exchange rates as indicating causality running from domestic prices to the domestic

² Sims (1972) concluded that money in the US can be regarded as exogenous relative to nominal income in the post World War II period. Using the same technique Williams, Goodhart & Gowling (1976) found that money was endogenous in the UK. Sims (1980) later modified his conclusions for the US. A popular description of these two approaches is given by Jackman, Mulvey & Trevthick (1980, pp. 127-131). See also Chapter 3 in Desai (1981) for a technical presentation as well as a criticism of the concept of Granger causality.

³ Cassese & Lothian (1982) also refer to various contributions to the literature on the international transmission mechanism of inflation.

money stock. However, for a small open economy under fixed rates the line of causation, according to the monetary approach to the balance of payments, goes from a third variable, i.e., international money and price developments, to the domestic money stock and the domestic price level. In my opinion, the statistical lead–lag relationship between money and prices does not, as Wells argues, indicate causality between these two variables—except in a very restricted statistical sense—but only a timing relationship. The driving force behind domestic movements in money and prices is most likely to be found in the behavior of money and prices in the reserve-currency country that Sweden was connected to during periods of fixed exchange rates. Wells may thus be excluding the “true” causal factor in his estimates by only looking at domestic money and prices.⁴

This point is also highlighted by Cassese & Lothian (1982). They use Granger–Sims tests to examine the international transmission of inflation, thus adopting the same type of econometric techniques as Wells. They state explicitly that they wish to avoid the use of the term “cause” and prefer to speak in terms of “timing relationships” when working with the Granger–Sims approach. They regard their application of Granger–Sims tests—although preceded by a detailed discussion of the theory of the international transmission mechanism—as “measurement with some theory”.

My third objection deals with Wells’ treatment of the years 1871–1970 as one uniform period. Wells is forced to do this because his statistical technique requires a large number of observations and only annual data are available. However, the monetary approach to the balance of payments implies that fixed exchange rate regimes should be separated from flexible exchange rate regimes. Thus, one test should properly be performed for periods of fixed rates and another for periods of flexible rates. Wells is well aware of this problem. However, as the number of years of flexible rates is fairly small, no Granger–Sims test covering annual data can be made for this type of monetary regime. Here I am of the opinion that a careful examination of the historical evidence for years of flexible rates, i.e., for 1914–1924, 1931–1933 and 1939–1945, is a more promising approach for analyzing causality than Wells’ comparisons of residuals.

Furthermore, most econometric studies using Granger–Sims test reported in the literature are based on monthly or quarterly data. Wells’ use of annual data is not a recommendable strategy as timing patterns between money and prices which may occur *within* a year are not revealed (instantaneous causation). Thus, observations covering shorter time periods than a year should preferably be used; on this point see also Granger (1969, p. 427).

⁴ The issue of the influence of a third variable in Granger–Sims tests is considered by e.g. Desai (1981). See also Sims (1980).

It should be pointed out in this context that the prevailing policy regime may have important effects on the econometric results; see Lucas (1976). It is likely that expectations and reaction patterns of the Swedish public during the Bretton Woods period—a period of full employment policies—were different from those during the classical gold standard prior to World War I, although fixed exchange rates were maintained during both periods. Such differences may influence the timing relationship between money and prices. In fact, some of the calculations in my article indicate that the timing relationship between money and prices for these two periods are radically different; see Table 5 in Jonung (1976). Consequently, the treatment of the years 1871–1970 as one single uniform period runs the risk of ignoring important historical and institutional developments, when testing for Granger causality using only annual data.

Wells tries to carry the analysis of causation between money and prices in my 1976 paper a step further by adopting the Granger–Sims approach. However, I see a number of objections to his analysis and conclusions. It is to be hoped that future work on Swedish monetary and price developments will clarify these issues.

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