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Commentary

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The adverse effects of high inflation on the real economy resulting from financial market frictions are presented in this interesting article by Sangmok Choi, Bruce D. Smith, and John H. Boyd. Their model suggests that the relationship between inflation and long-run growth is nonlinear: At low rates inflation has neutral or positive effects on real activity while, as inflation increases beyond some threshold level, inflation and real activity are negatively correlated.

The particular market friction they study is asymmetric information, which results in an adverse selection problem. The severity of the friction varies positively with inflation when inflation is sufficiently high. One nice feature of the model is the threshold level, the point at which further increases in inflation lead to credit rationing, is endogenous. Two types of agents exist in the economy, and information is asymmetric because lenders cannot distinguish between agent types. This environment has aggregate effects because higher inflation lowers real rates of return and induces lower quality borrowers (who were not receiving credit before) to borrow. Lenders respond by rationing credit in an effort to eliminate lower quality borrowers. At low inflation rates, there is no credit rationing.

The authors do not formally estimate the model, which is not well-suited to econometric techniques, because there is, in part, no aggregate uncertainty. Choi, Smith and Boyd do provide empirical results for the effects of inflation and inflation variability on the level of economic activity for U.S. stock markets over the period 1958 to 1993. They also examine stock market data for Chile, Korea, and Taiwan. Inflation has significant negative effects on real economic activity only if it is sufficiently high, the authors conclude.

THRESHOLD EFFECT

Although the evidence suggests building a model with an endogenous threshold effect, it does not provide a clear direction for the effect of increased inflation on real activity when initial inflation is low. Nevertheless, for the model to be fully specified, Choi, Smith, and Boyd must take a stand on how real activity responds to small increases in inflation when inflation is low. They choose to model inflation as having positive effects on real activity when inflation is low, but it would be easy to modify this. The model provides more dramatic results under this formulation because the sign of the correlation between real activity and inflation switches from positive to negative at the threshold point.

THE MODEL'S FEATURES

A few important features of the model include:

- Both types of agents are risk neutral and care only about consumption in the second period. Type 1 agents are endowed with one unit of labor supplied inelastically. Type 2 agents have access to a capital production process and are endowed with one unit of labor when old.

- Saving can take place in three ways: (1) The consumption good can be stored yielding x per unit. (2) Fiat money can be held with a return

$$\left(\frac{p_t}{p_{t+1}}\right).$$

(3) Real income can be deposited with a financial intermediary for a return r_{t+1}. For all three activities to take place, the returns must satisfy

$$r_{t+1} = \frac{p_t}{p_{t+1}} = x.$$

- Fiat money is an obligation of the government and the seigniorage is used to subsidize private capital formation. Although this choice in modeling clearly contradicts reality, it serves the following purpose: Adverse effects of inflation on real activity result entirely from how inflation affects the information asymmetry and not from distributional effects in allocating seigniorage. This formulation has the disadvantage of being at such odds with how governments actually work.

ADDITIONAL ISSUES

Several other issues are worth mention. Many restrictions are imposed on the parameter space of the model, raising the question of whether the parameter subspace that admits monetary equilibria contains empirically interesting parameter values. In particular, for money to be held,

$$(1) \quad f'(k_{t+1}) \geq r_{t+1} = \frac{p_t}{p_{t+1}}$$

must be satisfied. When equation 1 fails to hold, there are no monetary equilibria, although there are real equilibria. If inflation exists so that $(p_t / p_{t+1} < 1)$, then equation 1 imposes very strong restrictions on real interest rates. The production function displays constant elasticity of substitution, a specification for which there is a good deal of evidence on the factor shares and the elasticity of substitution between capital and labor. For many realistic parameter values, it is likely that money will not be held. Equation 1 would therefore be violated. The basic question is, for values of the parameters of the production function that are empirically interesting, is there an inflation level that is high enough to attain the credit rationing threshold? My sense is that money will not be valued in that part of the parameter space so that all equilibria are real. More generally, it would be useful to have some description of the parameter space. Although the authors provide a numerical example, the parameter values they choose are not the most natural ones.

Numerous studies have shown that expected inflation, volatility of inflation, and the level of real activity are linked. By incorporating aggregate uncertainty into a model with asymmetric information, Choi, Smith, and Boyd may be able to explain how these variables are related. Typically, episodes of high inflation are characterized by high volatility of inflation. One conjecture, which has some empirical support, is that the volatility of inflation—and not its level—is what matters for real activity. The authors' model suggests that the level of inflation is an important channel, regardless inflation's volatility.

To incorporate a meaningful consumption and savings decision will not significantly change their results, the authors assert. Although there may still be a threshold effect, to add a consumption and savings decision will impose even more restrictions on the parameter space, in particular limiting the parameter values of the money growth, and hence inflation, that can be examined.

EMPIRICAL VS. THEORETICAL

Empirical results are reported in the second half of the article. The link is not clear between the empirical and the theoretical sections. The empirical results can be viewed as providing a motive for the particular formulation of the theoretical model and, in their introduction, Choi, Smith, and Boyd apparently view the empirical section as serving this purpose. But later, in the empirical section, the authors observe that the model does make predictions that can be tested and they suggest that the empirical results in this section provide some evidence to support the model. Because many of the empirical features were used to guide how the model was constructed, the results in the empirical section do not serve as a test of the model.