Irving Fisher's Self-Stabilizing Money

Robert E. Hall

The American Economic Review, Vol. 87, No. 2, Papers and Proceedings of the Hundred and Fourth Annual Meeting of the American Economic Association. (May, 1997), pp. 436-438.

Stable URL:
http://links.jstor.org/sici?sici=0002-8282%28199705%2987%3A2%3C436%3AIFSM%3E2.0.CO%3B2-M

The American Economic Review is currently published by American Economic Association.

Irving Fisher's Self-Stabilizing Money

By ROBERT E. HALL*

Irving Fisher believed passionately in the social benefits of a stable price level. His ideas have fed an underground spring of monetary economics since around 1980. My remarks deal with developments in this underground. That Fisher's monetary ideas have remained so deeply underground is notable for two reasons. First, the ideas have been applied successfully in one nonsubterranean (but antipodal) economy. And second, although monetary economics based on conventional principles is disappearing as a professional specialty, neither the ideas of Fisher nor any other ideas have burbled up to fill the drying lake of conventional monetary thinking.

I will start with a brief discussion of the way that Fisher thought about the determination of the price level. Prices are quoted in a unit of value. To define the unit of value, the government makes a definition of the following generic form: the unit of value is x_t units of resource y. Some examples are provided in Table 1.

Let r_t be the value of one unit of the resource relative to the cost-of-living bundle. Then the real value of the unit of value is

$$v_t = x_t r_t$$

and the price level is

$$p_t = \frac{1}{x_t r_t}$$

To stabilize the price level at a level p_0, the rule is

$$x_t = \frac{1}{p_0 r_t}.$$

This is precisely the price-stabilization policy promoted by Fisher. He drew up detailed rules setting forth the mechanics of stabilized money. The steps are, first, measure the cost of living according to the prices quoted by merchants under the current definition of the monetary unit. Second, adjust the resource content of the monetary unit, x_t, by the same proportion that the measured price level misses the target, p_0. Fisher presumed the use of gold as the resource, so his rule was to adjust the gold content of the dollar as needed to keep the purchasing power of the dollar constant. Fisher pioneered measurement techniques for the cost of living in order to make this idea practical.

To my knowledge, Fisher's idea has never been used with a precious metal as the resource underlying the monetary unit. Most probably the neglect has been to society's benefit. Fluctuations in the purchasing power of gold have been sufficiently large that substantial changes in the gold content of the monetary unit would have been needed to stabilize prices. Moreover, the nature of the forces that change the dollar price of gold may be such that anticipatory, discretionary monetary policy would be less disruptive to economic activity than the mechanical application of Fisher's scheme.

Any credible method for price stabilization, including Fisher's, will prevent monetary panics precipitated by fears of coming inflation, when the prices of gold and other commodities rise sharply. Consequently, the wide swings in the purchasing power of gold seen during periods when the credibility of price stability was in doubt (such as 1980) cannot be used to measure the magnitude of the changes in the purchasing power of gold that Fisher's formula would be called upon to offset. Nonetheless, it appears that other sources of volatility in the purchasing power of gold would stand in the way of Fisher's scheme based on gold as the resource. One such source would be financial panics, when the public loses faith in banks and seeks to hold more wealth in gold and other commodities. In the face of a panic,

* Hoover Institution and Department of Economics, Stanford University, Stanford, CA 94305, and NBER.

TABLE 1—HISTORICAL EXAMPLES OF DEFINITIONS OF THE UNIT OF VALUE

Provenance	Name of unit of value	Resource	Rule for number of units of resource
United States before Civil War	dollar	gold	0.04838 oz
Modern United States	dollar	paper dollar: bearer security issued by Federal Reserve	1
Proposal by Irving Fisher (1920)	dollar	gold	Amount needed to buy the cost-of-living bundle
Modern Chile	unidad de fomento	paper peso: bearer security issued by Bank of Chile	Number required to buy the cost-of-living bundle
Argentina, Burma	peso, FEC	U.S. dollar	1

the necessary decline in the gold content of the monetary unit could be achieved under Fisher's scheme only by waiting for actual deflation to trigger the appropriate adjustment. Portfolio shifts originating in other countries also put stress on Fisher's formula; for example, the revolution in Iran coincided with a large increase in the purchasing power of gold that would have required months or years of grinding application of the formula before it found the right decrease in the gold content of the dollar.

In place of Fisher's mechanical formula, it appears in retrospect that it would be better to define the gold content of the dollar, x_t, as an instrument of discretionary monetary policy. Alan Greenspan could probably considerably outperform Fisher's formula, because he could use all available information about the current and likely future purchasing power of gold and adjust the gold content of the dollar before deflation or inflation actually occurred. But the superiority of discretion arises from defining the monetary unit in terms of an unstable resource, gold. Mechanical nondiscretionary rules can work well with a different resource.

The better application of Fisher's program for defining a self-stabilizing monetary unit is to use a resource with more stable purchasing power. The extreme form would be to define the unit of value directly in terms of the cost-of-living bundle; this approach is completely impractical. The resource underlying the definition must be one in which actual transactions can occur. In practice, this limits the resource to standardized metals and other commodities or to securities. Earlier research of mine in Fisher's framework demonstrated to my satisfaction that no bundle of commodities would work. This leaves securities. Practice, not research, has demonstrated beyond doubt that defining the monetary unit as x_t units of a standardized security is a foolproof way to create a self-stabilized monetary unit.

Though Fisher was regarded during his lifetime and long after as a crackpot visionary, his idea for self-stabilized money has been a complete success in actual practice. Since about 1980, Chile has had a monetary unit, the *unidad de fomento,* operated according to Fisher's principles. The resource underlying the UF is a bearer security of the Bank of Chile. The number x_t is published every day in every newspaper. An elaborate but successful formula changes the peso content of the UF each day so as to track the best estimate of that day's cost of living; the formula is driven by monthly data from the cost-of-living index. Soon after the introduction of the UF, essentially all forward contracts in Chile came to be written in UF's; the country achieved universal cost-of-living indexation painlessly. Every apartment lease, mortgage, savings account, and pension is stated in UF's.

Interestingly, the success of the UF has remained unknown, or at least unremarked upon, among economists in every country of the world outside Chile, despite the large number of self-professed Irving Fisher Fan Club members.

As I noted above, fluctuations in the purchasing power of the resource underlying the definition of the monetary unit are an inconvenience in Fisher's scheme. Could one

design a security whose purchasing power is constant? If so, it would be unnecessary to distinguish between the security and the monetary unit. Chile would not need to have a peso and a UF if the terms of the peso could be altered so that its purchasing power was constant. It turns out to be straightforward to create such a security. (If the underground Fisherian literature has already considered this issue, I am unaware of it.)

Let $p(t)$ be the price level measured in a country's existing unit of value and let $n(t)$ be the short-term nominal interest rate set by the market for government debt. Consider a security that pays a floating amount

$$p(t)\left[n(t) - \frac{\dot{p}(t)}{p(t)}\right].$$

That is, the security pays a nominal return equal to the current real interest rate multiplied by the price level. What is the nominal value of this security? It is

$$\int_t^{\infty} \exp\left(-\int_t^{t+\tau} n(s)\,ds\right) p(t+\tau) \times \left[n(t+\tau) - \frac{\dot{p}(t+\tau)}{p(t+\tau)}\right] d\tau.$$

Let

$$x(t+\tau) = \exp\left(-\int_t^{t+\tau} n(s)\,ds\right) p(t+\tau).$$

Then, the nominal value can be written as

$$\int_0^{p(t)} dx$$

which is just $p(t)$. So the nominal value of the security is equal to the price level. Its real value, $r(t)$, is 1. If the monetary unit is declared to be one of these securities, the price level must always be exactly 1.

In practice, a monetary policy based on this principle would involve paying interest on reserves. Each dollar of reserves would be credited with interest of $n_t p_t - p_t + p_{t-1}$. As with the UF, there would be daily interpolation between monthly price observations.

In conventional terms, the idea is to stimulate the demand for reserves if the price level is too high, which will raise the demand for reserves and pull down the price level. It is like a policy of reducing reserves when prices are too high, but it raises demand rather than lowering supply.

REFERENCES

Fisher, Irving. *Stabilizing the dollar*. New York: Macmillan, 1920.