The Welfare Cost of Inflation

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The specification of the money demand function is also crucial in the estimation of the welfare cost of inflation. Whether inflation is costly is an important question, especially given the prevalence of inflation in the economic history of many countries around the world. In this chapter we provide a brief summary of the theoretical issues regarding the estimation of the welfare cost of inflation and note that the welfare cost of inflation question is an outstanding one in macroeconomics and monetary economics.

6.1 The Money Demand Function

Consider the following money demand function

\[ \frac{M}{P} = F(R, y), \]

where \( M \) denotes nominal money balances, \( P \) the price level, \( y \) real income, and \( R \) the nominal rate of interest, all at time \( t \). Assuming that the \( F(R, y) \) function takes the form \( F(R, y) = \Phi(R)y \), the money
demand function can be written as \( m = \Phi(R)y \), where \( m \) denotes real money balances, \( M/P \). Equivalently, we can write
\[
z = \frac{m}{y} = \Phi(R),
\]
which gives the demand for real money balances per unit of income as a function of the nominal interest rate \( R \).

The specification of the money demand function is crucial in the estimation of the welfare cost of inflation. As you will see in the next section, Bailey (1956) and Friedman (1969) use a semi-log demand schedule whereas Lucas (2000) uses a double log (constant elasticity) schedule on the grounds that the double log performs better on the U.S. data that does not include regions of hyperinflation or rates of interest approaching zero.

### 6.2 The Consumer Surplus Approach

Bailey (1956) uses tools from public finance and applied microeconomics to measure the welfare cost of inflation. He argues that the welfare cost of inflation is the area under the inverse money demand schedule — the ‘consumer surplus’ that can be gained by reducing the nominal interest rate from a positive level of \( R \) to the lowest possible level (perhaps zero). In doing so, he implicitly assumes that individuals hold money (thereby sacrificing interest) because of the benefits from the transaction-facilitating services provided by money. These benefits are the reduced time and energy devoted to shopping and for any given change in the level of money holdings, the change in these benefits is represented by the area under the inverse money demand schedule between the initial and final levels of money holdings.

In particular, based on Bailey’s consumer surplus approach, we estimate the function \( z = \Phi(R) \), calculate its inverse \( R = \Psi(z) \), and define the welfare cost function \( w(R) \) by
\[
w(R) = \int_{\Phi(R)}^{\Phi(0)} \Psi(x)dx = \int_{0}^{R} \Phi(x)dx - R\Phi(R). \tag{6.1}
\]

Above, \( w(R) \) is the welfare cost of inflation expressed as a fraction of income.

Clearly any measure of the welfare cost of inflation depends on the money demand function \( \Phi(R) \) that is used. Bailey (1956) and Friedman