

# **A Theory of Slack**

**How Economic Slack Shapes Markets,  
Business Cycles, and Policies**

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# Preface

The Great Depression occurred almost one hundred years ago. This dramatic event generated a wave of research on recessions and business cycles. Early on, macroeconomists, most famously John Maynard Keynes, naturally concentrated on the most devastating aspect of the depression: mass unemployment. Contemporary models, however, have drifted away from this preoccupation to concentrate on fluctuations in prices—neglecting the vast number of workers who inevitably remain unemployed during economic downturns. This book returns the focus to economic slack—a concept that encompasses not just unemployment but all idle resources.

Before we go any further, we have to ponder: how much could incorporating slack into business cycle research really matter? A lot, it turns out. Let's go back to the beginning of 2008, at the start of the Great Recession. The unemployment rate was 5% (figure 1). This was actually below what modern macroeconomics stipulated. The unemployment target that comes out of the modern literature is the non-accelerating-inflation rate of unemployment (NAIRU): the unemployment rate that keeps inflation stable. The NAIRU was around 5.5% at the time. You will notice of course that keeping inflation stable has nothing to do with the health of the labor market or the government's mandate of full employment. But because modern macroeconomics focuses on prices exclusively, this is its target, and this is what the Federal Reserve uses as its unemployment target too.<sup>1</sup>

The unemployment rate skyrocketed as the Great Recession unfolded. The NAIRU rose also to about 6.5% but the unemployment rate was much higher than that, touching 10% in 2009. So according to the modern paradigm, the unemployment rate was about 3.5pp too high at the peak of the recession. Mind you, estimating the NAIRU is difficult, and each estimate of the NAIRU is surrounded by wide uncertainty, so it would not have

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<sup>1</sup>The Council of Economic Advisers (2024, p. 24)—which was created by the 1946 Employment Act to ensure that the government achieved its full-employment mandate—described the unemployment target as follows: “Modern economics has generally defined full employment by citing the theoretical concept of the lowest unemployment rate consistent with stable inflation, which is referred to as  $u^*$ , …the non-accelerating inflationary rate of unemployment (termed NAIRU).”

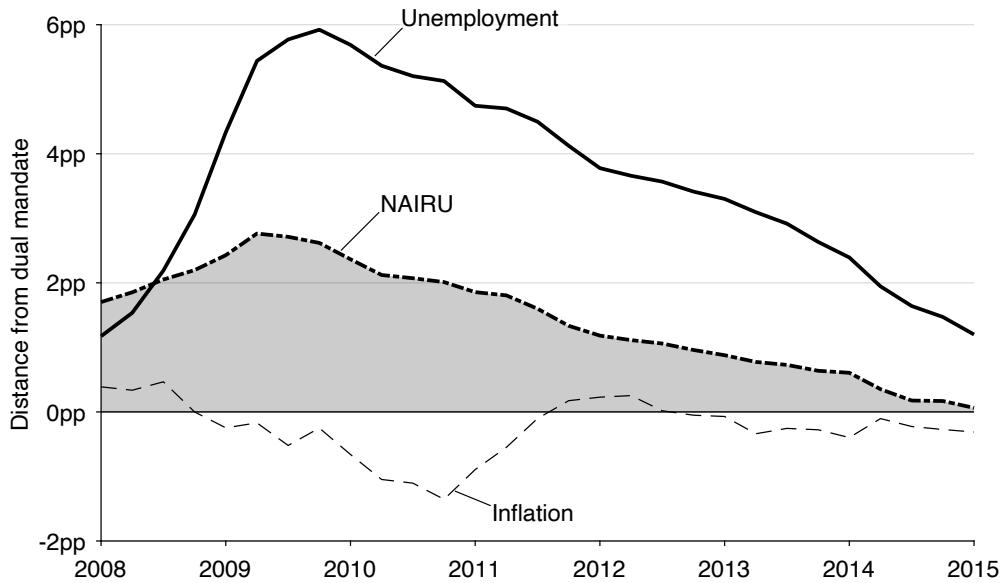


FIGURE 1. Costs of ignoring slack during the Great Recession in the United States

The unemployment rate is the quarterly average of the monthly, seasonally adjusted series produced by the BLS (2025b). The inflation rate 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 (2025a). The non-accelerating-inflation rate of unemployment (NAIRU) is constructed by Crump et al. (2024, figure 2). The unemployment rates are reported as departure from the full-employment rate of unemployment (FERU), which is described in chapter 15. The inflation rate is reported as departure from the inflation target of 2%.

been silly to claim that the unemployment rate was maybe only about 2.5pp or 2pp too high at the worst time of the Great Recession.

By contrast, it immediately comes out of a model with slack that the full-employment rate of unemployment (FERU) in 2008 was around 4%—and below 4.5% at any point of the recession and its recovery. As showed in figure 1, the difference is substantial. By ignoring slack, the modern paradigm set a target for unemployment that was much too lenient, about 2pp too high until 2011, with a peak of leniency at 2.8pp in 2009. It was not until 2015 that the gap between NAIRU and FERU vanished.

If we assume that policymakers would have tolerated the same unemployment gap if the FERU had been in effect instead of the NAIRU, how many jobs would have been saved? A lot, it turns out. On average between 2008 and 2015, the NAIRU was 1.5pp above the FERU, which translates into 195,286,484 worker-months of unemployment, or to keep numbers manageable, 16,273,873 worker-years of unemployment. By neglecting slack during and after the Great Recession, the modern paradigm therefore kept the equivalent of 16 million workers unemployed for an entire year. Such narrow focus on inflation, manifested through the NAIRU, is all the stranger given that inflation was never a problem

during that time. Inflation was always at its target of 2% or slightly below it; on average, it was 0.3pp below target (figure 1).

Additionally, the FERU formula developed in this book would have helped dismiss a related hypothesis that was popular at the time of the Great Recession and hindered policy response. A substantial number of academic economists and policymakers argued that mismatch was a key cause of high unemployment and therefore that there was not much for the Federal Reserve to do, since it did not have the tool to tackle mismatch.<sup>2</sup> One prominent advocate of that view was Narayana Kocherlakota, who was President of the Federal Reserve Bank of Minneapolis at the time. In a speech, Kocherlakota (2010) argued that

The inverse relationship between unemployment and job openings was extremely stable throughout the 2000-01 recession, the subsequent recovery, and on through the early part of this recession. Beginning in June 2008, this stable relationship began to break down ... Over the past year, the relationship has completely shattered. ... Firms have jobs, but can't find appropriate workers. The workers want to work, but can't find appropriate jobs. There are many possible sources of mismatch—geography, skills, demography—and they are probably all at work. Whatever the source, though, it is hard to see how the Fed can do much to cure this problem. Monetary stimulus has provided conditions so that manufacturing plants want to hire new workers. But the Fed does not have a means to transform construction workers into manufacturing workers. Of course, the key question is: How much of the current unemployment rate is really due to mismatch, as opposed to conditions that the Fed can readily ameliorate? The answer seems to be a lot. ... Most of the existing unemployment represents mismatch that is not readily amenable to monetary policy.

In essence, Kocherlakota argued that because of the shift in the Beveridge curve—the inverse relationship between unemployment and job openings—the unemployment rate that the Fed should target had increased drastically so the unemployment gap faced by the Fed was not very large, despite the high level of unemployment. As we will see in the book, the Beveridge curve is indeed central to understanding the workings of the labor market, and is at the heart of our FERU formula. However, the FERU formula allows us to formally quantify how much the Fed's full-employment target increased during the Great Recession. It turns out that mismatch only had a small effect on the FERU: yes, the Beveridge curve shifted outward; but no, the rise in the FERU did not account for most of the increase in unemployment. The FERU only increased from 3.8% in 2008 to 4.3% in 2010 and 4.5% in 2012. Since the FERU did not increase much, but the unemployment rate

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<sup>2</sup>See Rothstein (2012) for an overview of the debate and related empirical evidence.

increased drastically, the unemployment gap was substantial, peaking at 5.9pp at the end of 2009 (figure 1). This means that 5.9pp of unemployment was amenable to monetary policy, and to fiscal policy as well. However, due to the confusion created by the shift of the Beveridge curve and the lack of theory to translate that shift into a new full-employment target, the policy response was muted, condemning the US economy to an excruciatingly slow recovery from the recession.

Before bringing slack to the center of business cycle analysis, the book starts at the market level: it develops a model of markets with supply, demand, prices, but also slack. The presence of slack means that it's difficult for sellers to sell their wares—be it goods, services, or labor. In a way, this book is about things for sale on markets, which existing business cycle theories don't consider: selling is never a concern there.

Because selling is difficult, sellers are glad when they can find a buyer. What this means is that there is a range of prices at which sellers would be willing to sell: the one they had in mind when they placed the good for sale, higher prices of course, but also lower prices that eat up some of their surplus. The same is true for buyers: it's not always easy to find exactly the right good, and buyers are happy when they can purchase what they were looking for.

This difficulty in matching buyers and sellers—as demonstrated by the presence of slack—implies that in reality we're very far from the auction market envisioned by Leon Walras. Many prices might prevail in markets: not just the efficient, market-clearing price that Walras focused on. The implication is that markets are generally inefficient: sometimes too slack, sometimes too tight, and efficient only in a knife-edge case.

The first corollary of this generic inefficiency is that business cycle fluctuations are best understood as fluctuations in slack that correspond to more or less severe departures from efficiency. We will see that in the US economy, over the last century, there is always too much slack in recessions and sometimes too little in booms. Inefficiency is therefore a systematic outcome of market economies.

A second corollary is that macroeconomic policies should be designed to bring slack closer to its efficient level. There will always be slack in market economies, but there is an amount that is socially efficient, and this book explains how it can be measured in real time. Using the gap between slack and its efficient level, we will address questions that policymakers systematically face: how much should interest rates fall as unemployment rises, how large should stimulus spending be, and how immigration policy and unemployment insurance should be adjusted over the cycle. We will even see how fluctuations in slack can be used to detect recessions early.

The book's ideal reader is someone with basic mathematical training (at roughly the undergraduate level) and a curiosity about the social sciences and history—essentially, the kind of reader I was when I first began studying economics in graduate school at Berkeley.

This background should allow the reader to read the book from beginning to end, absorb a coherent picture of how the economy operates over the business cycle, and hopefully later apply the framework developed here to their own work on slack, business cycles, or related topics. The book aims above all to provide an internally coherent and practically useful way of understanding economic fluctuations.

Although the technical analyses are essential to the argument, they gain their full meaning only when placed in a broader historical and intellectual context—one that connects economic data and policy decisions with theories of business cycles. Within that context, I hope the ideas developed here will speak to general readers interested in how modern economies function and sometimes falter. While some sections of the book are necessarily mathematical, I have aimed to make the narrative, the data, and the findings accessible to readers who wish to follow the central argument without every mathematical detail. My hope is that such readers will find in these pages both insight and perspective on the forces that shape the recurrence of recessions and expansions.

I realize, of course, that the book may challenge professional economists in a certain way. Because they are fully ensconced in their paradigm—as they should be—it might be difficult for them to engage with the framework proposed here. When I presented the FERU framework at a policy conference in Washington, DC, in 2023, Christina Romer criticized our effort to “divorce the concept of full employment from stable prices” on the grounds that “a concept of full employment that isn’t consistent with stable inflation is not a sensible goal for policy”.<sup>3</sup> Christina Romer is a remarkable macroeconomist. She is one of the most accomplished scholars of the Great Depression; an expert on business cycles more generally; and a foremost expert on monetary and stabilization policy.<sup>4</sup> Furthermore, she understands how policy decisions are made in the real world: she chaired the Council of Economic Advisers during the Great Recession (2009–2010), hired by the White House to guide the US economy out of the crisis. More than anyone, she understands the toll that the Great Depression and Great Recession took on American workers and the role that policy can play to alleviate the desperation that comes with unemployment. Yet, after seeing my presentation, she emphasized that the concept of full employment could not be defined based on slack—it had to involve inflation. This exchange revealed how deeply the modern paradigm links full employment to price stability, even among its most thoughtful

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<sup>3</sup>The quote can be found in the general discussion that follows our paper on the FERU (Michaillat and Saez 2024, p. 422). The presentation of the paper and entire discussion are available online, for interested readers: [https://youtu.be/hNu7W5\\_XpZw](https://youtu.be/hNu7W5_XpZw). You will see that Christina Romer’s skepticism was widely shared by the audience. Such reactions are natural because the internal coherence of the modern macroeconomic paradigm makes alternatives difficult to conceive.

<sup>4</sup>On the Great Depression, see Romer (1990), Romer (1992), and Romer (1993). On business cycles, see Romer (1986), Romer (1989), and Romer (1999). On stabilization policy, see Romer and Romer (1989), Romer and Romer (2002), and Romer and Romer (2004). Her expertise is widely recognized: she was codirector of the NBER Monetary Economics Program for two decades and is part of the NBER Business Cycle Dating Committee.

practitioners, and more generally how paradigms shape thinking, as we will discuss in chapter 20. Nevertheless, I hope that macroeconomists interested in these issues will read the book and consider the framework that it proposes and its policy applications.

Overall, the book aims to provide a new lens through which to view, and ultimately manage, the enduring problem of the business cycle. By placing slack at the center of business cycle analysis, this book offers both a new understanding of how economies fluctuate and a practical framework for stabilization policy. A goal throughout is transparency and applicability—providing students, researchers, and policymakers with a framework and tools they can actually use to study, monitor, and respond to the inefficiencies that markets inevitably produce.

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