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The Knowledge Problem in Monetary Policy: The Case for Nominal GDP Targeting

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MONETARY POLICY IS HARD. IN THE BEST OF times, it requires a well-informed understanding of the economy and the ability to respond in a timely manner. In less favorable conditions, monetary policy requires near omniscience and the herculean power to stop economic disasters from unfolding.

This knowledge problem has been at the heart of the many failures of monetary policy, including the high inflation of the 1970s and the Great Recession of 2007–2009. In both cases, Federal Reserve (Fed) officials lacked the real-time knowledge of the economy they needed to make informed decisions. As a result, their decisions worsened the business cycle.

Many observers argue that the solution is to move to a more rules-based approach to monetary policy. Doing so, they argue, will stabilize monetary policy by forcing it to be more predictable and less susceptible to poor decision-making by Fed officials.

While making monetary policy more systematic is an important goal, simply moving to a rule is not enough. A monetary policy rule that fails to address the knowledge problem will not be able to keep monetary conditions neutral and thus will destabilize the economy. Solving the knowledge problem, then, is a key part of implementing a successful monetary policy rule.

This policy note shows that a monetary policy rule that aims to stabilize the price level, such as either a simple inflation target or a flexible inflation target (FIT), will often fail to solve the knowledge problem. In contrast, a monetary policy that aims to stabilize the growth of total dollar spending, such as a nominal GDP (NGDP) level target, does solve the knowledge problem and therefore could serve as an effective monetary policy rule.

THE KNOWLEDGE PROBLEM IN A SIMPLE INFLATION TARGET

As Friedrich A. Hayek first noted, the knowledge problem occurs because the information needed for successful centralized economic planning is distributed widely among many households and firms.¹ It is beyond the knowledge of a central planning authority. Applied to central banking, this understanding means that the information policymakers need to successfully manage the business cycle through discretionary monetary policy is simply not available to them. Monetary authorities simply do not know enough on their own to manage the booms and busts of the economy.

This critique also applies to certain monetary policy rules, including a simple inflation target. Some observers have argued for moving to such a target as a way of narrowing the Fed's mandate. Unfortunately, this sort of rule does not fully address the knowledge

problem and therefore could still be destabilizing to the economy.

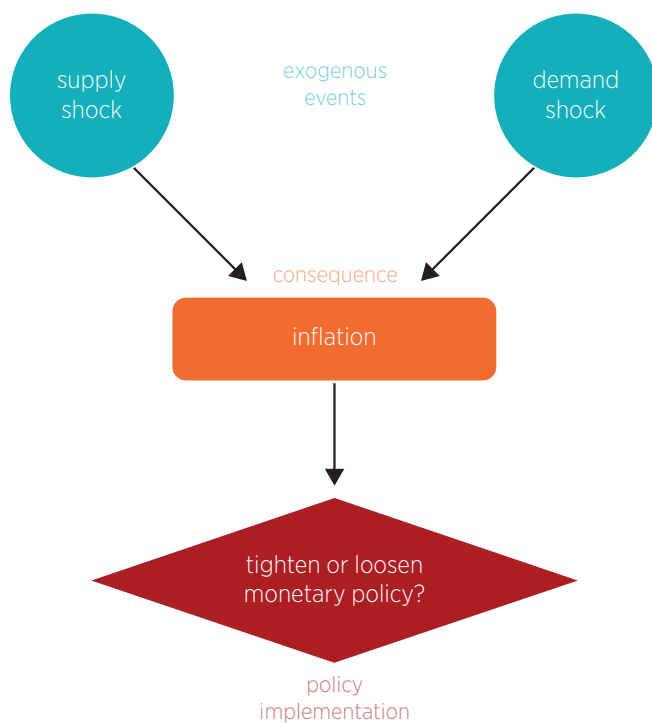
The difficulty is as follows. Inflation is caused by both supply and demand shocks. Monetary policy can only productively address the latter, but discerning which type of shock has caused inflation in a particular instance is almost impossible for Fed officials to do in real time. Figure 1 summarizes this problem.

To understand why officials would have this difficulty, it is necessary to take a closer look at the two types of shock that cause inflation. Supply shocks are unexpected changes that affect the productive capacity of an economy. They create problems for monetary policy because they push economic activity and the price level in opposite directions. A sharp reduction in the labor force, oil supply, or technology, for example, would increase production costs and temporarily raise inflation. This development might tempt a central bank to tighten monetary policy. In this case, however, tightening would further choke an economy already weakened by the reduction in resources.² When movements in the price level reflect changes to the productive capacity of the economy, the best policy for the Fed is to ignore them.

On the other hand, the Fed *should* tackle demand shocks. These shocks push economic activity and the price level in the same direction and are therefore easier for a central bank to handle. The Fed's influence on the economy, moreover, comes from altering monetary conditions, which ultimately determines demand. Therefore, if an unsustainable increase in economic activity and inflation had been caused by a sudden surge in consumer spending, the central bank's tightening of monetary policy would be helpful, simultaneously fixing the excess in inflation and the increase in economic activity by reducing demand pressures.

The knowledge problem in this context is that Fed officials are unlikely to know in real time what kind of shock is causing changes in inflation. Knowing the difference, however, is crucial, because responding to supply-shock-driven movements in inflation could destabilize the economy.

Figure 1. The Knowledge Problem: Inflation Targeting



This knowledge problem has been at the heart of the many failures of monetary policy, including the high inflation of the 1970s and the Great Recession of 2007–2009.

This sort of knowledge problem arose between 2002 and 2004, when a much-ballyhooed productivity boom (a positive supply shock) created a disinflationary environment. These circumstances caused Fed officials to worry about deflation. The officials consequently kept interest rates low for an extended period, even though housing and credit growth had begun to take off. In this instance, the Fed's response intensified the economic boom.³ The problem reemerged in fall 2008 when Fed officials were concerned about rising commodity prices (a negative supply shock) that pushed up inflation. As a result, they decided not to cut interest rates at their September Federal Open Market Committee meeting, despite the collapsing economy. This inaction worsened the weakening of the economy. Across the Atlantic, the European Central Bank (ECB) struggled even more with supply shocks. The ECB raised interest rates in 2008 and in 2011 in response to rising commodity prices (a negative supply shock) that pushed up inflation. These actions helped create the eurozone crisis and then deepened its severity.⁴

More recently, the Fed and the ECB wrestled with the question of why inflation had been persistently below its target of 2 percent: Was it because of the drop in oil prices (a positive supply shock) or because the economy was getting weaker (a negative demand shock)? This was a vexing issue for central bankers over the 2015–2016 period and made them hesitant to act.

THE KNOWLEDGE PROBLEM IN A FLEXIBLE INFLATION TARGET

Most central banks have moved beyond a simple inflation target and adopted FIT, which gives

a monetary authority more flexibility in hitting its inflation target by allowing it to respond to unemployed resources, or slack, in the economy. FIT, in other words, gives central banks the ability to fight the business cycle. With this type of targeting, the central bank only has to hit its inflation target on average over a multiyear period.

FIT is generally implemented by a central bank following a Taylor rule. A Taylor rule prescribes the systematic adjustment of monetary policy to changes in both inflation and the amount of slack in the economy.⁵ But, like the simple inflation target, even though the FIT approach to monetary policy is rules based, it suffers from the knowledge problem. Specifically, it is impossible to know the amount of slack in the economy in real time. To know this would require knowing both the productive capacity of an economy and how much of that capacity is currently being used. No one has real-time access to this information, especially in a large economy like that of the United States.

Taylor rules, consequently, can systematically prescribe the wrong path for monetary policy. According to economist Athanasios Orphanides, this is what happened in the 1970s: Policymakers thought there was more spare capacity in the economy than there actually was, and they ran the economy too hot.⁶ The high and turbulent inflation of the 1970s was the inevitable consequence. In a previous study, Josh Hendrickson and I showed that this knowledge problem regarding economic slack remains a problem for the Fed to this day.⁷

As this discussion shows, whether a price-stabilizing rule involves a simple inflation target or FIT, the knowledge problem remains a binding constraint on monetary policy.

A WORKAROUND TO THE KNOWLEDGE PROBLEM: MAINTAINING MONETARY NEUTRALITY

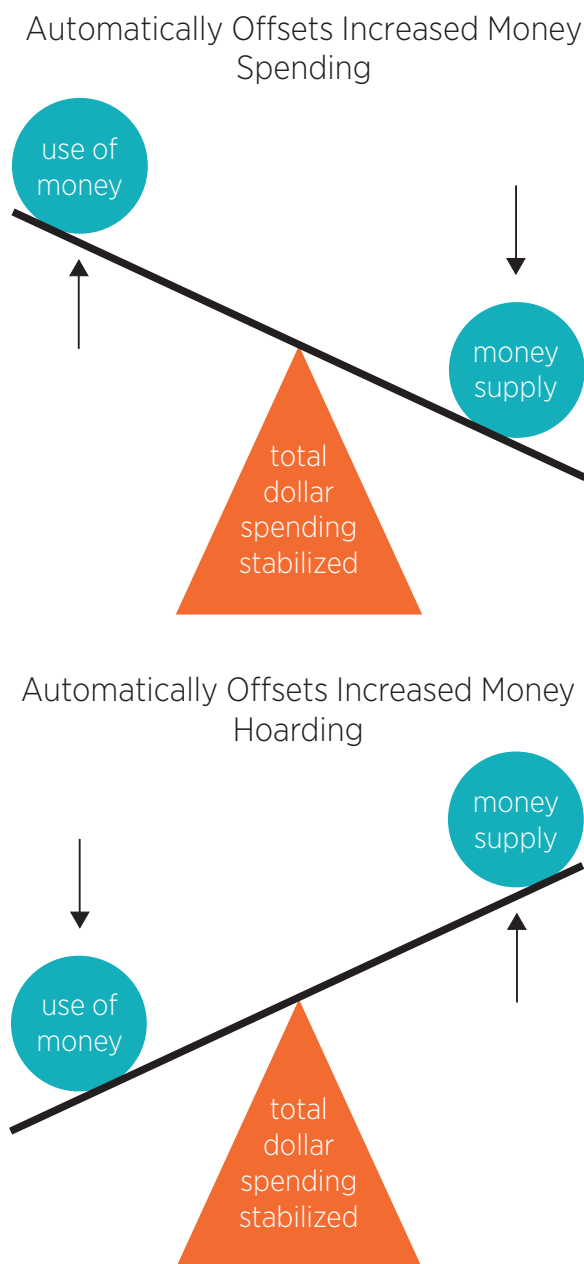
The Fed will never directly solve the knowledge problem. The information requirements for managing monetary conditions for the largest economy in the world are simply too great. Given these vast requirements, it is impossible for discretionary monetary policy or price stability rules—or any other solution that requires full and accurate knowledge—to work. But while Fed officials cannot “solve” the knowledge problem, they may be able to circumvent it through a rule that aims for monetary neutrality.

What is monetary neutrality? To answer this question, first consider that money is the one asset that is a part of every transaction. Whether the transaction is the sale of a physical or financial asset, a good, or a service, money is always a part of the exchange. It reaches into every market. Consequently, destabilizing money destabilizes all markets. Monetary neutrality is the avoidance of such destabilizing changes in monetary conditions.

One way in which the Fed could achieve and maintain monetary neutrality would be to use changes in the supply of money to offset changes in the demand for money. For example, the Fed would increase the money supply when people were more inclined to hold money balances—when, for example, they were afraid of economic trouble and wanted liquid assets—and it would decrease the money supply when people were rapidly spending money. Put differently, the Fed would decrease the money supply when money is circulating quickly and increase it when turnover is low. These actions would keep total dollar spending stable and thereby maintain money neutrality. This offsetting use of the supply of money is shown in figure 2 as a “monetary seesaw.”

To be clear, most money is created by banks and other financial firms when they make loans.⁸ So the Fed cannot directly adjust the money supply in response to changes in money demand. What it can do is adjust the stance of monetary policy to influence how much spending households and businesses will

Figure 2. Maintaining Monetary Stability: The Seesaw View



wish to make. This influence, in turn, will influence both the demand for money and how much money is created by banks. In other words, by altering the macroeconomic environment through monetary policy, the Fed can shape the path of total dollar spending.

If the Fed were to target a stable growth path for total dollar spending, it would not only help keep monetary conditions neutral, but also remove the temptation to respond to changes in the real economy.

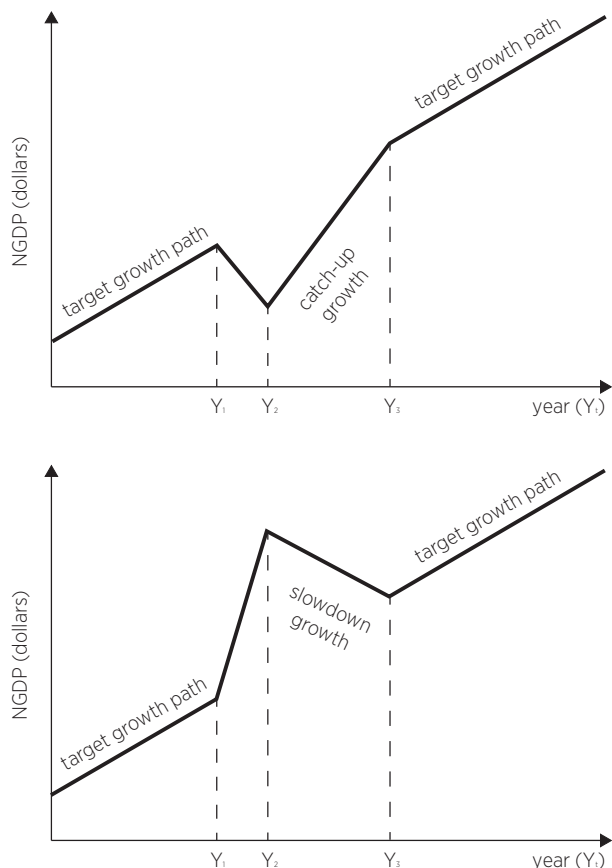
If, for example, there were a positive supply shock that lowered prices—say a new technology or an increase in the oil supply—the Fed would do nothing other than maintain stable money spending. The composition of the spending would change—more goods and services at lower prices—but the total amount of spending would not. Overall demand would be stable.

Similarly, total dollar spending would not change if a negative supply shock—such as a natural disaster or an oil shortage—reduced the capacity of the economy and raised prices. Again, the composition of spending would change—fewer goods and services at higher prices—but overall demand would be stable. In both cases, the Fed would let relative prices and markets sort out real shocks on their own while maintaining

monetary stability. This approach would mean that the Fed would no longer have to deal with the knowledge problem, and the problem would cease to be a constraint on implementing good monetary policy.

By stabilizing the growth of total dollar spending, then, the Fed would be creating a workaround to the knowledge problem. If the Fed were to credibly adopt such an approach, it would create expectations of stable spending growth that would become self-fulfilling. That is, households and firms would have less incentive to rapidly spend or hoard money in the first place. This effect would, in turn, reduce boom-bust cycles and minimize the need for government intervention in the economy. Thus, targeting the growth of total dollar spending would not only address the knowledge problem, but also dampen the business cycle.

Figure 3. Nominal GDP Level Target: A Stable Growth Path



A NOMINAL GDP TARGET FOR THE FED

So what would a total dollar spending target look like? First, the Fed would pick some measure of total dollar spending to target. The measure most widely suggested has been nominal GDP, which economists Michael Woodford, Scott Sumner, Christina Romer, George Selgin, and others have endorsed.⁹

The Fed would then target the growth path, or level, of NGDP. This targeting would commit the Fed to making up for past targeting “misses” so that the targeted growth path would always be maintained. The belief that the Fed would always correct such past misses would increase business and household expectations of stable spending growth and further diminish the incentive to rapidly spend or hoard. For this reason, using a growth path target for total dollar spending rather than a growth rate target (which would not make up for past misses) is an important part of this rule.

The application of this rule is shown in a scenario in figure 3 where the Fed has targeted some growth rate—the slope of the line—for NGDP. In year one (Y₁) money spending falls (perhaps from panic-induced hoarding). In the figure’s top panel,

the Federal Reserve makes up for this failure to hit the target rate by increasing total dollar spending in the next year (Y_2) faster than the target—the steeper slope—until it catches up to its target path. A similar response, in reverse, would follow a spending boom that pushed money spending above the targeted path, as seen in the figure's bottom panel.

To operationalize this sort of rule, the Fed could use NGDP futures contracts, as recommended by Scott Sumner,¹⁰ or traditional methods shown by economists Michael Belongia and Peter Ireland.¹¹

CONCLUSION

The knowledge problem is a pervasive issue for monetary policy. As this paper has shown, price-targeting rules fail to cope with this knowledge problem. In contrast, adoption of an NGDP level target would enable the Fed to get past the knowledge problem by working around it.¹² This approach has received much attention in recent years. The discussion here provides further reasons for seriously considering NGDP level targeting for the Fed.

NOTES

1. F. A. Hayek, "The Use of Knowledge in Society," *American Economic Review* 35, no. 4 (1945): 519–30.
2. Conversely, a sudden increase in the labor force, oil supply, or technology would decrease production costs and temporarily reduce inflation. This development would tempt a central bank to ease monetary policy. That response, however, would add monetary stimulus when it is not needed.
3. George Selgin, David Beckworth, and Berrak Bahadir, "The Productivity Gap: Monetary Policy, the Subprime Boom, and the Post-2001 Productivity Surge," *Journal of Policy Modeling* 37, no. 2 (2015): 189–207.
4. David Beckworth, "The Monetary Policy Origins of the Eurozone Crisis," *International Finance* (forthcoming).
5. More formally, a standard Taylor rule can be defined as follows:

$$r_t = r_t^* + \Phi_\pi \tilde{\pi}_t + \Phi_y \tilde{y}_t,$$

where the target policy interest rate, r_t , follows a baseline equilibrium nominal interest rate, r_t^* , and responds to deviations of inflation from its target, $\tilde{\pi}_t$, and the output gap, \tilde{y}_t . The output gap is defined as the percentage difference between actual real GDP and potential real GDP and reflects the amount of slack in the economy.

6. Athanasios Orphanides, "Activist Stabilization Policy and Inflation: The Taylor Rule in the 1970s" (working paper, Federal Reserve Board of Governors, 2000). Athanasios Orphanides, "Monetary-Policy Rules and the Great Inflation," *American Economic Review* 92, no. 2 (2002): 115–20. Athanasios Orphanides, "The Unreliability of Output-Gap Estimates in Real Time," *Review of Economics and Statistics* 84, no. 4 (2002): 569–83. Athanasios Orphanides, "Monetary Policy Rules, Macroeconomic Stability, and Inflation: A View from the Trenches," *Journal of Credit, Money, and Banking* 36, no. 2 (2004): 151–75.
7. Even in the successful "Great Moderation" period of 1984–2007, when monetary policy seemed to do well at stabilizing the economy, it was subject to the knowledge problem. The only difference was that the Fed arguably got lucky because a benign economic environment made it easier to forecast economic slack. For more on this point, see David Beckworth and Josh Hendrickson, "Nominal GDP Targeting versus the Taylor Rule on an Even Playing Field" (Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, 2016).
8. When a bank makes a loan, it also creates a deposit. Deposits are then used in payment as money.
9. Michael Woodford, "Methods of Policy Accommodation at the Interest-Rate Lower Bound," in *Proceedings—Economic Policy Symposium—Jackson Hole* (Jackson Hole, WY: Federal Reserve Bank of Kansas City, 2012), 185–288; Scott Sumner, "Re-Targeting the Fed," *National Affairs*, Fall 2011, 79–86; Scott Sumner, "A Market-Driven Nominal GDP Targeting Regime" (Mercatus Research, Mercatus Center at George Mason University, Arlington, VA, July 2013); Christina Romer, "Dear Ben: It's Time for Your Volcker Moment," *New York Times*, October 30, 2011; Selgin et al., "Productivity Gap."
10. See Sumner, "Market-Driven Nominal GDP Targeting Regime."
11. Michael Belongia and Peter Ireland, "A Working Solution to the Question of Nominal GDP Targeting," *Macroeconomic Dynamics* 19, no. 3 (2015): 508–34.
12. For a formal exposition of this point, see Beckworth and Hendrickson, "Nominal GDP Targeting"; and Basil Halperin, "Monetary Misperceptions: Optimal Monetary Policy under Incomplete Information" (working paper, 2016).

About the Author

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