

Money matters even in the long run without any price friction

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1. Introduction

I have devoted myself to the research concerning the neutrality of money for more than ten years to fix the dynamic microeconomic foundation for the Keynesian economics in the monetary economy. Although it is widely known that there are another equilibrium price functions in the seminal work of Lucas (1972), properties of such functions have not been precisely analyzed (for example, see Otani (1985)).

Lucas's proposition on the neutrality of money crucially depends on two assumptions: (i) the quantity-theoretic equilibrium price function; (ii) the specific money-supply rule that money is supplied by its own interest. Combining these two assumptions, an increment of money is equivalent to a kind of denomination, and hence money becomes neutral under the perfect information structure.

My sequential papers and books (Otaki 2005, 2007, 2009, 2011a, 2011b 2011c, Otaki and Tamai 2011a, 2011b) also deploys a market clearing two period overlapping-generation model, however, entirely eliminating the two quantity-theory favorable assumption. As a result, I find that Hicks-Samuelson's 45 degree line analysis is still valid even in utility-profit maximizing behavior and flexible price mechanism. In the subsequent section, I shall illustrate the outline of the theory.

2. By which is the price level determined marginal cost or nominal money supply?

As Keynes (1936) points out, there is a curious chasm between micro and macro economics. Microeconomics teaches us that the price is governed by its marginal cost. On the other hand, however, macroeconomics textbooks suddenly claim the importance of nominal money supply in price determination. How do these seemingly contradictory theses relate with each other?

Our approach follows the microeconomics principle. That is, we presume that price is equalized to its marginal cost. Consider, for simplicity, that the production resource is confined to labor, and that unit labor bears unit good. Then, the price is equal to the nominal equilibrium wage.

Nevertheless, in the OLG model, minimum nominal wage W that invokes individuals to work is not only a function of the current price but also that of the future price because individuals takes the future consumption level into consideration when

they decide whether to participate. Thus, we obtain the following fundamental difference equation concerning the evolution of price level p_t :

$$p_t = W(p_t, p_{t+1}).$$

The above equation immediately implies that the price can be determined entirely independent of the nominal money supply M_t . If individuals rationally believe that money is *credible*, which means the purchasing power of money $1/p_{t+1}$ is not perturbed by a change of nominal supply, the current price level is also endogenously fixed, and the economy is upturned by the increase of the real money supply $m \equiv M_t / p_t$. In this sense, the cause of price stickiness is not the exogenous price-realignment cost, but the faith of individuals to the value of money.

If the utility function on lifetime consumption is homothetic, we can write down the equilibrium condition for the good market as

$$y_t = c(\pi^*) y_t + m,$$

where π^* is the equilibrium inflation rate determined by the above fundamental difference equation. y_t denotes the real GDP. Accordingly, Hicks-Samuelson's 45 degree analysis can be verified even under the standard neoclassical microeconomics application.

Finally, we must note that the good market's equilibrium condition is time independent. In this sense, the imperfect employment equilibrium can be stationary, and thus, Keynesian theory on the basis of a rigorous dynamic microeconomics is considered as a long-run equilibrium analysis, not the analysis of transition process toward the long-run equilibrium that neoclassical macroeconomics describes.

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