Hawks, Doves, Bubbles, and Inflation Targets

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Any opinions expressed here are mine and do not necessarily reflect those of others on the Federal Open Market Committee.
Inflation targeting
The FOMC adopted an explicit, numerical inflation target at the January 2012 meeting.

Some discussion has suggested that “inflation targeting” is inconsistent with the Fed’s dual mandate.

The purpose of this talk is to argue that inflation targeting is perfectly consistent with the Fed’s dual mandate.

Indeed, as we shall see, inflation targeting is consistent with hawks, doves, and even bubbles.
Inflation Targeting

At the January 2012 meeting, the Federal Open Market Committee (FOMC) named an explicit, numerical inflation target of 2 percent.

The Fed joins many central banks around the world in adopting an inflation target.

It has been Chairman Bernanke’s goal since joining the Fed.

Congratulations to the Chairman on this important accomplishment.
The dual mandate is actually a triple mandate:

- The Fed should conduct monetary policy to “… promote effectively the goals of maximum employment, stable prices, and moderate long-run interest rates.”
- Most focus on two goals: “maximum employment” and “stable prices.”
The ECB, by contrast, has a single mandate.

The goal is to promote “stable prices.”

In practice, monetary policy is viewed in the same way in Europe as it is in the U.S., despite the differing mandates.

This talk may shed some light on why this occurs.
DO CENTRAL BANKS BEHAVE DIFFERENTLY?
THIS TALK

- Use a simple “toy” model.
- Use a simple policy rule.
- The model plus the policy rule jointly determines an equilibrium.
- The coefficients in the policy rule will affect the nature of the equilibrium.
- Key point: The choice of the inflation target is separate from the choice of the coefficients in the policy rule.
Consistency with the dual mandate
A TOY MODEL

- Households maximize an index of material well-being by making decisions on how much to consume and save, and how much time to devote to market work.
  - The solution to their problem gives one equation.
- Firms hire workers and produce output for sale to households.
  - The solution to the firms’ pricing problem gives a second equation.
- The monetary authority controls a short-term nominal interest rate.
  - We will use a Taylor-type policy rule to describe the decision on interest rates.
The controversial sticky price assumption

- Models of this general form have been popularized by Michael Woodford (2003, *Interest and Prices*, Princeton University Press).
- A key assumption is that prices are “sticky” in a certain sense.
- If prices are perfectly flexible, the model is like the “real business cycle” model described by Edward Prescott (1986, FRB Minneapolis *Quarterly Review*).
- There would be no role for the central bank in that model.
- The sticky price assumption is controversial: See, for instance, Mark Bils and Peter Klenow (2004, *Journal of Political Economy*).
- However, I will not challenge the sticky price assumption here.
Some equations

The three equation system is

\[ z_t = E_t z_{t+1} - \theta (r_t - E_t \pi_{t+1}) + \epsilon_t \]  \hspace{1cm} (1)
\[ \pi_t = \kappa z_t + \beta E_t \pi_{t+1} \]  \hspace{1cm} (2)
\[ r_t = \varphi_\pi \pi_t + \varphi_z z_t \]  \hspace{1cm} (3)

Here \( z_t \) is the output gap, \( \pi_t \) is the deviation of inflation from target, and \( r_t \) is the deviation of the nominal interest rate from its long-run value.

So, the steady state occurs where \( z_t, \pi_t, \) and \( r_t \) are all equal to zero.

The \( \epsilon_t \) term is a stochastic shock that keeps knocking the economy away from steady state.
Some equations

The three equation system is

\[ z_t = E_t z_{t+1} - \theta (r_t - E_t \pi_{t+1}) + \epsilon_t \]  

\[ \pi_t = \kappa z_t + \beta E_t \pi_{t+1} \]  

\[ r_t = \phi_{\pi} \pi_t + \phi_z z_t \]

The model is forward-looking because the actors in the model are forward-looking.

The parameters \( \theta, \kappa, \) and \( \beta \) come from the structure of the model.

- In calibrated versions, \( \kappa \approx 0.024 \) and \( \beta \approx 0.99 \); thus inflation today is mostly expected inflation.

The “Taylor-type” policy rule has parameters \( \phi_{\pi} \) and \( \phi_z \).
What is the output gap?

- The output gap in the model is not the output gap of common parlance.
- Instead, $z_t$ is the difference between the amount of output that would be produced if prices were flexible versus the amount of output actually produced when prices are sticky.
- The flexible price level of output would fluctuate dramatically in response to shocks in the economy.
- The size of the output gap measured this way is likely to be smaller than conventional measures once prices have a chance to adjust.
WHERE IS THE INFLATION TARGET?

- The inflation target is not explicitly specified in this system.
- This is because it is inside the $\pi_t$ term, which is the deviation of observed inflation from an inflation target.
- The central bank controls the inflation rate in the medium and long term.
- The inflation target is simply the embodiment of this fact.
- In effect, researchers “pencil in” the long-run rate of inflation they think the central bank desires.
Naming an inflation target

- Historically, central banks did not say explicitly what rate of inflation they were trying to achieve in the medium to long run.
- After the global inflation debacle of the 1970s, this practice was called into question.
- Since the central bank controls the inflation rate, there seems to be little to be gained from “hiding” the inflation target.
- Financial markets will “pencil in” their own perception of the inflation target anyway, but with some uncertainty about the true value.
- That just adds unnecessary uncertainty to the macroeconomic system.
**IS AN INFLATION TARGET HAWKISH OR DOVISH?**

- Naming an explicit numerical inflation target is neither hawkish nor dovish.
- It is simply a recognition that the central bank controls the medium- to long-run rate of inflation, and that in order to minimize uncertainty the central bank may as well say what it is trying to achieve.
- The subject of which actual value of long-run inflation is best for society is the subject of an entire literature.
- The literature generally supports low rates of inflation.
- As a practical matter, many central banks have adopted 2 percent.
THE DUAL MANDATE AND THE STEADY STATE

- In the steady state, the central bank achieves its inflation target.
- The other equations, representing the private sector, then churn out the steady state values of the other variables.
- Chief among these are the steady state level of consumption and the steady state level of labor supply.
- The steady state level of labor supply could be interpreted as the “maximum employment” of the dual mandate.
  - It is the amount of time households desire to work given wages and all other variables in the economy.
- The shock $\epsilon_t$ keeps knocking the economy off of this level of employment (either above or below).
The best policy achieves the dual mandate

- In the three equation system above, the central bank can move the nominal interest rate to offset incoming shocks exactly.
- The other variables never leave their steady state values.
- Inflation remains at the target rate of inflation.
- Employment remains at the maximum level.
- The dual mandate is achieved exactly at every point in time.
- Real-world policy cannot fully offset incoming shocks, but this toy model provides a conceptual benchmark.
What about a single mandate?

- In a single price stability mandate system, the essential story would not change.
- The central bank still controls inflation over the medium to long run.
- It still makes sense to explicitly name the inflation target as opposed to “hiding” it.
- And, achieving the single mandate is still consistent with the maximum level of employment of households.
- The single mandate may be a clearer way to describe the essential story, but it would not change the story.
Hawks and doves
THE RHETORIC ON THE DUAL MANDATE

- If inflation targeting is consistent with the dual mandate, why all the discussion?
- Answer: There are more aspects to policy than just the inflation target.
- In particular, there are the policy parameters \( \varphi_\pi \) and \( \varphi_z \) in the Taylor-type policy rule.
- These parameters describe how aggressively the central bank reacts to inflation (\( \varphi_\pi \)) and to the output gap (\( \varphi_z \)) when setting the nominal interest rate in the Taylor-type rule.
More rhetoric

- Relatively large values of $\phi_{\pi}$ might be viewed as “hawkish”, while relatively large values of $\phi_{z}$ might be viewed as “dovish.”
- But whatever values are chosen for these parameters, the system operates within the context of an inflation target.
- In other words, the nature of the policy rule is separate from the issue of naming an inflation target.
I think most of the discussion about the dual mandate is really a discussion about how much emphasis should be put on each of the two parts of the Taylor-type policy rule.

If shocks can be offset completely each period, then the policymaker should choose values to accomplish that.

But that can only be done in the toy model.

In reality, both inflation and output are going to deviate from their steady state values.

So, how should these values be set?
What do the households want?

- One advantage of starting the analysis with households is that policy can be chosen to maximize the well-being of the households.
- This is superior to allowing policymakers to impose their own judgements on the macroeconomy.
- The idea is to choose $\phi_{\pi}$ and $\phi_{z}$ to maximize household utility when the system is simulated over a long period of time.
- There is a large literature on this topic which provides ample fodder for both hawks and doves.
- In general, the answer will depend on additional assumptions made in the underlying model.
Beyond interest rate adjustment
Other considerations

- There are many important monetary policy considerations other than the nature of interest rate adjustment.
- Some of these can be discussed even with just the toy model.
- Others involve missing elements from the model.
Bubbles

- There has been a lot of discussion concerning the possibility that current Fed policy may lead to “bubbles” in the economy.
- I interpret bubbles to mean that there are multiple equilibria, that is, situations where two or more sets of prices and expectations can clear markets.
- In that situation, the model cannot tell us which equilibrium will be achieved.
- Some equilibria can be very volatile.
- Interestingly, the toy model has a clear condition for such a situation to exist.
The Taylor principle

- The condition for multiple equilibria in the toy model is that the policymaker violates the “Taylor principle.”
- The Taylor principle is, in its simplest form, that nominal interest rates should be adjusted more than one-for-one with deviations of inflation from target.
- The principle is violated when $\varphi_\pi$ and $\varphi_z$ are “too small.”
- In effect, the policymaker must be sufficiently aggressive in responding to shocks, otherwise the economy will have multiple equilibria, some of which may be very unpleasant.
The worst policy

- In the toy model, one of the worst policies is to set both $\phi_\pi$ and $\phi_z$ to zero.
- This guarantees that the Taylor principle is violated, and that multiple equilibria exist.
- This is also known as the “interest rate peg” policy, because interest rates never change.
- Actual policy rates in the U.S. have been near zero since December 2008 and are projected to remain there until late 2014.
- This could be viewed as an approximation to the “interest rate peg” policy, and thus conducive to multiple equilibria.
The toy model is missing important variables.

One of these is unemployment.

Existing models of unemployment in macroeconomics have a search-theoretic nature.

Leading authors: Peter Diamond, Dale Mortensen, Christopher Pissarides.

It is difficult, but possible, to merge the search-theoretic models with macroeconomics.

See, for instance, Mark Gertler, Luca Sala, and Antonella Trigari, *Journal of Money, Credit, and Banking*. 

UNEMPLOYMENT
Another issue is that most monetary policy is not currently about interest rate adjustment.

Instead, so-called “unconventional” policy such as quantitative easing has come to the fore.

For an assessment of the effectiveness of quantitative easing programs, see the Federal Reserve Bank of St. Louis conference, “Quantitative Easing,” June 30, 2011.
MISSING FACTORS

- Other factors have been especially important during the last five years, in ways that were unanticipated before 2007.
- One critically important area is housing and real estate more generally.
- Another critically important area is financial market stability.
  - Runs on non-bank financial institutions were very important during the recent crisis.
- Without these elements in the models in a well-understood way, we cannot be completely sure that any particular monetary policy is the appropriate one.
Globalization

- I would be remiss if I did not mention globalization and international monetary policy arrangements as another missing aspect of this model.
- For some discussion of this issue, see Bullard and Singh (2008, *Journal of Monetary Economics*).
Robust policy

- These considerations suggest that policy should be conducted in a way that is robust to possible errors of omission or commission in the baseline model.
- There is a “robust control” literature that adopts techniques from engineering to the forward-looking systems of macroeconomics.
- The findings there have been interesting but are not sufficient at this time to address the many issues in macroeconomic models.
Conclusion
CONCLUSION

- The FOMC recently set an explicit numerical inflation target.
- I have argued that such a target is consistent with the Fed’s dual mandate.
- Much of the discussion about the dual mandate is, in my view, really about the nature of the Fed’s reaction function to economic events.
- However, that issue is separate from setting an inflation target.
- I have stressed that heavy focus on the nature of the Fed’s interest rate reaction function in the current environment is questionable.
- There are many issues at least as important, and resolution of any of those issues could change the argument for a particular reaction function.
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