Epilogue

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Macroeconomics is far from complete. It will not become complete in my or your or anyone's lifetime. One reason for this is that the subject is complicated. A second reason is that macroeconomists are pursuing an ever-changing and ever-moving target: as the economy changes, its macroeconomic behavior changes as well. Four centuries ago (if there had been a macroeconomics course then) the macroeconomics of harvest failures would have been a big topic. Today it isn't. Many of what we see as important topics today will be dismissed as irrelevant a generation or a century from now. And much of what they will need answers to is unimportant to us, or unknown to us.

But here at the end of the book is the place to quickly look back over the entire text. There are a great many things that macroeconomists do know. And this is the place to summarize them, before going on to discuss what macroeconomists don't

know, and what I believe macroeconomists will never know.

What Economists Know…

…About the Current State of the Economy

Largely relying on government-collected statistics, economists know a substantial amount about the current state of the economy. They have good estimates of the level of potential output. They have good estimates of the current real wage level, of the amount of unemployment, and of the general state of the labor market. They have good estimates of the rate of inflation.

Economists' knowledge of the long-run pace of economic growth is, however, much more partial. The size and extent of the biases inevitably present in the National Income and Product Accounts remain elusive. And economists' knowledge of the current state of the economy comes with a substantial lag: economists know much more about the state of the economy last year than they do about the state of the economy today.

But all in all, the NIPA system—and the other largely government-collected economic statistics—give us a remarkable amount of knowledge about the current state of our economy. Certainly the amount of easily publicly-available information about the state of the American macroeconomy today dwarfs the knowledge that even the best-informed in previous centuries had, or even the knowledge that the leaders presiding over the centrally-planned economies of the twentieth century had of the real state of affairs.

…About Long-Run Economic Growth

Economists also know a surprising amount about the preconditions of long run growth. We know demography--Malthus, the population explosion, the demographic revolution, and the importance of education. We know that back before the industrial revolution living standards were very low because in the race between human fertility, diminishing returns, and technological development the rate of technological progress was slow. We know that once human populations pass through a threshold level of material prosperity and literacy, that population growth rates slow down drastically—the experience of western Europe suggests that negative population growth may be in humanity's future after the middle of the next century.

Economists understand the importance of a high rate of investment for achieving successful economic growth—both because capital goods amplify our skills and capabilities, and because much of modern technology that increases total factor productivity works only if it is accompanied by—embodied in—the right kinds of capital goods. A high rate of investment is key to a rapidly-growing and relatively prosperous economy.

Economists also know that better *technology*--understood both in a broad and a narrow sense--is *the* single most important key to sustained progress in material standards of living. And here I believe economists have fallen down on the job: macroeconomists know much less about the development and diffusion of this truly important source of growth—technology—than we should. But it is completely clear that a high rate of investment to generate a high capital-output ratio, a strong commitment to education to

create a skilled and literate workforce (and a low rate of population growth), and better technology are the goals of economic policy as far as the long-run is concerned.

Economists also know important things about how to achieve these goals of economic policy: the role of the government in economic development has become increasingly clear over the past generation. It is now clear that it is much easier to achieve successful long-run growth if one relies on the market system to coordinate economic activity than if one relies of central planning and central commands. Market economies appear to function well only if they are coupled with strong legal and institutional protections for private property. Over-mighty governments—governments that regard other people's things as the government's property—appear to be very bad for economic growth.

It is also clear that government policy needs to provide the market economy with the right incentives and signals if it is to function: activities with negative externalities like pollution need to be penalized; activities with positive externalities like research and development need to be encouraged. Thus a government that protects property rights, promotes education, and promotes innovation seems important as a precondition for successful economic growth.

But our knowledge of economic growth is incomplete. The links between different kinds of investment and rates of total factor productivity growth and the mechanisms underlying the transfer of technology from rich countries to poor countries remain elusive.

…About Business Cycles, Unemployment, and Inflation in the Long Run

Economists know that market economies are robust things. In the long run—and exceptional circumstances like the Great Depression aside—the market economy does tend to return to a position of near-full employment. Markets for goods and for labor do—absent large blockages—reach something like a supply-and-demand equilibrium. In a recession it is safe to predict that the next five years will bring a boom. In a boom it is safe to predict that the next five years will bring a recession.

Thus economists know that shifts in government spending will crowd out (or crowd in) consumption and investment. They know that shortfalls of national saving or booms in investment will bring inflows of capital and the trade deficits needed to finance them. They know that the central bank's policy is in the long run the absolutely crucial determinant of the price level and the inflation rate.

…About Business Cycles, Unemployment, and Inflation in the Short Run

Economists know that the basic Keynesian sticky-price model still provides a good guide to the basic determinants of the level of aggregate demand. And the aggregate supply-Phillips curve diagram still provides a guide—not necessarily a good guide, but it is the best guide we have—to the relationship between the level of real aggregate demand and the rate of price increase.

Because aggregate demand is the principal determinant of the level of GDP in the short run, anything that affects aggregate demand affects employment and output: fiscal policy,

monetary policy, expectations, shocks to componets of demand, shocks to the financial markets, changes in the international environment—all of these produce shifts in the equilibrium level of output.

Economists know that aggregate demand interacts with aggregate supply—the Phillips curve—to generate the inflation rate. And economists know that the Phillips curve is extremely volatile. The natural rate of unemployment can undergo substantial shifts in a much more rapid time scale than the changing composition of the labor force would suggest possible. The expected rate of inflation depends critically on expectations of the central bank's competence and commitment to price stability.

…About the Making of Macroeconomic Policy

Thus governments attempting to stabilize the economy face a hard task of damping out many kinds of shocks. Their task is made harder because shifts in economic policy have uncertain and delayed effects on spending: policy affects output and prices with long and variable lags. Perhaps the first lesson of stabilization policy is that governments should not overestimate their power and attempt to do much. The second lesson is that monetary policy is the most useful *discretionary* stabilization policy tool. And the third lesson is that automatic stabilizers—the fiscal automatic stabilizers in the government's budget and the financial automatic stabilizers of deposit insurance—are important factors that help limit the need for discretionary stabilization policy.

Economists have learned over the past two decades that peacetime inflation at a level high enough that it becomes an important part of voters' consciousness—inflation at a rate of even ten percent per year—is politically unacceptable in modern industrial democracies. Voters appear to hate and loathe politicians who preside over such episodes of inflation. Why even moderate inflation should be viewed so negatively is somewhat of a mystery: economists' attempts to model costs of inflation have a difficult time coming up with costs to justify the high political value of low inflation. It may be that people simply dislike the lack of knowledge about what is going on that inflation generates. It may be that people are simply making a mistake—that they should not dislike inflation as much as they do.

But for whatever reason, it is clear that in a modern democracy successful control of inflation must be a very high priority for public policy.

At the root, growth in the money supply is the ultimate determinant of inflation. Control the rate of growth of the money supply, and you control inflation. A central bank that loses sight of this goal will find itself unable to control inflation.

But that is not all that economists know about controlling inflation. We also know that controlling inflation is easy—can be accomplished at low cost—if and only if investors, managers, and workers have confidence in the central bank's commitment to control inflation. Central bank *credibility* is the most important asset in order to make control of inflation easy and cheap. Central bank credibility is the most valuable thing a central bank can have—and is the most costly thing to regain once it is lost.

Economists know that in the short run the level of GDP and of employment depends on the level of aggregate demand for goods and services. Thus a good macroeconomic policy that seeks to avoid unnecessary unemployment and inflation must walk a fine line. Aggregate demand must be high enough to eliminate unnecessary unemployment, but not high enough to generate accelerating inflation or (worst of all) to call into question the central bank's commitment to low inflation.

What Economists Don't Know—But Could Learn

…About the Long-Run Relationship Between Kinds of Investment and Productivity Growth

The list of what macroeconomists don't know is even longer than the list of things that macroeconomists do know. First, large chunks of the process of long-run economic growth remain a mystery. Macroeconomists cannot prescribe to poor countries the policy mix that would enable them to duplicate the rapid convergence of Japan or Italy to industrial-core status that we have seen since World War II. Macroeconomists cannot prescribe to rich countries how to maximize their rates of economic growth and appropriately-discounted levels of economic welfare. Macroeconomists do not know what is the right degree of "openness" for the world economy. They do not know at what point would we get the most benefits from international trade and invest flows while suffering the lowest costs from international financial market-generated economic instability.

But in these areas, at least, macroeconomists can learn. The history of the world over the past century provides a lot of lessons about the sources of long-run growth and stagnation. And the future will continue to provide more such lessons. As long as economists are willing to take fresh looks at the world and mark their beliefs to market, macroeconomists in a generation will know much more about long-run growth than we do today.

…About the Short-Run Determinants of Investment

Ultimately the key issue dividing the new Keynesian and the real business cycle schools of macroeconomists depends on the sources of shifts in investment. The most common large-scale macroeconomic shock hitting a modern industrial market economy is an inward (or outward) shift in the IS curve caused by an investment slump (or boom) accompanied by a fall (or a swift rise) in the stock market. Is this shock better thought of as optimal responses of the market to news about future profits and technological opportunities? If so, then the real business cycle research program will be the most fruitful over the next generation. Is this shock more accurately seen as one of the less-than-rational social-psychological opinion shifts that John Maynard Keynes referred to as “animal spirits”? If so, then the new Keynesian research program is likely to pay the highest dividends over the next generation.

This question of the most important determinants of domestic investment booms is closely tied up with the key issue in international finance. Why have international financial markets been so vulnerable to financial crises over the past decade? And is the appropriate response to constrain governments from engaging in disturbing policies, to

reduce the magnitude of cross-border trade and financial flows, or to adopt more aggressive policies to intervene to support countries afflicted by financial crises?

The only true answer is that macroeconomists today do not really know. This area is going to be one of the major political flashpoints of the next generation. And it is also going to be one of the major battlegrounds—and hopefully areas of the progress of knowledge—over the next generation.

…About the Impact of Government Policy on the Economy

And a lot is still not known about how and why government policy affects the economy. Macroeconomists still argue about the relative roles played in generating short-run business cycles of "monetary" shocks and "real" shocks. Macroeconomists for the most part feel that that there ought to be powerful benefits from eliminating noise in the price system. But these gains from achieving low and stable inflation have not hitherto been demonstrated. And it remains mysterious why voters seem so averse to inflation when its measured economic costs appear relatively low.

Thus many fundamental questions about government policy remain up for grabs. How aggressively should central bankers pursue stabilization policy? The answer to that question depends on the solutions to the mysteries noted in the paragraph above. How much should we worry about large government deficits? The answer turns on whether or not Ricardian equivalence is roughly correct, and that depends in turn on the determinants and motivations of households' consumption and savings decisions.

…About the Microfoundations of Macroeconomics

Thus we come to the final set of things that economists do not know--but might someday find out. Macroeconomists do not understand aggregate consumption and savings decisions in the economy. Macroeconomists do not understand what determines the large shifts in the natural rate of unemployment seen over the past thirty years. Macroeconomists do not understand what can be done to constructively lower the natural rate of unemployment, or even what the natural rate of unemployment should be. It is clear that it is worthwhile for the average job losing worker to spend some time unemployed searching for a new job. But how much?

And, last, what are the underlying reasons that wages and prices are slow to respond to shifts in aggregate demand?

These questions about the "microfoundations of macroeconomics" have been at the top of the agenda for economic research at least since the end of World War II. Looking back, it is somewhat depressing to realize how little progress has been made, and how much the live microfoundational issues of today are those that economists like Franco Modigliani were worrying about immediately after World War II

What Economists Will Never Know

Chasing an Ever-Moving Target

In the natural sciences there is a strong sense of progress toward a goal: understanding advances, and the amount of unknowns left to be understood shrinks. In the social sciences it is not so clear that there is progress. More is known, yes. But we are chasing an ever-moving target: one economist's joke is that you can repeat the same exam every twenty years, as long as you remember that the right answers will change.

Macroeconomics is a science of what might be called *emergent* phenomena. The marginal propensity to consume, the slope of the IS curve, the velocity of money—these are not basic, unchanging, fundamental quantities that can be measured and described once and for all. They are, instead, summary rule-of-thumb characterizations of phenomena that *emerge* from the billions of economic decisions made by hundreds of millions of workers, consumers, and firms. Thus we should expect macroeconomic "truth" to change over time as our economy changes.

So if there is a final lesson, it is this: Keep an open mind. Mark your beliefs to market regularly. Recognize that some of the things taught in this book will turn out to be wrong, or incomplete. And recognize that the questions that people want macroeconomics to answer will change in the future as well, both because the economy will change and because macroeconomics is the handmaiden of policy, which is a sub-branch of politics. And as politics changes the questions that policy makers will ask of macroeconomists will change as well.