

Inflation: The Cruellest Tax?

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Inflation has become of paramount importance over the last 25 years. Its effects, real and presumed have led to it becoming, in many people's eyes public enemy number one. Alan Stuart discusses some of the welfare effects and difficulties in measuring inflation.

Inflation can be defined as a persistent rise in the average price level over time. The importance of price stability as a *secondary* policy objective lies not so much as an end in itself, but due to its implications for more *primary* policy objectives of equity, efficiency and growth.¹ In this paper I shall initially examine the social costs of inflation and problems associated with its measurement at a microeconomic level. Then inflation's macroeconomic impact on the goods, money and labour markets using the Hicksian IS-LM framework, in the context of both a closed and an open economy. Finally, given the importance of hyperinflation to many newly-industrialising and less-developed countries, I shall conclude with an investigation as to how government policy can end hyperinflation through certain fiscal and monetary policy prescriptions.

Social Costs of Inflation

Conventional approaches to analysing inflation's costs are divided into two idealised contingencies: expected and unexpected inflation, although partial anticipation is perhaps most realistic. With *perfectly anticipated* inflation all prices and wages are perfectly indexed and households and firms suffer no money illusion. Yet even under such an ideal, costs are incurred. The "shoe leather costs" involves the inconvenience of having to make more frequent withdrawals from the banks for transactions in order to minimise depreciating holdings of currency. "Menu costs" involve the difficulties with continually having to change prices and wages so as not to distort market decisions. In addition, the changing price level distorts money's function as a measure of value.

More realistic of 1990s Western Europe, *partially anticipated* inflation involves indexation with a lag effect. Problems here include the distortion to relative prices when indexation adjustments are made at different intervals. Apart from creating market allocation inefficiency, the issue of determining real capital gains for taxation purposes arises with lagged indexation.² Periodic transfers of wealth

¹ Hayes & McAleese, 1995

² Mankiw, 1994

from private sector to public sector due to lagged tax bands is another taxation difficulty.

The worst social effects, however, emerge under conditions of *unanticipated* inflation. Here, all types of arbitrary redistribution's of wealth occur. Primarily, debtors gain at the expense of creditors on fixed contracts due to the fact that repayments are in a less valuable currency. People on fixed incomes like some workers and pensioners suffer badly, and since these economic groups tend to be poorest, inflation increases inequality in society. Since high inflation is also extremely variable it is difficult for investors to calculate net present values accurately, resulting in a shortening of agents planning horizons.

Measurement Problems of Inflation

The accurate measurement of inflation is vital for indexation purposes and control by the Central Bank in the economy. Altogether three main factors affect the accuracy of price indices. This is to do with the fact that the RPI, WPI, MPI and CPI are all Laspeyres indices based on a weighted average of a fixed "basket of goods".³ Firstly, there may be changes in the quality of goods that are not incorporated accurately in the price indices (*quality bias*), a more gradual measurement problem. The fixed "basket of goods" also doesn't allow for substitution to lower priced goods and thus only measures the "income effect" of inflation (*substitution bias*). However, the worst measurement problem lies in the fact that the sample basket is an incomplete inventory of the economy's goods and services (*composition bias*) which renders inaccurate the measure of an average individual's purchasing decisions.

Inflation's Effect on Keynesian IS/LM Model

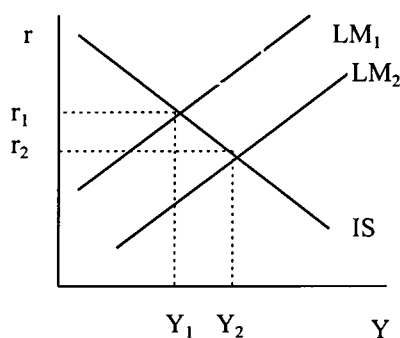
When Hicks originally adapted Keynes's ideas to the IS-LM framework, the assumption of constant prices was paramount. Thus the model does not lend itself well to analysing the effects of inflation, and many economists have only tended to study one inflationary effect in isolation. The best synthesis of inflationary effects available using an IS-LM framework is by Gowland (1991) and can be grouped into: (a) wealth effects; (b) real balance effects; (c) real interest rate effects.

Concerning wealth effects, it must be noted that an increase in wealth stock usually accompanies an increase in income flow, but here we hold income constant and examine comparative static changes in exogenous wealth. Changes in wealth affects both the IS and LM curves. With regard to the LM curve, inflation reduces household wealth by reducing the real value of all money-denominated assets, therefore leading to less money being demanded at each

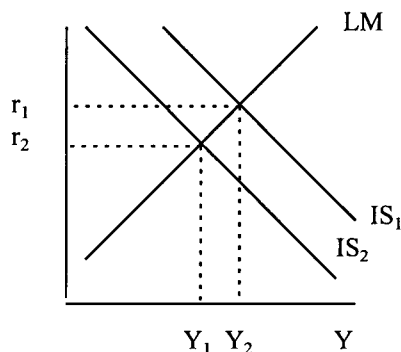
³ Mankiw, 1994

combination of income and interest rates. The money demand schedule shall shift inwards and lead to an excess of money supply over money demand, holding the money supply curve constant. Thus, to restore equilibrium the LM curve must shift to the right, and a new equilibrium is attained at (Y_2, r_2) (see diagram (a)).

Diagram (a) & (b)

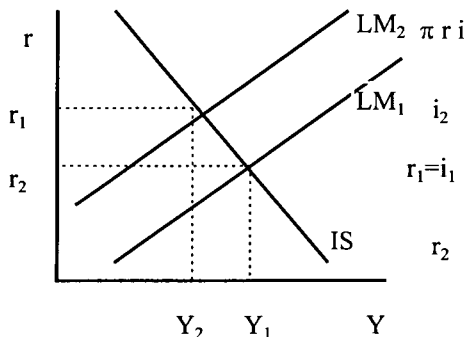


(a) Inflationary decrease in wealth shifts LM curve outwards

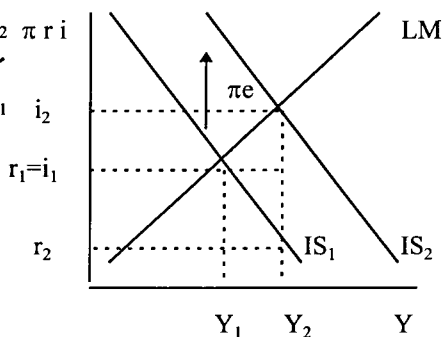


(b) Inflationary decreases in wealth shifts IS curve inwards

Diagram (c) & (d)



(c) Inflationary decrease in real balances shifts LM curve inwards.



(d) Expected inflation lowers the real rate and shifts the IS outwards

The effect on the IS curve, more intuitively, involves an inward shift.⁴ A decrease in wealth induces consumers to spend less at each level of income so more is saved. Thus planned withdrawals are more at each level of income (presuming no taxation or imports), and therefore at every interest rate a lower level of income is

⁴ Gowland, 1994

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necessary to generate an equal quantity of planned withdrawals. The result, *ceteris paribus*, is an inward shift in the IS curve (diagram (b)).

The second inflationary effect to consider is the real balance effect of inflation. This effect, holding money demand constant, measures the decrease in the supply of real money balances due to inflation, holding the nominal money supply constant. The vertical real money supply curve shifts inwards and the excess money demand drives up interest rates to regain equilibrium, thus shifting the LM curve inwards (diagram (c)).

A third inflationary effect arises when one takes into account the real interest rate. Strictly defined, the real interest rate (r) is derived from the nominal interest rate (i) and inflation rate (π) according to the formula: $r = [(1+i)/(1+\pi)] - 1$.⁵ However, the Fisher Effect relationship is usually approximated to $r = i - \pi$ arithmetically.⁶ If the inflation is expected, the real interest rate deviates below the nominal interest rate by the expected inflation rate (π). The reduction in the *real* interest rate for any given *nominal* interest rate stimulates the investment component of Aggregate Demand, which shifts the IS curve outwards (diagram (d)).

Therefore, from this brief analysis one can appreciate the conflicting effects of inflation on the goods and money markets. No single conclusive result can be drawn, although often attempted, regarding inflation in the IS-LM framework at a theoretical level.⁷

Effects of Inflation on Labour Markets

The effects of inflation upon the labour market also reflect conflicting ideas about inflation's effects depending upon workers' and firms' ability to anticipate price rises. For simplicity let us assume that the quantity of labour demanded and supplied is related to the real wage in simple linear relationships ($L_D: W/P = a_1 - b_1 L$; $L_S: W/P = a_2 + b_2 L$).

Supply

$$\text{Perfectly anticipated } \pi: \frac{W(1+\pi)}{P(1+\pi)} = \frac{W}{P} = a_2 + b_2 L$$

$$\text{Perfectly unanticipated } \pi: \frac{W}{P(1+\pi)} = a_2 + b_2 L$$

Demand

$$\frac{W(1+\pi)}{P(1+\pi)} = \frac{W}{P} = a_1 - b_1 L$$

$$\frac{W}{P(1+\pi)} = a_1 - b_1 L$$

⁵ Hardwick, 1987

⁶ Mankiw, 1994

⁷ Gowland, 1994

$$\Rightarrow \underline{W}=(a_2+b_2L)(1+\pi)$$

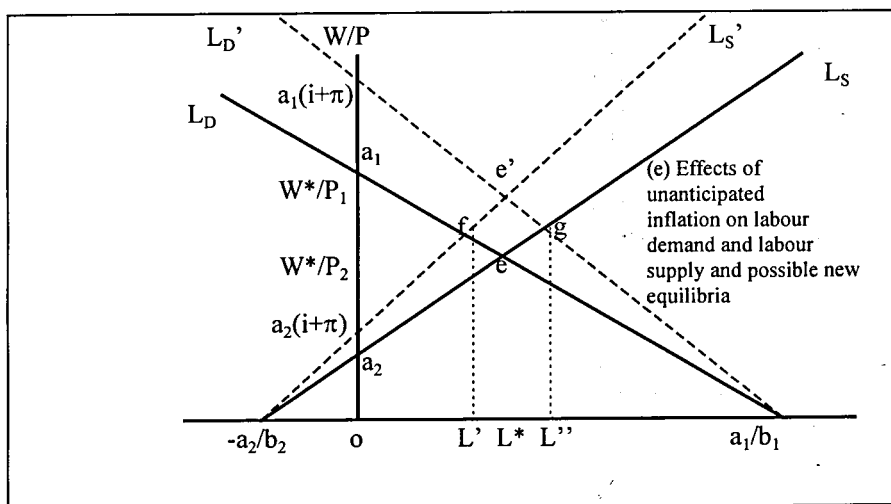
$$\Rightarrow \underline{W}=(a_2+b_2L)(1+\pi)$$

$$\Rightarrow \underline{W}=(a_1-b_1L)(1+\pi)$$

$$\Rightarrow \underline{W}=(a_1-b_1L)(1+\pi)$$

With perfectly *anticipated* inflation, both wages and the price level increase by a factor of $(1+\pi)$, thus leaving the overall real wage, and demand and supply curves unchanged (i.e. $W(1+\pi)/P(1+\pi)=W/P$). However, with perfectly *unanticipated* inflation the real wage rate remains constant while only prices increase. The money illusion of workers and firms causes the labour supply curve to rotate inwards and the labour demand curve to rotate outwards around their labour-axis intercepts as is shown in diagram (e).

Diagram (e)



Thus, unanticipated inflation drives up the real wage rate to clear the market shifting equilibrium from e to e' , whereas with perfect anticipation equilibrium remains at e . Output L^* could only deviate towards L' or L'' if firms' and workers' perceptions about the future price differed. The locus of all market clearing equilibria covering all degrees of anticipation for workers and firms is represented by the polygon "efe'g" in the diagram. However others⁸ have suspected that the presence of market imperfections due to collective wage bargaining could lead to even different equilibria, and that the "atomised" bargaining assumption I have made is unrealistic.

Effects of Inflation on Open Economies

⁸ Carlin & Soskice, 1996

Effects of Inflation on Open Economies

Relaxing the assumption of autarky, the effects of inflation upon the goods and money markets in open economies shall now be examined. An effective analysis of open economy inflation should begin with a discussion of the real exchange rate or *terms of trade* (ϵ), defined in relation to the nominal exchange rate (e), the domestic price level (P) and the foreign price level (P') in the relationship $\epsilon = eP/P'$. For open economies with fixed nominal exchange rates and large foreign trade to GDP ratios, their inflation rates (P); must be closely tied to those of their large trading partners (P') to maintain constant terms of trade competitiveness (ϵ). If import prices are increased due to external inflation, then the effect will be passed on by a rise in domestic prices (P) to maintain competitiveness.⁹ Large open economies are insulated from this "law of one price" theory of inflation if foreign trade is a small part of GDP or if only minor trading partners experience inflation.¹⁰ Alternatively the terms of trade (ϵ) can be held constant against foreign inflation if necessary by large and small open economies by maintaining a flexible exchange rate regime and periodically revaluing. Conversely devaluation can exacerbate foreign inflationary pressures by augmenting the cost of imports, as many Latin American countries discovered in the 1970s. A more detailed investigation of exchange rates and inflation rates can be undertaken if one considers the real trade-weighted exchange rate or *effective rate* (ϵ_t),¹¹ which weight an open economy's trade according to the significance of trade with various trade partners in the relationship:

$$\epsilon_t = (e_1 P/P'_1)w_1 + (e_2 P/P'_2)w_2 + \dots + (e_n P/P'_n)w_n$$

However, for simplicity we shall not differentiate between the effective rate and terms of trade, since only the latter is considered by Robert Mundell and Marcus Fleming in their open-economy adaptation of the IS-LM framework.¹² For our purposes, holding the nominal money supply, trade restrictions and government spending fixed, important results can be obtained from analysis of the inflationary impact. We shall assume a *small* open under consideration, which has no effect on the world interest rate and thus accepts a given equilibrium in the money market independent of the real exchange rate. Thus the LM curve used in the Mundell-Fleming model for an open economy (LM*) can be represented by a vertical line in relation to the real exchange rate (diagram (f)).

In an open economy, it must be remembered that net exports are another component of aggregate demand, and that it has an inverse relationship with the

⁹ Hayes & McAleese, 1995

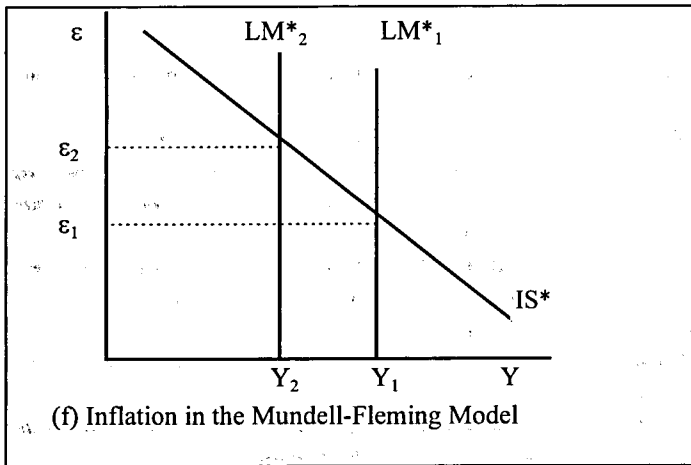
¹⁰ Snowdon, Vane & Wyneczyk, 1994

¹¹ Hayes & McAleese, 1995

¹² Carlin & Soskice, 1996

real exchange rate (ϵ)¹³. Thus if the ratio of domestic inflation to foreign inflation increases, the real exchange rate will appreciate unless a flexible *nominal* exchange rate is allowed to adjust to keep the real rate constant. However under a fixed nominal rate regime the real exchange rate will appreciate, thus reducing net exports and causing a contraction in aggregate demand. The result of this contraction is a movement along the IS curve to a new equilibrium at Y_2 . The reduction in real money balances under inflation with a constant nominal money

Diagram (f)



supply induces the LM* curve to shift inwards under an “inverse” Pigou effect to reach a new goods and money market equilibrium at a higher real exchange rate (ϵ_2). The effect of a real exchange rate appreciation on a large open economy wouldn't be as severe due to its ability to influence the international interest rate, and adjust net foreign investment accordingly.¹⁴

Conclusion

This paper has sought to raise some important questions regarding inflation which are relevant to assessing its impact on other key economic variables. Although comparatively a modern phenomenon, there have been some major inflationary bouts throughout history. Spanish gold and silver looted from the Aztecs and Incas in the 16th century brought a huge bout of inflation to Europe, while the post-WWI hyperinflation in Germany is a classic example that comes to mind. The description of inflation in the title leaves one in no doubt as to its malign effects. However, no two economists seem to agree upon the magnitude of these effects and to what extent they are strengthened or dissipated by indexation,

¹³ Carlin & Soskice, 1996

¹⁴ *ibid.*

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expectations, sticky wages, market imperfections and how accurately they can be measured. Thankfully, the contemporary phenomenon of creeping inflation in the industrialised world seems to signify that policymakers believe its control to be an important policy objective. Consistent vigilance is necessary however, as casual monetary and fiscal policy can easily stimulate rapid inflation as Ireland and the U.K. discovered in the 1970s.

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