Some Difficulties with the IS-MP and AD-IA Models

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Abstract

This note describes a few difficulties I encountered teaching the IS-MP and AD-IA models to 205 undergraduates at the National University of Singapore.

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1 Introduction

This note highlights a few difficulties I encountered when I taught IS-MP and AD-IA models to 205 undergraduates at the National University of Singapore. This course only discusses the close economy version of the theory of short run fluctuations. The IS-MP and AD-IA models were taught as a new development, after exposing the students to the more traditional IS-LM and AD-AS models, following the textbook of Abel and Bernanke (2001). My powerpoint slides on the IS-MP and AD-IA models can be found at the following web page: http://courses.nus.edu.sg/course/ecswong/notes/lecture11.ppt

2 The Difficulties

Here are some specific problems I encountered:

Difficulty 1: Why does the AD curve suddenly become an inverse relationship between inflation and output? How should we think about this AD curve when everything we learnt elsewhere tells us that AD is an inverse relation between price and output?

The students really have a hard time accepting the AD curve as an inverse relationship between inflation and output and relating this to what they learnt elsewhere. One student put it quite bluntly: ”The axis must be wrong!” The students have always learnt that AD is an inverse relationship between price and real output, and inflation is the rate of change of prices. Because I taught the IS-LM and AD-AS frameworks before teaching the IS-MP and AD-IA frameworks, this change feels especially drastic. By calling the inverse relation between inflation and output as AD, I feel that we are asking the students to unlearn what they had learnt so far. To them, it means that either what they had learnt is wrong or this stuff is wrong. Either possibility is unpalatable. Because they get confused and disoriented with an AD curve with inflation on the vertical axis, this change makes it harder for them to accept the rest of the model.
I feel that we gain very little by retaining the name AD for an inverse relation between inflation and output. But the cost in the form of confusion is great: they grew suspicious with the model and more effort is required to teach the model. My suggestion is: Why not call this relation by a different name, say the output adjustment (OA) curve? After all, the short run AS curve is replaced by the Inflation Adjustment line, why not go one step further and rename the AD as well? After all, aside from the definition of AD as the intersection of IS and MP curves, it is somewhat weird to think of the aggregate demand in terms of the rate of change of prices, instead of prices themselves. I think a name along the line of output adjustment curve makes sense given that in the OA-IA framework, IA tells us the inflation rate we inherited from the past at any moment. In turn, given the inflation rate, OA (the output adjustment curve) tells us how output adjusts to the inflation rate (through the actions of the central bank).

**Difficulty 2: What exactly does the IA line mean? What are the micro-foundations of inflation stickiness, especially downward inflation rigidity?**

I have followed your notes in telling the students that the IA line tells us what the inflation rate is at any moment in time. It is fixed in the short run because current inflation is inherited from the past. When students remain confused, I try to explain why current inflation is “inherited” from the past. John Taylor (2004) contains some arguments motivating the horizontal IA line.

Taylor (2004) gave two explanations: first, the expectations of continuing inflation, and second, staggered price and wage setting. Let me talk about the second explanation first. I feel that while we have a lot of theory trying to explain price stickiness (like menu costs and near rationality), I am not aware of a lot of theory trying to explain inflation stickiness (and I do not remember at the top of my head the implications of these sticky price models on inflation stickiness). So in some sense, I am not sure how I should teach them the micro-foundation for inflation stickiness other than to wave my hands about staggered price setting.

Taylor’s first explanation about the expectations of continuing inflation raises the third difficulty.
**Difficulty 3:** How to discuss inflation in the IS-MP and AD-IA models? What are the determinants of inflation here?

In the IS-LM model, inflation is ultimately everywhere and always a monetary phenomenon. In the long run, the rate of inflation is the growth rate of nominal money supply. I showed the students many empirical graphs to nail this down. In the IS-MP model, it is not so clear what to say of the determinants of the inflation in the long run because it intentionally moves away from the discussion of money supply. Without explicitly discussing the relationship between nominal money growth and inflation, what are the micro-foundations for the expectations of continuing inflation? Are we reverting to adaptive expectations?

This gives rise to more difficulties. One of the recurring questions I got comes from the discussion of fiscal policy in AD-IA framework (Romer, 2002, pp.49-53 and Figure III-9). Here you discuss the short run and long run effects of a permanent increase in government purchases, i.e., government purchases rise from their initial level to a higher level, and then remain at that higher level.

**Difficulty 4:** Since the government also has to satisfy a budget constraint, wouldn’t a permanent increase in government expenditure lead to a permanent increase in taxes and a permanent fall in consumption by an equal amount, leaving the IS curve and the AD curve unaffected?

One of the difficulties I encountered was due to the fact that I was following Abel and Bernanke’s text. In their text, consumption theory is based on either the permanent income hypothesis or life cycle hypothesis. Thus, a permanent increase in government purchase must induce a permanent increase in taxes and so consumption must fall by the full amount, not by the marginal propensity to consume. So the IS curve and the AD curve do not shift. It is slightly uncomfortable but that is a rather minor difficulty if I adopt the usual Keynesian consumption function that depends on current disposable income.
However, there are three more unsettling difficulties I encountered in this discussion, which is related to point 3 above about the determinants of inflation in the IS-MP and AD-IA models. When I taught the IS-MP framework, I taught them Taylor rule as a way to understand the MP curve. I told them that they can think of the central bank as one that follows Taylor’s rule. Of course, a central banker that follows Taylor’s rule worries about inflation and will raise interest rate to curb excessive inflation (basically Figure III-10 in Romer (2002)).

**Difficulty 5: If the central bank really cares about inflation as we assumed in the notes, why does the actions of central bank lead to higher long-run inflation in Figures III-9 and III-10?**

A common misunderstanding among the students is that the action of the central bank aimed at reducing inflation appears to have increased inflation instead in Figure III-9. They often ask me why the action of central bank leads to higher inflation, when the central bank is in fact trying to do the opposite. Did the central bank screw up? I often told them that higher inflation is due to permanently higher government purchases that increases AD above the natural rate, and not due to the action of central bank. The central bank’s action merely explains the adjustment of output back to its natural rate, i.e., the north westerly movement along the new AD curve to the long run equilibrium. Perhaps a brief note in the updated version may help avoid this confusion?

A natural question is what would happen if the central bank in fact does nothing as inflation rises. I find myself having difficulties explaining what would happen otherwise. On the one hand, any output above the natural rate is unsustainable. On the other hand, if central bank does nothing (keeps interest rate unchanged), I do not see other mechanisms in the IS-MP framework that would bring the economy back to the long run equilibrium at the natural rate. On the third hand (I am running out of hand :-), this economy cannot have explosive inflation if the central bank does nothing because there is no change in money supply.

**Difficulty 6: So what would indeed happen with permanently higher government expendi-**
What if the central bank does not react to the inflationary pressure under the IS-MP model?

How to explain the mechanisms that would restore long run equilibrium in the absence of central bank intervention?

We turn next to the last point on inflation determination. No student asks me this question but I have trouble convincing myself:

Difficulty 7: How can the inflation rate be permanently higher in the long-run equilibrium with a permanent but ultimately a one-time increase in the level of government purchases?

Wouldn’t that just have a level effect on prices when the dusts settle, not a growth effect?

If I am not mistaken (I apologize if I make a mistake), this cannot happen under the IS-LM model – only permanently higher growth rate of money supply can do this. Even forgetting the IS-LM model for the time being, how does a one-time jump in government purchases lead to higher inflation rate in the long run? I can believe a temporary increase in inflation rate during the transition, but I have a real hard time convincing myself that a permanent increase in government purchases (ignoring the effect on the government budget constraint) leads to higher inflation forever. Does sticky inflation leave a 500 dollars bill on the sidewalk? This goes back to the question about the micro-foundations of inflation stickiness and the determinants of inflation under the IS-MP and AD-IA frameworks.

Difficulty 8: Can we distinguish inflation shock and supply shock so clearly?

In Romer (2002), a distinction is made between inflation shock and supply shock and their effects are analyzed separately. An example of negative inflation shocks is the increase in oil prices. Wouldn’t an increase in oil prices such as the oil crisis of the 1970s also reduce the full-employment output? One can imagine firms economizing on the use of oil, reducing the use of energy-intensive machinery, reducing employment etc. I would have thought that the oil crisis is a negative supply shock, in addition to being an inflation shock.
References

