

A Theory of Slack

How Economic Slack Shapes Markets, Business Cycles, and Policies

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CHAPTER 17.

Monetary policy

We have seen that the unemployment rate in the United States is always inefficiently high in slumps, and sometimes inefficiently low in booms (chapter 13). Therefore, the economy requires active and systematic stabilization policy to align unemployment with its efficient level. A natural policy to achieve such stabilization is monetary policy, which has scope to stabilize the unemployment rate. The link is the interest-rate channel: by shifting interest rates, monetary policy can move aggregate demand and thus unemployment toward the efficient rate—at least when conventional interest-rate policy is unconstrained (chapter 14).

17.1. Optimal monetary policy

We know that the unemployment rate fluctuates over the business cycle, while the efficient unemployment rate remains very stable. This means that the unemployment gap fluctuates over the business cycle, as we showed in chapter 13. We also saw in chapter 14 that monetary policy is able to stabilize aggregate demand, especially away from the zero lower bound. Although there are lags in the real world and monetary policy cannot be effective immediately, it can theoretically be used to bring the unemployment rate closer to the efficient level and improve social welfare. In this chapter, we derive a sufficient-statistic formula for the optimal monetary policy.

17.1.1. Social planner's problem

We solve the problem of a planner who uses monetary policy to maximize social welfare. We impose a few assumptions. First, we assume that monetary policy is non-neutral and conducted through the nominal interest rate. This means that nominal interest rates can stabilize the economy. The slackish models in part IV are an example of this, where interest rates control aggregate demand. But more generally, any neo-Wicksellian model falls into this category (Woodford 2003).

Our second assumption is that we work in a model in which there is unemployment, unemployment determines social welfare, and the efficient unemployment rate can be measured by sufficient statistics, as in chapter 13, and as in the models of chapters 14 and 16.

Lastly, we assume that inflation is fixed, as in the model of chapter 14, or the divine coincidence holds, as in the model of chapter 16. This means that either inflation does not respond to monetary policy or inflation is at its target level when the unemployment rate is efficient.

17.1.2. Sufficient-statistic formula

We now derive our sufficient-statistic formula for optimal monetary policy. Given the current unemployment rate, u , and current nominal interest rate, i , the sufficient-statistic formula should give the optimal nominal interest rate, i^* , that the central bank should set. The optimal nominal interest rate is defined by

$$u(i^*) = u^*,$$

where $u(i)$ is the function linking the unemployment rate to the nominal interest rate in the economy, and u^* is the efficient unemployment rate or FERU.

To derive the sufficient-statistic formula, we perform a first-order Taylor expansion of the function $u(i)$ around i :

$$u(i^*) = u(i) + \frac{du}{di} \cdot (i^* - i),$$

where the derivative du/di is evaluated at the current interest rate and unemployment rate.

By definition of the function $u(i)$ and optimal interest rate i^* , we have $u(i) = u$ and $u(i^*) = u^*$, so the Taylor expansion gives

$$u^* = u + \frac{du}{di} \cdot (i^* - i).$$

Rewriting this to express the optimal interest rate as a function of the prevailing unemployment gap, we get

$$(17.1) \quad i^* = i - \frac{u - u^*}{du/di}.$$

This is our sufficient-statistic formula. The statistic $u - u^*$ is the unemployment gap. The statistic du/di is the monetary multiplier: it gives the percentage-point change in unemployment when the nominal interest rate increases by 1 percentage point. It is positive if an exogenous increase in nominal interest rate raises unemployment, as it typically does in the real world.

17.1.3. Interpretation of the formula

The optimal monetary-policy formula (17.1) tells us that the central bank should adjust the nominal interest rate to bring the unemployment rate to the FERU.

Consider the realistic case where the monetary multiplier is positive, so an increase in interest rates raises the unemployment rate. Then if the unemployment rate is above the FERU, the central bank needs to cut interest rates. On the other hand, if the unemployment rate is below the FERU, interest rates need to be raised.

We can also see that how much the central bank should respond to the unemployment gap depends on the monetary multiplier. If the monetary multiplier is large, monetary policy has a strong effect on the unemployment gap so rates need to be changed by a smaller amount. If the multiplier is small, monetary policy only has a limited impact on the unemployment gap so rates need to be changed by a larger amount.

17.1.4. Calibration of the sufficient statistics

The sufficient statistics in formula (17.1) have been estimated in the United States.

The nominal interest rate i is just the federal funds rate that is controlled by the Board of Governors of the Federal Reserve System (2025).

The unemployment gap $u - u^*$ can be estimated directly from the unemployment and vacancy rates, as we saw in chapter 13.

A challenge in measuring the monetary multiplier du/di —and measuring the impact of policies in general—is that nominal interest rate changes are never exogenous: they are always endogenous to the current situation. This makes it difficult to estimate the monetary multiplier properly. But several methods have been developed to isolate exogenous variations in the nominal interest rate and measure the effect of monetary policy on aggregate variables, particularly on the unemployment rate.¹

¹See Christiano, Eichenbaum, and Evans (1999) and Ramey (2016) for surveys.

Many papers use vector autoregressions (VARs) to identify exogenous variations in monetary policy and compute the monetary multiplier. For instance, using such an approach, Coibion (2012, p. 5) finds $du/di = 0.16$. This value accords with previous estimates of the monetary multiplier obtained by Christiano, Eichenbaum, and Evans (1996), Bernanke, Boivin, and Elias (2005), and others, with the exception of the larger estimate $du/di = 0.6$ obtained by Bernanke and Blinder (1992).

However, VAR does come with its issues—it is quite difficult to estimate the exogenous changes in monetary policy. An alternative approach is the narrative approach pioneered by Romer and Romer (1989, 2004). The idea is to carefully read accounts of policy decisions to separate endogenous and exogenous changes in the interest rate by isolating idiosyncratic decisions made by the Federal Reserve that were not driven by current economic conditions. Romer and Romer (1989, 2004) construct a series of monetary policy shocks using only these idiosyncratic decisions and, based on this series, measure the impact of monetary policy on the economy. Using the narrative approach, Coibion (2012, p. 7) obtains a much larger estimate of the monetary multiplier: $du/di = 0.93$.

This is significantly bigger than the value computed using VAR, and using this number would lead to very different outcomes in our analysis. Thus, it is important to try to get a narrower range of estimates for the monetary multiplier so that we can be more certain about how to conduct monetary policy. To reconcile the difference between the two approaches, Coibion (2012, p. 8) proposes a hybrid approach that yields a medium estimate of the monetary multiplier: $du/di = 0.40$. The hybrid approach appears robust: across numerous specifications, it yields monetary multipliers between 0.4 and 0.6 (Coibion 2012, p. 12). We use the midpoint of this range, $du/di = 0.5$, to carry out our analysis and study optimal monetary policy.

17.2. Optimal response to unemployment fluctuations

Now that we have estimates for the sufficient statistics in our optimal interest-rate formula, we can put everything together to describe what the Fed's optimal behavior is. Combining the optimal interest-rate formula, given by (17.1), with the midrange estimate of the monetary multiplier, $du/di = 0.5$, we obtain the following formula:

$$(17.2) \quad i^* = i - 2 \times (u - u^*).$$

Therefore, for any unemployment gap, the optimal response of the nominal interest rate is twice the size of the gap. For example, if the unemployment gap is 1pp, the federal funds rate should drop by 2pp.

This is a very simple rule that should guide the Fed's response to unemployment fluctuations. Of course, it differs from the typical Taylor (1993) rule that appears in New

Keynesian macroeconomics: rule (17.2) links monetary policy to the unemployment rate whereas the Taylor rule links it to the inflation rate. Moreover, the optimal response of monetary policy to the unemployment rate can be obtained empirically, by estimating the monetary multiplier. By contrast, the most appropriate response of monetary policy to inflation is typically determined by simulations in New Keynesian models.²

17.3. Application to the slackish business cycle model

The slackish business cycle model of chapter 14 falls entirely into the class of models studied in this chapter. First, social welfare is solely determined by the unemployment rate, so social welfare is maximized when the rate of unemployment is efficient. Second, monetary policy determines the unemployment rate by modulating aggregate demand, without creating any distortions. Hence, the optimal monetary policy is to set the nominal interest rate so as to reach the efficient unemployment rate u^* and eliminate the unemployment gap. Formally, the optimal nominal interest rate i^* must be set so that $u(\theta(i^*)) = u^*$, where the unemployment rate is a function $u(\theta)$ of tightness given by (14.2), and tightness is a function of the interest rate given by (14.13).

Figure 17.1A illustrates the optimal response of monetary policy when the unemployment gap is small. Initially, aggregate demand is given by the dashed aggregate demand curve, and tightness is θ . Since $\theta < \theta^*$, the initial unemployment gap is positive. It is optimal for monetary policy to eliminate the unemployment gap, so the interest rate should drop to stimulate aggregate demand and bring tightness to θ^* .

Since the efficient allocation is in the gray cone in figure 17.1A, optimal monetary policy can be implemented. The gray cone represents the range of aggregate demand curves for any positive interest rate below the current interest rate; the outward boundary of the cone is the highest aggregate demand curve, obtained when the nominal interest rate is 0.

Due to the zero lower bound, the optimal policy is only feasible if $i^* \geq 0$. In figure 17.1B, aggregate demand is initially more depressed, and the efficient allocation falls outside of the gray cone. Hence, monetary policy cannot eliminate the unemployment gap before reaching the zero lower bound. The best that monetary policy can do is reduce the nominal interest rate to 0, and bring the economy to the zero lower bound. There tightness is $\theta^z < \theta^*$, so the unemployment gap remains positive.

Finally, we come back to the conventional situation illustrated in figure 17.1A. There the drop in interest rate to bring tightness up from θ to θ^* , and the unemployment rate down from u to u^* , is given by the sufficient-statistic formula (17.1). We saw in chapter 14 that the slackish business cycle model can produce the sort of fluctuations in the unemployment

²See for instance the survey by Taylor and Williams (2010).

gap observed in the US labor market. One naturally wonders whether the slackish business cycle model is also able to match the values of the monetary multiplier estimated in US data—to rationalize empirical estimates of the effectiveness of monetary policy. The monetary multiplier is given by (14.9.2) in the model. It equals

$$\frac{du}{di} = \frac{1 - u^*}{\delta - r^*}$$

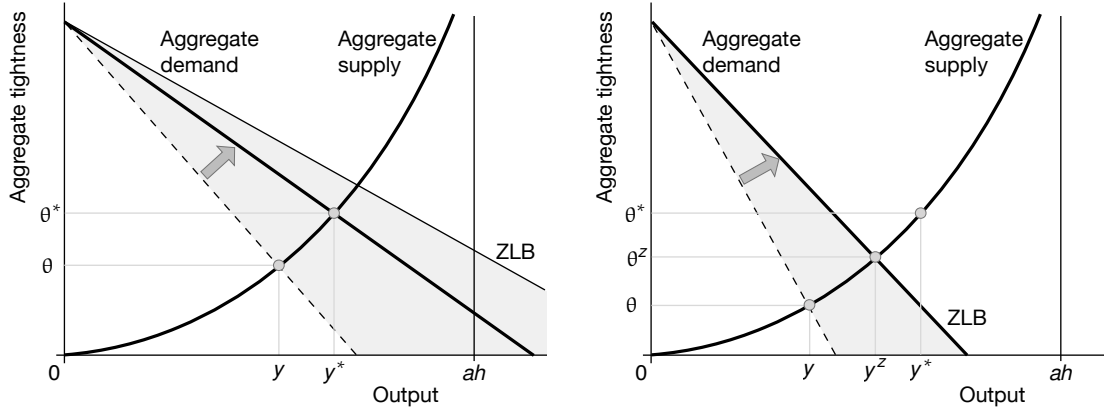
at full employment, and increases with unemployment around full employment, as described in figure 14.3A.

On average over 1948–2019, the US FERU averages $u^* = 4.2\%$ (chapter 13). As of 2016, in the United States, the natural rate of interest (real interest rate consistent with full employment) is about $r^* = 0.5\%$ (Williams 2017, table 1). Estimates of the time discount rate δ obtained in field and laboratory experiments and from real-world behavior are quite dispersed, but the majority of them point to discount rates well above prevailing real interest rates. Frederick, Loewenstein, and O’Donoghue (2002, table 1) and Andersen et al. (2014, table 3) survey a total of 54 studies. For each of the 54 studies we compute the mean estimate, then take the median across studies. We obtain a median annual discount rate of $\delta = 36\%$. The estimates are very dispersed: the lower quartile is $\delta = 13\%$ and the upper quartile is $\delta = 175\%$. To capture the impatience observed in many studies, we also compute a mean discount rate, after excluding 9 studies whose estimates are implausibly high. We obtain a truncated mean of $\delta = 91\%$.³ We adopt $\delta = 91\%$ as a baseline calibration.

From these estimates, we calibrate the monetary multiplier in the model to be $du/di = (1 - 0.042)/(0.91 - 0.005) = 1.06$. That is higher than the midrange estimate provided by Coibion (2012) ($du/di = 0.5$), but quite close to the estimate that he obtains from the narrative approach ($du/di = 0.93$). The takeaway is that the monetary multiplier in the basic slackish model is fairly consistent with the estimates coming from the narrative approach, but is much higher than the estimates coming from VAR approaches. If we used a lower value of the time discount factor in our calibration, closer to the median estimate, the calibrated value of the monetary multiplier would be higher, and further away from empirical estimates. So it seems fair to remark that the slackish business cycle model, in its basic form, might predict effects of monetary policy that are stronger than what we observe empirically.⁴

³Frederick, Loewenstein, and O’Donoghue (2002, table 1) contains 42 studies and Andersen et al. (2014, table 3) contains 16 studies, but 4 studies appear in both tables, so 54 distinct studies are included in total. When we compute the mean discount rate, we remove a few studies in which respondents are so impatient that the behavior cannot be easily rationalized with an exponential discounting model—they imply immense annual discount rates, sometimes above 10¹⁰%. The cutoff that we use for the annual discount rate is 1000%. We remove 9 studies whose mean estimate is above the cutoff.

⁴A possible reason why changes in the federal funds rate are less potent in reality than in the model is that the changes do not affect households directly. Households respond to the interest rates on their credit cards, loans, and mortgages, not directly to the fed funds rate. If these interest rates respond sluggishly or partially



A. Small initial unemployment gap: optimal monetary policy restores efficient unemployment

B. Large initial unemployment gap: optimal monetary policy reaches the ZLB

FIGURE 17.1. Optimal monetary policy in the slackish business cycle model

The aggregate supply and aggregate demand curves are constructed in figure 14.1B. The ZLB curve is constructed in figure 14.4A. The tightness θ^* and output y^* constitute the efficient allocation.

17.4. Optimal monetary policy in absence of divine coincidence

The same logic applies to optimal monetary policy in models without divine coincidence. When the divine coincidence fails, monetary policy faces a tradeoff between closing the unemployment gap and bringing inflation to its target, so targeting the FERU is no longer optimal. Nevertheless, the optimal interest rate depends on the FERU: it is determined by weighting the unemployment gap against the inflation gap.

To see this, consider an extension of the social planner's framework in which social welfare depends not only on unemployment but also on inflation—for instance as in chapter 16. Let's denote the efficient inflation rate by π^* . The welfare loss around the efficient allocation (u^*, π^*) admits the following quadratic approximation:

$$(17.3) \quad \mathcal{L}(u, \pi) = (\pi - \pi^*)^2 + \Lambda (u - u^*)^2,$$

where $\Lambda > 0$ measures the importance of unemployment relative to inflation in the social welfare function.

Additionally, the social planner faces a Phillips curve that relates inflation to unemployment. Around the efficient allocation, the Phillips curve admits the following linear approximation:

$$(17.4) \quad \pi - \pi^* = -\Gamma (u - u^*) + \Omega,$$

to the fed funds rate, then of course the fed funds rate would have a limited effect on aggregate demand and the economy in reality (Gregor, Melecky, and Melecky 2021).

where $\Gamma > 0$ gives the slope of the downward-sloping Phillips curve, and $\Omega \neq 0$ is introduced to break the divine coincidence. Indeed, if $\Omega = 0$, then $\pi = \pi^*$ when $u = u^*$: inflation is on target at full employment, so the divine coincidence holds. If $\Omega > 0$, then $\pi > \pi^*$ when $u = u^*$: inflation is too high at full employment, so unemployment must be above the FERU to bring inflation to target, just like in the 1970s. Conversely, if $\Omega < 0$, then $\pi < \pi^*$ when $u = u^*$: inflation is too low at full employment.

The Phillips curve developed in chapter 16 links the unemployment and inflation gaps, and it guarantees that the divine coincidence holds if inflation expectations are anchored, so $\Omega = 0$ in (17.4). But we also saw that the divine coincidence might fail if inflation expectations are not anchored, leading to $\Omega \neq 0$.

The social planner minimizes the welfare loss (17.3) subject to the Phillips curve (17.4). Inflation can be substituted out of the welfare loss using the Phillips curve. Then, the planner's problem is to find $u \in [0, 1]$ to minimize

$$[-\Gamma(u - u^*) + \Omega]^2 + \Lambda[u - u^*]^2.$$

This objective function is strictly convex in u , so the first-order condition is sufficient to find its minimum. We take the function's derivative with respect to u and set it to 0:

$$0 = -2\Gamma[-\Gamma(u - u^*) + \Omega] + 2\Lambda[u - u^*].$$

Rearranging terms, we express the optimal unemployment gap as a function of the parameters:

$$(17.5) \quad u - u^* = \frac{\Omega\Gamma}{\Gamma^2 + \Lambda}.$$

Plugging (17.5) in the Phillips curve (17.4), we express the optimal inflation gap as a function of the same parameters:

$$(17.6) \quad \pi - \pi^* = \frac{\Omega\Lambda}{\Gamma^2 + \Lambda}.$$

From these two expressions, we obtain a simple expression for the ratio between the optimal unemployment and inflation gaps:

$$(17.7) \quad \frac{u - u^*}{\pi - \pi^*} = \frac{\Gamma}{\Lambda} > 0.$$

The tradeoff between inflation and unemployment in the absence of divine coincidence clearly appears in these equations. Consider the case where inflation is too high at the FERU ($\Omega > 0$). Then (17.5) and (17.6) say that it is optimal to keep unemployment above the FERU ($u > u^*$) and inflation above its target ($\pi > \pi^*$). Furthermore, (17.7) shows that the

optimal gaps are determined by the welfare cost of unemployment relative to inflation (Λ) and the response of inflation to unemployment (Γ). If unemployment is particularly costly (high Λ) or if the Phillips curve is flat (low Γ), the optimal unemployment gap is small relative to the optimal inflation gap. In such cases, the optimal unemployment rate remains close to the FERU, either due to the high marginal cost of unemployment (high Λ) or the limited marginal benefit of unemployment (low Γ).

The equations provide two additional insights. First, if the divine coincidence holds ($\Omega = 0$), then it is optimal to keep unemployment at the FERU ($u = u^*$ in (17.5)), which guarantees that inflation hits its target ($\pi = \pi^*$ in (17.6)). Second, it is never optimal for the unemployment and inflation gaps to have opposite signs ($(u - u^*)/(\pi - \pi^*) > 0$ in (17.7)). This is because welfare can be improved if the gaps take opposite signs. For example if the unemployment gap is negative and the inflation gap is positive (as in 2021–2024), then raising unemployment moves the unemployment gap toward zero and, by cooling inflation, moves the inflation gap toward zero—thereby improving welfare.

17.5. Might the price mandate explain departures from full employment?

Despite the US government’s full-employment mandate, the US labor market has consistently fallen short of full employment in the past century (chapter 13). In a world of fixed inflation or divine coincidence, there is no justification for falling short of full employment. But if the divine coincidence does not hold, one possible justification is that the dual mandate forced the Federal Reserve to keep unemployment inefficiently high so as to tame inflation, along the lines of equation (17.7). We explore this possibility here.

A central insight of equation (17.7) is that when monetary policy is conducted optimally, the unemployment gap and inflation gap should have the same sign. In other words, an unemployment rate above the FERU can only be justified if inflation is above target—as a way to cool inflation. Conversely, an unemployment rate below the FERU can only be justified if inflation is below target—as a way to boost inflation. In fact, optimality requires that the unemployment gap and inflation gap are linearly related through equation (17.7). A weaker but useful diagnostic is that they must at least have the same sign: if they do not, welfare can be improved by moving them toward the ratio in (17.7).

To assess whether this basic optimality requirement is satisfied, we first plot the unemployment gap (the distance between the unemployment rate and FERU) and inflation gap (the distance between the inflation rate and target of 2%) over time (figure 17.2A). Whenever the two gaps have opposite signs, monetary policy cannot be optimal. What we first see is that in many notable recessions, when the unemployment gap is positive, the inflation gap is negative, so clearly monetary policy was suboptimal. There was for instance notable deflation during the Great Depression—when the inflation gap was below -10 pp. There were also notable negative inflation gaps, together with positive unemployment

gaps, during the 1937–1938, 1948–1949, and 1953–1954 recessions.

Figure 17.3A zooms in on the recent, 2000–2024 period. The consensus is that the conduct of monetary policy has improved significantly in the past decades, so we examine whether improved performance is visible in unemployment and inflation data. We see again that the large unemployment gaps observed after the dot-com recession (2.5pp), and especially the Great Recession (5.9pp) and pandemic recession (6.4pp) cannot be explained by the price-stability mandate. When the unemployment gap peaked after these recessions, the inflation gap was always negative. This is especially true after the Great Recession, when the inflation gap fell as low as -1.4 pp; the inflation gap bottomed at -0.8 pp after the dot-com recession and -0.7 pp after the pandemic recession.

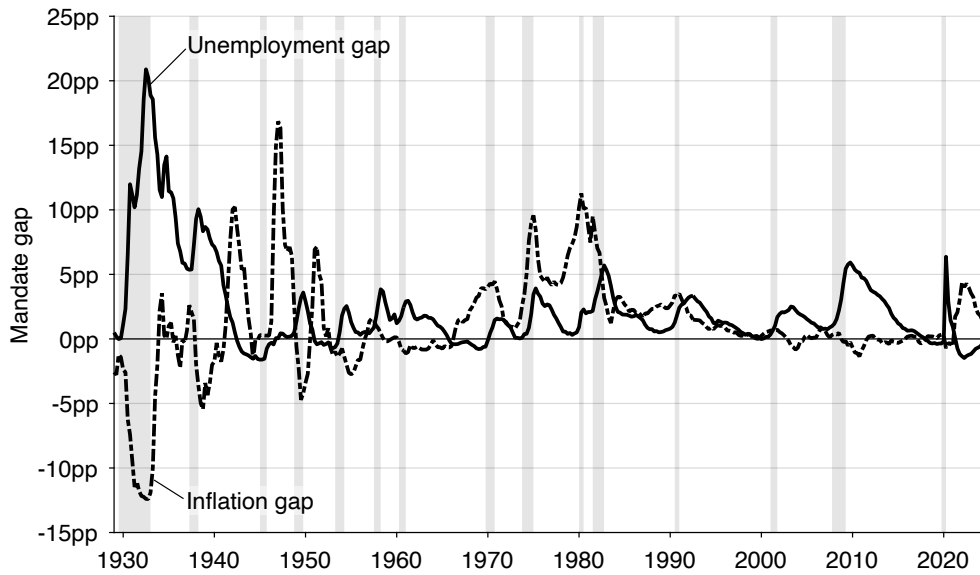
Another striking period of suboptimal monetary policy is the post-pandemic period. The inflation gap was positive from 2021:Q2 until the end of 2024, peaking at 4.3pp in 2022:Q3, but that cannot be justified by a positive unemployment gap. To the contrary, unemployment was below the FERU from 2021:Q3 onward, and the unemployment gap fell as low as -1.5 pp in 2022:Q2. So in 2021–2024, monetary policy was unambiguously too lax, leading to excessive inflation and labor market tightness.

To evaluate more systematically monetary policy, and assess whether the price-stability mandate could really explain departures from full employment, we produce scatter plots of the unemployment gap against the inflation gap (figure 17.2B). Under our baseline necessary condition for optimality, the unemployment and inflation gaps must have the same sign (equation (17.7)). Quarters that fall in the northwest or southeast quadrants therefore violate this condition: in those quadrants the gaps have opposite signs, so monetary policy cannot be optimal.

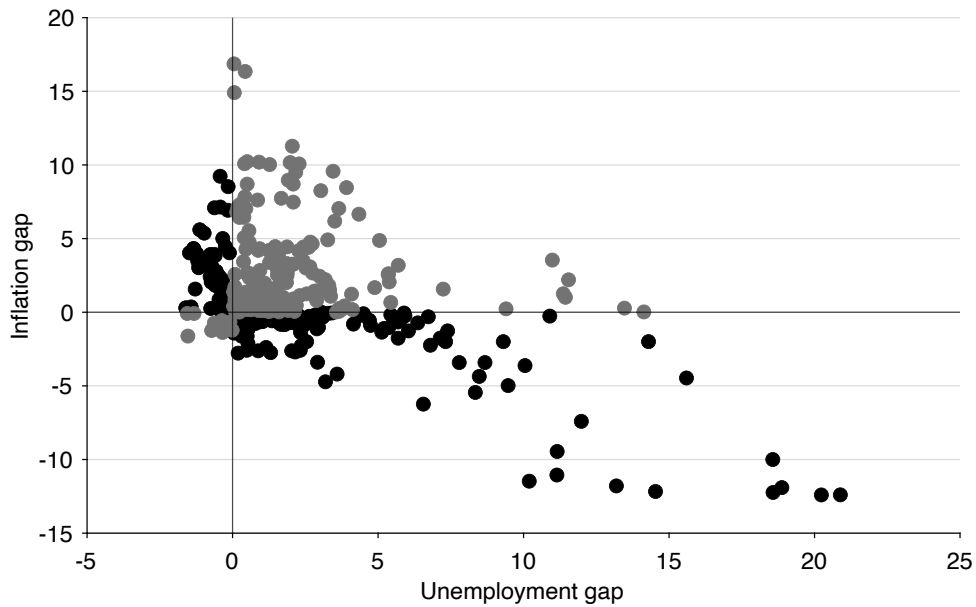
In the entire, 1929–2024 period, monetary policy is non-optimal at least half of the time: 47% of the 384 quarters cannot be optimal. This is not to say that monetary policy is optimal in 53% of the quarters: just that optimality cannot be rejected on the grounds that unemployment and inflation gaps have opposite signs. Indeed, when monetary policy is conducted optimally, the unemployment and inflation gaps should be linearly related (equation (17.7)). Such a linear relationship does not appear in the scatter plots.

If one believes that the conduct of monetary policy has improved over time, one would expect the share of non-optimal quarters to fall over time. That is not what we observe. If we focus on the 2000–2024 period (figure 17.3B), we see that 63% of the 100 quarters display non-optimal monetary policy. If we zoom in on the even more recent, 2008–2024 period, we find that 81% of the 68 quarters display non-optimal monetary policy! That is, since the Great Recession, only 19% of the quarters feature same-sign unemployment and inflation gaps. Clearly, modern departures from full employment are not because of the price-stability mandate.

For the most part, therefore, we can reject the explanation that the US government has



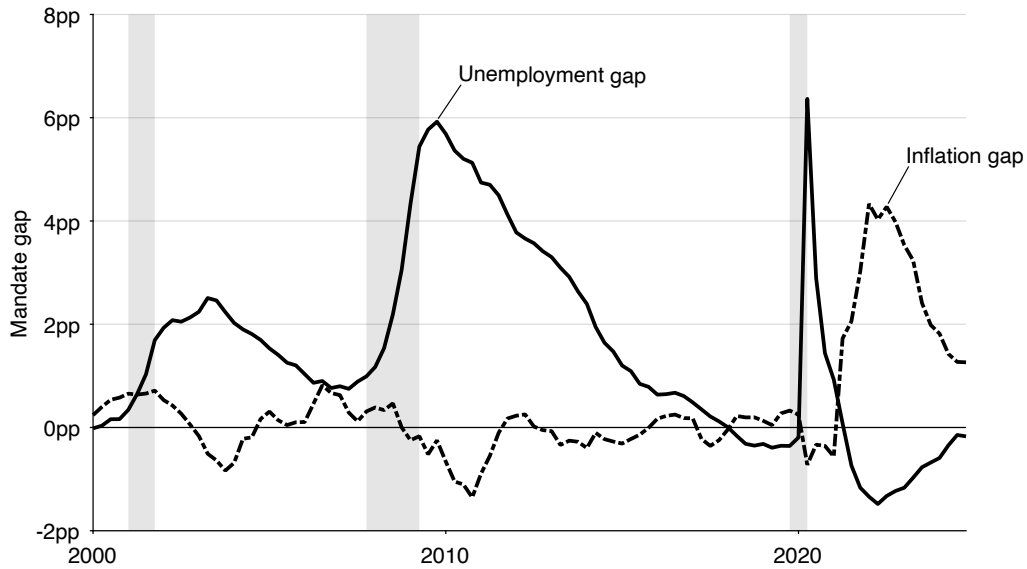
A. Time-series representation



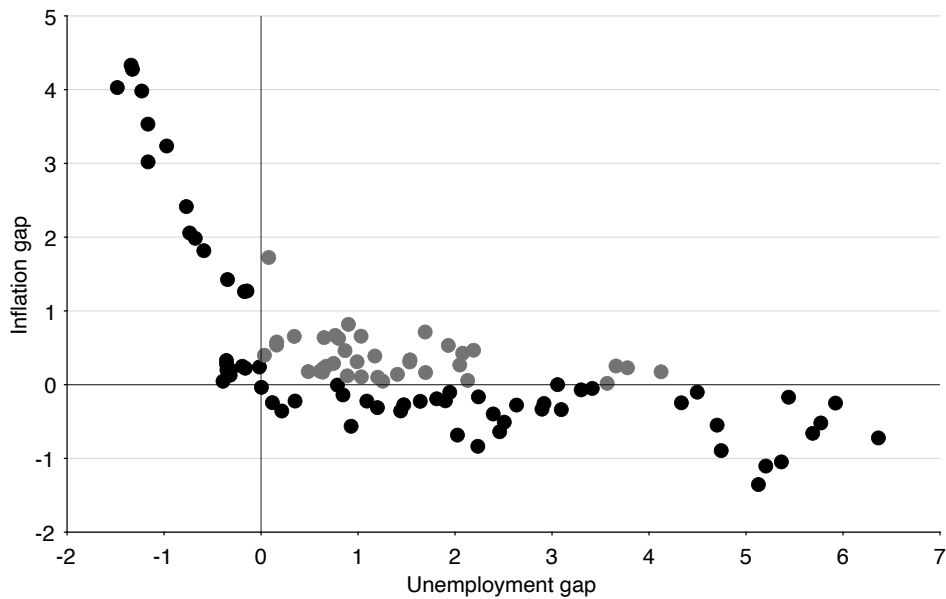
B. Scatter-plot representation

FIGURE 17.2. Unemployment gap and inflation gap in the United States, 1929–2024

The unemployment gap is $u - u^*$, where the unemployment rate u comes from figure 2.1 and the FERU u^* comes from figure 13.2. The inflation gap is $\pi - 2\%$, where π is the quarterly average of the monthly, seasonally adjusted, percentage change from a year ago of the consumer price index for all urban consumers which is produced by the BLS (2025a). After 1958, we use the core consumer price index produced by the BLS (2025b), which is typically preferred by the Federal Reserve because it does not include the prices of food and energy. Shaded areas indicate recessions dated by the NBER (2023).



A. Time-series representation



B. Scatter-plot representation

FIGURE 17.3. Unemployment gap and inflation gap in the United States, 2000–2024

The unemployment gap is $u - u^*$, where the unemployment rate u comes from figure 2.1 and the FERU u^* comes from figure 13.2. The inflation gap is $\pi - 2\%$, where π is the quarterly average of the monthly, seasonally adjusted, percentage change from a year ago of the consumer price index for all urban consumers, less food and energy, which is produced by the BLS (2025b). Shaded areas indicate recessions dated by the NBER (2023).

failed to maintain the labor market at full employment over the past century because of its price-stability mandate. The only period when large departures from full employment could be explained by the price-stability mandate is the 1970s and 1980s. During these two decades, unemployment was above the FERU and inflation was above target, so any reduction in unemployment might have been deemed undesirable as it might have pushed inflation even higher. Maybe surprisingly, the stagflation of the 1970s is a sign that the Fed was doing the best it could, given the constraints imposed by the Beveridge and Phillips curves. In that way, if the Fed had not let unemployment rise during the period, it would not have done enough to combat rampant inflation.

17.6. So why did the US economy fall short of full employment for a century?

The US government has consistently failed to maintain the labor market at full employment over the past century, and this failure cannot easily be explained by the price-stability mandate. Here we review other explanations as to why the US labor market has deviated from full employment in different periods.

17.6.1. Great Depression and its aftermath

During the Great Depression and its aftermath, the US economy was exceedingly slack. From the beginning of 1930, when our data begin, to the end of 1941, when the United States entered World War 2, the unemployment gap averaged +9.6pp. So the US economy was extremely far from full employment.

Three factors may explain this large amount of slack. The first is that the US government and the Federal Reserve did not have a full-employment mandate at the time. The mandate was introduced with the Employment Act of 1946, as a result of the Great Depression. A second factor is that the Federal Reserve was committed to the gold standard. The gold standard generated a deep deflation in the early 1930s, with dramatic consequences (Eichengreen and Temin 2000). A third factor is that the Fed failed to curb recurrent banking panics in the 1930s (Friedman and Schwartz 1963, chapter 7). Overall, as former Fed Chair Bernanke (2022, p. xvii) writes, “Blaming the Depression entirely on the Fed is an exaggeration, but the relatively new and unseasoned central bank did perform poorly.”

17.6.2. World War 2, Korean War, Vietnam War

The US labor market was pulled out of its Great Depression slackness by World War 2 (figure 13.1). In fact, the labor market became inefficiently tight during the war, with tightness averaging 2.8 over the 1942–1945 period. The labor market was once again inefficiently tight during the Korean War, with tightness averaging 1.12 over the 1951–

1953 period, and during the Vietnam War, with tightness averaging 1.22 over the 1966–1969 period.

Why was tightness so high during the wars? Part of the reason is that government spending was substantial during these three major wars (Ramey and Shapiro 1998). Such expenditure boosts aggregate demand, which increases tightness. Another part of the reason is that millions of potential labor-force participants were sent abroad on military duty (Department of Veteran Affairs 2023). Such drastic reduction in labor force reduces labor supply, which raises tightness and reduces the unemployment rate among the workers who stayed home.

So why didn't the Fed tighten monetary policy to reduce tightness in wartime? Indeed, a high real interest rate curbs aggregate demand, which reduces tightness and raises unemployment. An appropriate increase in interest rates could have brought tightness back to its full-employment level of 1. In the case of World War 2, there is a simple answer. As Bernanke (2022, p. xviii) explains, during and shortly after World War 2, “at the Treasury’s request, the Fed held interest rates at low levels to reduce the government’s cost of financing the war.”

The same happened at the beginning of the Korean War, when “facing new hostilities in Korea, President Truman pressed the Fed to keep rates low” (Bernanke 2022, p. xviii). The Fed did rebel and was allowed to phase out the low interest-rate peg that had been in place. But the phasing out came too late to cool down the labor market.

The situation during the Vietnam War was different (Bernanke 2022, pp. 20–22). The Fed raised interest rates by half a percentage point at the end of 1965, at the exact time when the economy had reached full employment. However, President Johnson was furious that the Fed tightened monetary policy. He needed low rates to help finance the war. Despite the pressure exerted by Johnson, the Fed continued increasing rates in 1966, which rapidly cooled the labor market. Worried about a possible recession, the Fed reversed its previous tightening. Under pressure from the White House, and facing a chaotic political situation, the Fed continued swinging between tightening and loosening until 1970. The lack of decisive tightening explains why the labor market remained so hot from 1966 to 1969.

17.6.3. Postwar period

In the postwar period, the US labor market was generally inefficiently slack. A manifestation of such pervasive slack is that the unemployment gap averaged 1.4pp between 1946 and 2019. Another manifestation is that the labor market did not achieve full employment once between 1970:Q1 and 2018:Q1—it was inefficiently slack for almost half a century.

A reason that might explain the slackness of the US labor market in the postwar period, especially after 1970, is that the Fed prioritized inflation at the expense of unemployment. Thornton (2011) reviews policy directives by the Federal Open Market Committee (FOMC)

and finds that it made no reference to unemployment or full employment between 1979 and 2008—despite the dual mandate introduced in 1977. Instead, Thornton finds that the FOMC preferred “to state its objectives in terms of price stability and economic growth.” This changed at the end of 2008, when the FOMC started mentioning its dual objective of “maximum employment and price stability” in policy directives and statements. Kaya et al. (2019) also detect this focus on inflation in FOMC transcripts. They find that from 1960 to 2010 FOMC discussions increasingly emphasized inflation relative to unemployment, and that this shift occurred during the Volcker era and continued even as inflation declined. They conclude that “the emphasis on inflation has become entrenched and disconnected from actual inflation.”

The prioritization of inflation might be due to a change in the Fed’s preferences or in macroeconomic theory. It might also come from Congress. Hess and Shelton (2016) examine legislative activity to determine when Congress pressures the Fed, and whether this pressure affects monetary policy. They find that by the late 1980s Congress shifted from threatening the Fed when unemployment was high to threatening when inflation was high. This finding is consistent with Weir (1987, p. 377)’s view that “By the mid-1980s full employment had been all but erased as a major political issue in the United States.” In fact, Weir (1987, p. 395) argues that although the Kennedy CEA identified an unemployment rate of 4% as full employment, in the following decades “more conservative economists [offered] ever-increasing rates of unemployment as the ‘true’ definition of full employment.”

17.6.4. Great Recession

The Great Recession saw the highest unemployment gap of the 1946–2019 period, at +5.9pp, and it presented new challenges to the Fed. Although the unemployment gap skyrocketed in 2008–2009, the Fed was unable to respond because it ran against the zero lower bound on nominal interest rates from the end of 2008 until 2015 (Board of Governors of the Federal Reserve System 2025). The Fed could not stimulate aggregate demand through lower interest rates because it was constrained by the zero lower bound, so it could not boost tightness and lower unemployment. Hence, unemployment remained inefficiently high until 2018.

Indeed, during the Great Recession, the unemployment gap shot up to around 6 percentage points. In this case, using our formula, the Fed should have lowered the federal funds rate by 12 percentage points. In reality, the federal funds rate at that time was 5%, so it would not have been possible for it to drop so much due to the zero-lower-bound (ZLB) on the nominal interest rate. The ZLB therefore became binding.

The Fed did resort to unconventional monetary policy, including forward guidance and quantitative easing, to reduce long-term interest rates in the aftermath of the Great

Recession (Kuttner 2018). But the effectiveness of such policies is debatable (Greenlaw et al. 2018; Michaillat and Saez 2021). Moreover, the Fed may not have used these policies aggressively enough because once again they targeted an unemployment rate that was too high. The Fed commonly uses the CBO's NRU to indicate full employment. During the Great Recession the CBO (2021) adjusted the NRU upward by 1pp because they believed that structural factors temporarily kept the unemployment rate high. As a result, in 2011:Q4, the short-term NRU reached 5.8%. We do find that the outward shift of the Beveridge curve after the Great Recession raised the FERU by 0.5pp, but the FERU only stood at 4.5% in 2011:Q4—1.3pp below the short-term NRU.

17.6.5. Coronavirus pandemic

The coronavirus pandemic sharply slowed down economic activity. In 2020, the US economy reached the largest unemployment gap since the Great Depression, at +6.3pp. As during the Great Recession, the Fed could not respond more aggressively to the slackness of the economy because of the zero lower bound (Board of Governors of the Federal Reserve System 2025).

Thanks to aggressive expansionary fiscal policy, however, the US economy recovered rapidly from the pandemic (Romer 2021). The US economy reached full employment in 2021:Q2, and the labor market continued tightening after that. In 2022:Q2, labor market tightness reached 1.98, a level it had not seen since the end of World War 2. It is only then, in spring 2022, that the Fed started tightening monetary policy (Board of Governors of the Federal Reserve System 2025). It is unclear why the Fed did not start tightening monetary policy earlier. After the labor market became too tight (2021:Q2), an entire year passed before the Fed increased rates (2022:Q2). This delay is all the more surprising since inflation was also above its target of 2% at the time. Core inflation was 3.7% in 2021:Q2 and rose to 6.3% in 2022:Q1 (BLS 2025b). Combined with the two years required by monetary policy to be fully effective (Coibion 2012), this delay explains well why the labor market remained inefficiently tight until the end of 2024.

17.7. Summary

In this chapter, we have seen that if inflation is fixed or the divine coincidence holds, the optimal monetary policy is to adjust interest rates to eliminate the unemployment gap entirely. The central bank should lower rates in bad times, when unemployment is inefficiently high, and raise rates in good times, when unemployment is inefficiently low.

In fact, optimal monetary policy is given by a simple formula that relates the optimal interest rate to two sufficient statistics: the unemployment gap and the monetary multiplier (the effect of the federal funds rate on the unemployment rate). In the United States, the

monetary multiplier is about 0.5. The formula then indicates that the Fed should lower the federal funds rate by 2 percentage points for any 1 percentage point of unemployment gap.

When inflation responds to monetary policy and the divine coincidence fails, optimal monetary policy is more complex but still calls for reducing the unemployment gap. In this case, it is optimal for the Fed to tolerate unemployment above the FERU when inflation is above target, and to tolerate unemployment below the FERU when inflation is below target. The sizes of the deviations of unemployment and inflation from their targets are determined by the welfare cost of inflation relative to unemployment and by the slope of the Phillips curve.

Finally, we examine why the US labor market has generally been too slack in the past century. We find that the price-stability mandate is not the answer: most of the time, when unemployment was too high, inflation was too low. Other constraints on monetary policy, such as political pressure and the zero lower bound, as well as misestimates of full employment, are more plausible explanations.

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