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# The behavior of money and other economic variables: Two natural experiments

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### A B S T R A C T

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The object of this paper is to test the performance of the quantity-theory model and the related proposition of monetary neutrality in a context in which, to use Bernanke's phraseology, "money move[d] for reasons that [were] plausibly unrelated to the current state of the economy." We investigate this question using data from two recent episodes of monetary-policy regime change – the move to floating exchange rates throughout the industrialized world following the breakdown of Bretton Woods in the early 1970s and the shift toward less expansive monetary policy that to varying degrees took place in these countries a decade or so later. The results of this exercise are highly positive. The money–price relationship that we observe is fully consistent with theory – growth shifts in the nominal stock of money and in the price level are highly correlated and bear a one-to-one relation to one another. Growth shifts in exchange rates are significantly related both to growth shifts in relative price levels and to growth shifts in relative excess supplies of money. The classical neutrality proposition – in this context superneutrality – in general, receives strong, though not totally unambiguous, support.

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## 1. Introduction

Every once in a great while history provides us with a natural experiment, an episode in which a major change in a key economic variable occurs that has no direct relation to the contemporaneous movements in the variables that theory suggests it ought to affect.<sup>2</sup>

A classic example was the currency reform during the U.S. Civil War by the Confederacy in spring 1864. A second was provided by the massive inflow of specie from the New World to Spain in the sixteenth century. In the first example, a rapidly growing money stock suddenly fell and a decline in the price level followed. In the second, a century-long upward movement in price levels occurred throughout most of Europe. The question that researchers addressed in both instances had to do with the links between the monetary changes and the price behavior that followed (Lerner, 1956; Hamilton, 1934).

In this paper we investigate the same question using data from two more recent episodes of monetary-policy regime change – the move to floating exchange rates throughout the industrialized world following the breakdown of Bretton Woods in the early 1970s and the shift toward less expansive monetary policy that to varying degrees took place in these countries a decade or so later.<sup>3</sup> Both quite arguably were natural experiments in their own right. Both, moreover, were followed by similar sea changes in price behavior – the Great Inflation of the 1970s and early 80s in the first instance and the two decades of relative price stability thereafter in the latter case.

Our object here is twofold: to test the performance of the quantity-theory model and the related proposition of monetary neutrality in an ideal context, one in which, to use Bernanke's (2002) phraseology, "money move[d] for reasons that [were] plausibly unrelated to the current state of the economy;" and to reexamine this unique period of macroeconomic behavior from a vantage point in which the dust has, so to speak, settled.

The association between broad movements in money supply growth and inflation in these three episodes is one small but nevertheless telling bit of evidence in favor of what Nelson (2003) has termed the "AEMP proposition," the proposition that, as Friedman (1963) had earlier put it, "substantial inflation is always and everywhere a monetary phenomenon." In effect, however, when this association is examined for any one country or pooled data for several countries the evidence from these episodes provides only three observations.

Fortunately, these regime changes also had a cross-country dimension to them. Underlying the breakdown in Bretton Woods was a desire on the part of many countries to pursue monetary policies independent to that of the United States. Floating exchange rates provided the leeway to do so. Differences among countries in long-term rates of money-supply growth and inflation increased dramatically as a result. Some countries, like Italy and the United Kingdom, saw substantial increases in their inflation rates following the move to floating exchange rates; others, like Germany and Switzerland, only small increases. On the downside, similar cross-country differences emerged as all countries in the sample during the course of the 1980s and 90s returned to the same moderate rates of inflation but from quite different starting points.

In our empirical analysis, we exploit these differences. We use panel data for 20 OECD countries over the period 1960–1998 to investigate the relations between money and prices, real incomes and exchange rates. We focus in particular on the cross-country and cross-regime movements in these data using as our basic units of observation growth shifts, cross-regime changes in the within-regime country average annual rates of growth of the variables.<sup>4</sup> We go on to compare our findings for the 20 OECD countries with findings for a control group of 13 additional countries in which monetary policies followed time paths different to those of the OECD countries in these three periods. As a further check on our results, we estimate a series of money–price regressions using the disaggregated yearly data.

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<sup>2</sup> See Bernanke (2002) for a discussion of the important role that such experiments have played in empirical monetary economics and Friedman (2005) for a recent application to U.S. experience.

<sup>3</sup> See Barro (1982) and Darby et al. (1983) for discussions of this first episode and King and Goodfriend (2005) for a recent retrospective on the second.

<sup>4</sup> Earlier studies employing a similar methodology include Schwartz (1973), Lothian (1985), Duck (1993), McCandless and Weber (1995), and Dwyer and Hafer (1999).

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