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Macroeconomics in *CORE: The Economy*

Paul Segal

Macroeconomics is not easy. In microeconomics, students' intuitions can be developed by imagining how an individual might react to a given set of incentives. But our everyday experiences are little guide for the intuitions of macroeconomics. Consider the dreaded "household analogy" – the spurious claim, beloved by pro-austerity political parties, that a government must "live within its means" just like a household. As Keynes showed long ago, this intuition is deeply misleading at the macro level, and can cause great harm. It is not only students who struggle: I have had more than one economist colleague refuse to teach undergraduate macroeconomics on the basis that they do not understand it themselves.

But macroeconomics does not need to be as hard as traditional textbooks have made it. If the reality can be confusing, traditional models have made matters worse by not accurately representing that reality. At the heart of CORE's approach is the belief that many of the putative simplifications in traditional textbooks end up obscuring the phenomena they are intended to clarify.

This is well documented in the case of the traditional workhorse model of macroeconomic stabilization, IS-LM-AS. Romer's (2000) intervention pointed out three key problems. First, it refers to 'the' interest rate when in fact LM depends on the nominal interest rate while IS depends on the real interest rate. Second, the implied AD and AS curves depend on output and the price *level*, when in reality policy makers target the inflation rate – and declines in the price level are extremely rare. Third, it assumes that central banks concern themselves with the money supply, when in reality their policy tool is usually the (nominal) interest rate.

CORE's macroeconomic model is a variant of the New Keynesian model recommended by Romer, and more recently by Olivier Blanchard.¹ This model comprises three relationships. First, the IS relationship between the real interest rate and output. Second, a Phillips Curve that relates inflation to the output gap and expected inflation. Third, a monetary policy rule that describes the central bank's chosen nominal interest rate.

The IS curve in *The Economy* is represented in Unit 14 through a relatively standard open-economy Keynesian cross, which it denotes the "multiplier model". The book does not take the step of drawing an IS curve in (Y, r) space in order to maintain the focus on the underlying mechanisms. It explains how the central bank chooses the interest rate to affect spending and thus output, and derives an expectations-augmented Phillips Curve from the labour market model – on which, more later.

The virtue of this model is not simply that it better reflects macroeconomic policy making. Crucially, this also makes it easier to understand. Students read about inflation,

¹ <https://piie.com/blogs/realtime-economic-issues-watch/how-teach-intermediate-macroeconomics-after-crisis>

unemployment, and central banks' debates over interest rates in the financial press, so the model fits their observations of the real economy around them. Indeed, the integration of cross-country and historical evidence is a key feature of *The Economy*, and its Unit 17 is dedicated to the Great Depression, the post-WWII golden age and the recent global financial crisis.

At the same time, CORE goes beyond Romer's original proposal. He noted that the IS-LM-AS model lacked microfoundations, but he saw this as necessary: he argued that "even the easiest models with microfoundations are much harder than the corresponding ingredients of IS-LM-AS" (pp. 152-3), adding that microfoundations like the permanent income model appear "no more accurate" than the ad-hoc assumptions of IS-LM-AS. In contrast, the integration of the micro with the macro is one of the most remarkable features of *CORE: The Economy*.

I will explore this integration through microfoundations in the next section. First a methodological remark. One reason why standard microfounded macro models perform so badly is precisely because they are based on the permanent income model, which assumes an infinitely-lived consumption-smoothing representative agent with perfect information. This is the heart of the dynamic stochastic general equilibrium model, or DSGE. But as Stiglitz (2018) puts it, these are the *wrong* microfoundations. The New Keynesian research program has advanced through the progressive addition of more and more market "imperfections" to this baseline – starting with a highly stylized model of price stickiness, moving on to consumption habits, credit constraints, and other deviations from frictionless general equilibrium. But at its heart, the DSGE model remains a neoclassical Real Business Cycle model with added frictions.

By contrast, CORE's philosophy is to describe markets as we find them – which means starting with wage- and price-setting firms, and assuming that principal-agent problems, asymmetric information and incomplete contracts are irreducible features of markets. It bases economic interactions in game theory, where agents make ordered decisions based on incentives and available information, rather than pretending that markets function via a mythical auctioneer. Economic rents are endemic and agents seek to maximize them. Again, like the move away from IS-LM-AS, students have no trouble understanding these features of the model precisely because they are consistent with what they observe around them. Constant reference to concrete examples from around the world, with emphasis on the lessons of historical experience, help develop intuitions and demonstrate the relevance of the models presented.

CORE Macro's Microfoundations

The labour market model of Unit 9, which provides the microfoundations for the Phillips Curve, can be seen as the lynchpin of the textbook. Drawing on Shapiro and Stiglitz's (1984) model of efficiency wages, it represents the microeconomic philosophy just described: it is a game theory model where the actors are the worker and the firm, operating in a context of

incomplete contracts and asymmetric information. Firms cannot perfectly monitor or control their workers, so they pay them an efficiency wage to keep them motivated. As in the title of that famous paper, this leads to “Equilibrium Unemployment as a Worker Discipline Device.”

This leads to an expectations-augmented Phillips Curve via a wage-price spiral in Unit 15, as follows. If output is high and unemployment falls then the cost to workers of being fired declines. They know they could get another job with little difficulty. This implies that they can bargain for a higher wage, because firms understand they have to pay more in order to motivate them to work hard. Thus wages rise. But the markup of price over cost is determined by the degree of competition in the market, and by hypothesis this has not changed. So a fixed markup means that a rise in wages will imply a proportional rise in prices. Since all firms follow the same process, this produces higher inflation.

But the story does not end there. As long as unemployment remains low, worker bargaining power does not decline, so firms again raise wages to motivate workers, and then again raise prices in response to product market competition, and so on, producing a wage-price spiral.

This represents inflation as an outcome of distributional conflict, which also ties in with *CORE*'s goal of bringing inequality and income distribution back into the heart of economics. Inconsistent demands over the overall pie occur because of two conflicting real wage equilibria: one equilibrium driven by worker bargaining power, implying high real wages when unemployment is low (and conversely); another equilibrium driven by product market competition that determines the gap between prices and wages. The distance between the two levels of real wages is denoted the “bargaining gap”, and the economy is in its medium-run equilibrium with constant inflation only when the two equilibria are equal. Adding a term in expected inflation, and assuming that expectations are backward looking, yields the standard accelerationist Phillips Curve.

Turning to monetary policy, *The Economy* describes the spread of inflation targeting around the world. It highlights the uncertainty involved in the interest rate-output relationship, which most textbooks assume is unproblematic. It also stands out in explicitly discussing the housing market, which is sensitive to the interest rate and susceptible to bubbles – and is presented as an important cause of the 2008 financial crisis.

Yet where it diverges most radically from other textbooks is its approach to money, given in Unit 10. It draws heavily on the brilliant exposition by three member of the Bank of England's Monetary Analysis Directorate, in McLeay, Radia and Thomas (2014a,b).

It turns out that money is another example where the truth is simpler, and easier to understand, than traditional models. Most textbooks tell a parable of the primordial depositor placing cash in a bank vault, which allows the bank to lend out whatever share of that cash it believes their depositor will not be requiring in the short term. The recipients of these first loans in turn deposit their cash in other banks, and again some share of those deposits gets

loaned out, and so on, leading to the multiplication of money, and thus the money multiplier, defined as total deposits divided by the amount of base money.

The first problem with this parable is that it is false. There was no such primordial depositor, and banks do not wait for a depositor to arrive in order to make their first loan. In reality, they are free to make as many loans as they wish – they are not constrained by the volume of “funds available”. (In some economies they may face legal constraints on lending volumes, but these are not economic constraints.) A bank does not need a deposit to make a loan; on the contrary, creating a loan implies crediting the money to the borrower’s deposit account – so the loan creates a deposit. This is how most money gets created. Moreover, when banks do need base money, they have money markets (and perhaps shareholders) they may appeal to. Depositors are just one among several potential sources of base money.

The second problem is that there is no such thing as the money multiplier. The ratio between bank money and base money varies over time, and across countries, and cannot be (and is not) relied upon in the determination of macroeconomic policy.

The reality of money and money creation is not trivial, but the key features are simple enough, and do not depend on a demonstrably false origins story. The analysis starts by distinguishing between *base money* produced by the central bank (cash, and accounts held by commercial banks at the central bank) and *bank money* created by commercial banks. Base money comprises only 3-4% of total money in the UK, and 8-10% in China. (*The Economy* does not elaborate on this cross-country variation, but its discussion of credit constraints can be used to think through why developing countries typically have a higher share.)

Next, banks need base money for two main reasons. People sometimes demand physical cash, and banks have to be able to supply that demand with base money. In addition, people and firms make payments to one another, instructing their banks to transfer deposits. However, the multiple everyday transactions back and forth mean that, from the perspective of the banks, most such payments cancel one another out. Banks have to transfer only the *net* value of transactions to each other (via central bank reserves) at the end of each business day, and these net values are much smaller than gross transactions. For these reasons, commercial banks need some base money – but the quantity is relatively small, and has no straight forward relationship with the amount of deposits they record on their balance sheets.

This more accurate representation of money feeds into the explanation of monetary policy. Consider a bank’s decision on whether to make a new \$100 loan. In the first instance the loan will increase the bank’s assets by the \$100 owed to it, and increase the bank’s liabilities by the \$100 it credits to the lender. This means that bank money increases by \$100, but so far there are no direct implications for base money. However, the bank knows that this loan will be spent, and at that point they will need to make an additional \$100 transfer of base money to some other bank.

The key is to note that, even though most transactions cancel out, this is a decision at the margin: whatever net transfers they have to make in the absence of lending this \$100, the decision to make the loan implies they will have to transfer an additional \$100. So for the bank, the marginal cost of making the loan is the cost of borrowing \$100 of base money.

This is what provides the central bank with the ability to make monetary policy: at the margin, commercial banks get base money from the money markets – and here the central bank controls the price of borrowing by providing whatever supply of base money is demanded at its chosen policy interest rate. When the central bank increases the policy interest rate, the implied rise in the marginal cost of making the loan is usually passed on in higher borrowing rates charged to bank's borrowers.

If *The Economy* clarifies the microeconomics of monetary policy, it deliberately problematizes the transmission through to the real economy. Central banks can control the base rate, but not the bank lending rate, which depends in part on the markup set by commercial banks. This markup, or spread, can vary, and its sudden rise was a common feature in countries that suffered the Great Recession. This uncertainty compounds the variability in the responsiveness of spending to changes in the interest rate, which depends on firms' investment decisions, consumers' purchases of durable goods and, via the exchange rate effect, the impact on imports and exports. For many developing countries with relatively underdeveloped financial sectors, the exchange rate effect dominates domestic mechanisms. And of course, as many high-income countries have found, monetary policy loses much of its effectiveness at the zero lower bound.

As the above comments signal, one of *The Economy's* strengths is that it aims to be relevant for students around the world. The text cites examples from numerous countries, including bank closures in Ireland and money lenders in Pakistan; life chances for individuals born into different social classes in China, and in the US; redistribution in Brazil, Mexico and South Africa. It gives the tools required to understand why credit markets are different in poor countries and in rich countries, as a function of both income levels and institutional arrangements. Institutions and policies during South Korea's take-off are compared with Great Britain's industrial revolution.

Room for improvement

CORE continues to evolve, and aims to be responsive to criticism. Simon Wren-Lewis has noted the absence of money printing as a source of government finance at a key point in the textbook, which he describes as a “mistake” that should (and maybe will) be corrected.² More challenging is evidence on the Phillips Curve. One view is that it has recently disappeared in the US – though not in longer-run data or in other countries.³ Another view is that an old-

² Simon Wren-Lewis, <https://mainlymacro.blogspot.com/2017/09/the-core-economicscurriculum-designed.html>

³ Paul Krugman, <https://www.nytimes.com/2018/03/27/opinion/immaculate-inflation-strikes-again-wonkish.html>

fashioned non-accelerationist Phillips Curve fits the data better – what Paul Krugman calls the “neo-paleo-Keynesian Phillips curve”.⁴ *The Economy* could be used to teach these alternatives, but working through their implications for the macroeconomy would be too much for an introductory textbook. Understanding one coherent model is hard enough at this level. Having to fully comprehend two or three competing models seems too much to ask. Some complications should be left for more advanced textbooks.

Another question is the role of unions. *The Economy* presents cross-country and historical evidence that institutions of wage bargaining matter a lot to economic performance. Moreover, different kinds of union-firm relations can have different effects. Spain has high union coverage and high unemployment, while Austria has high union coverage and low unemployment. Spain’s outcome can be explained by the standard mechanism whereby higher wage demands by unions lead firms to reduce employment. To explain outcomes like in Austria, *The Economy* presents a model of a “union voice effect”, that states that unionized workers may be happier in their jobs (because they have more “voice”). This means they require less of a threat of unemployment in order to be motivated to work. If this effect dominates, a given wage is consistent with lower unemployment, as in the Austrian experience. On this basis, the argument is that when firms and unions cooperate then work conditions improve and unemployment does not rise. On the other hand, when relations between firms and unions are antagonistic, then unemployment can indeed rise.

Less satisfactory is the role of unions in wage determination. Given that inequality is a central theme throughout *The Economy* – Unit 19 is dedicated to the topic – it is regrettable that the labour market model implies that unions cannot affect the distribution of income between workers and firms. This is because the profit rate is fixed by the degree of competition in product markets, which in turn determines the relationship between prices and wages (and hence the real wage). It is right that this approach stresses the role of competition in the distribution of income. This is often overlooked, and it surely matters a great deal. Still, the evidence suggests that unions can reduce inequality by redistributing economic rents away from profits and towards wages (Hirsch and Müller, 2018; Farber et al., 2018). Indeed, *The Economy*’s insistence on the systemic importance of economic rents is consistent with this approach. Some creativity may be required to incorporate this effect into the labour market model.

Beyond *The Economy*

At the heart of CORE is an insistence that the study of economics engage directly with real-world problems, and with the institutions, norms and policies in which markets are embedded. For macroeconomics, this requires engaging with the historical and contemporary performance of countries around the world. This makes for better economics, and for more engaged students, preparing them to continue their studies with good intermediate macroeconomics textbooks such as Blanchard (2017) or Carlin and Soskice (2014). It also

⁴ Paul Krugman, <https://www.nytimes.com/2018/05/06/opinion/unnatural-economics-wonkish.html>

prepares students for engagement with cutting edge policy and research questions. What if the Phillips Curve really is flat? How do institutions and policies affect economic growth, both in rich and in poor countries? What is the role of the financial sector in creating instability? If *The Economy* convinces students of the relevance of economics to today's major challenges, and stimulates some of them to pursue it in greater depth, it will have achieved its goals.

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