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## Money demand and the relative price of capital goods in hyperinflations

Ellis W. Tallman<sup>\*,a</sup>, Ping Wang<sup>b</sup>

<sup>a</sup> *Federal Reserve Bank of Atlanta, Atlanta, GA 30303, USA*

<sup>b</sup> *Pennsylvania State University, University Park, PA 16802, USA*

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### Abstract

We investigate dynamic interactions between relative price movements and money demand behaviors during hyperinflations, viewing relative price changes as resulting primarily from real disturbances. We develop a general equilibrium model with heterogeneous consumption and capital goods to illustrate how monetary shocks may produce real effects through the relative price channel. This motivates the design of long-run restrictions to identify a structural vector autoregression, employing data from the post-WWI Germany and the post-WWII Chinese hyperinflationary episodes. The empirical results support the contention that both real and nominal shocks have important effects on the relative price and money demand during hyperinflations.

*Key words:* Hyperinflation dynamics; Real and nominal interactions

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\*Corresponding author.

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## 1. Introduction

Hyperinflations provide a fertile area for research topics because there remain so many unanswered questions surrounding these phenomena. Past research has been unable to examine completely some fundamental issues, such as whether economic fluctuations during hyperinflations are similar, whether money growth produces real effects, or whether real shocks have a significant impact on money demand beyond inflation expectations.

Cagan (1956), in his pivotal work, models money demand in an adaptive expectations framework, in which an increase in the expected rate of inflation raises the cost of holding money and thus reduces real balances.<sup>1</sup> In a recent article, Taylor (1991) employs cointegration techniques to reexamine the Cagan hyperinflation study and finds that the traditional money demand specification is not supported by the German data.<sup>2</sup> We infer that these results imply that variables in addition to expected inflation have significant impact on money demand.

We hypothesize that real activities have an important bearing on the behavior of money demand even in a hyperinflationary environment. In previous studies of hyperinflation, real variables have generally been excluded from the estimated money demand regression because of the absence of adequate output measures at a monthly frequency. In contrast to previous work, we use additional data measures to indicate real economic factors.

Our study examines and compares two hyperinflationary episodes, post-World War I Germany and post-World War II China, both of which experienced the highest inflation with the longest sample and richest reliable data. Most previous work on hyperinflations assumed that all prices increased equi-proportionately. In contrast, we examine the relative price movements measured by the ratio of the wholesale price to the cost-of-living index.<sup>3</sup> These two countries, to our knowledge, are the only ones experiencing hyperinflation to have separate indexes for consumer and wholesale prices. We use this price ratio

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<sup>1</sup> Sargent (1977) modifies Cagan's approach by allowing individuals' expectations to be rational, while Frenkel (1977) implements the analysis using forward premium as a proxy for expected inflation. Abel, Dornbusch, Huizinga, and Marcus (1979) find that forward premium has significant explanatory power for money demand in addition to inflation expectations.

<sup>2</sup> Taylor shows that for the Cagan model to hold, real money demand and expected inflation must be cointegrated. For certain data samples, most notably for the post-World War I German hyperinflation (1920–1923), the null hypothesis of noncointegration cannot be rejected for these series.

<sup>3</sup> Garber (1982) first used this measure as a proxy for the relative price of capital to consumption goods because of the absence of a capital goods price index. As Garber noted, the proxy measure understates the actual relative price movement of capital goods because the wholesale price index contains prices for some final goods in addition to primary inputs and capital goods.

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