A Simple Model of Keynesian Fiscal Policy

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Abstract

A simple Keynesian model based on fixed wages.

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I thank xxx for helpful comments.

1. Introduction

It's useful to have as simple a model as possible of Keynesian stimulus. That's what I try to provide here. It is even easier to understand than the aggregate supply/aggregate-demand model of the textbooks, I think, but more rigorous too. It achieves this simplicity by omitting money, time, and interest rates from the model.

2. The Model without Taxes

The economist consists of a government and a large number of workers and identical firms, which are owned by the workers.

The number of firms is fixed, and production has diminishing returns so in equilibrium each firm produces the same output. Firms hire workers at a fixed wage w, contractually fixed at the start of the model's one period, to produce one good. Each unit of output requires one unit of labor and an amount of depreciation of the existing stock of capital that depends on how much labor is used, so the cost to the economy of producing Q units of output is

$$c(Q) = wQ + rd(Q), \tag{1}$$

where we assume that $d' > 0, d'' > 0$.

The aggregate supply curve is the industry marginal cost curve, which is

$$AggregateSupply(AS) : P(Q) = c'(Q) = w + rd'(Q). \tag{2}$$

Private income is the sum of labor income and capital income, which is

$$Income = wQ + (PQ - (wQ + rd(Q)) = wQ + [w + rd'(Q)]Q - wQ - rd(Q)) = wQ + rd'(Q)Q - \tag{3}$$

Private quantity demanded, y, falls in the price directly and rises in national income. Since national income rises with price, it is possible that $y(P)$ rises with price. We will rule that out by assumption.

Demand for output is the sum of private quantity demanded y(P) plus government deficit quantity demanded G:

$$AggregateDemand(AD) : Q(P) = y(P) + G. \tag{4}$$

I call G the government deficit because balanced-budget government spending, if financed by lump-sum taxes, will not affect aggregate demand or supply.

xxx How about saying that in the second period, the worker retires and consumes his entire wealth at a particular longterm equilibrium price-wage. YES. Zero time preference, concave utility will do that. I still need the slope assumption.

G can be any exogenous demand source. Foreign demand for our exports, for example. Or investment demand.

3. Using the Model

Now we can put the two curves together.

For each possible wage level w there is a different AS and AD curve combination. AS and AD both shift up with the wage.

For each government deficit level G there is a different AD curve, though G does not affect the AS curve. Bigger G shifts up AD.

There is one wage level that would equilibrate the system if wages were flexible and $G = 0$. FALSE– THE OUTPUT IS PINNED DOWN, BUT NOT THE NOMINAL WAGE We will call that the long-run wage and its AS-AD equilibrium output the long-run output.

We finally come to the payoff of this model. What happens if the government deficit increases?

What happens after G increases is that AD shifts up. There is a new intersection of AS and AD at a bigger output and higher prices.

The story is that government demand tends to raise the price, which makes production more profitable, so employment goes up. As people become richer, they demand more too, raising prices still further, which increases employment further.

Note that this reasoning applies whether the economy starts below long-run equilibrium output or above.

Could the economy permanently be above long-run equilibrium output? Yes, in this myopic model. But that wouldn't be optimal– people are working too hard.

Can private consumption rise with G (a multiplier of more than 1?)

Also discuss a supply shock– banking crisis.

Also discuss a coordination expectations shock.

I don't have anything that pins down prices in this model in the long run.

4. The Model with Taxes

Now let us add two kinds of taxes to the model. The first is a tax on workers of t per dollar of labor income. The second is a sales (or value-added) tax on firms of s per unit of output.

Private aftertax income, the sum of labor and capital income, is now

$$Income = wQ(1-t) + ([P-s]Q - [wQ + rd(Q)]) \tag{5}$$

Now the aggregate supply curve becomes

$$AggregateSupply(AS) : P(Q) = w + s + rd'(Q) \tag{6}$$

References

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