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 spurred 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 resources that remain idle over the business cycle.

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 start of the Great Recession at the beginning of 2008. The unemployment rate was 5%. This was actually below what modern macroeconomics stipulated (figure 1). 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. Of course, 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, the NAIRU has naturally become the preeminent unemployment target, including at the Federal Reserve.[1]

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

[1]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)."

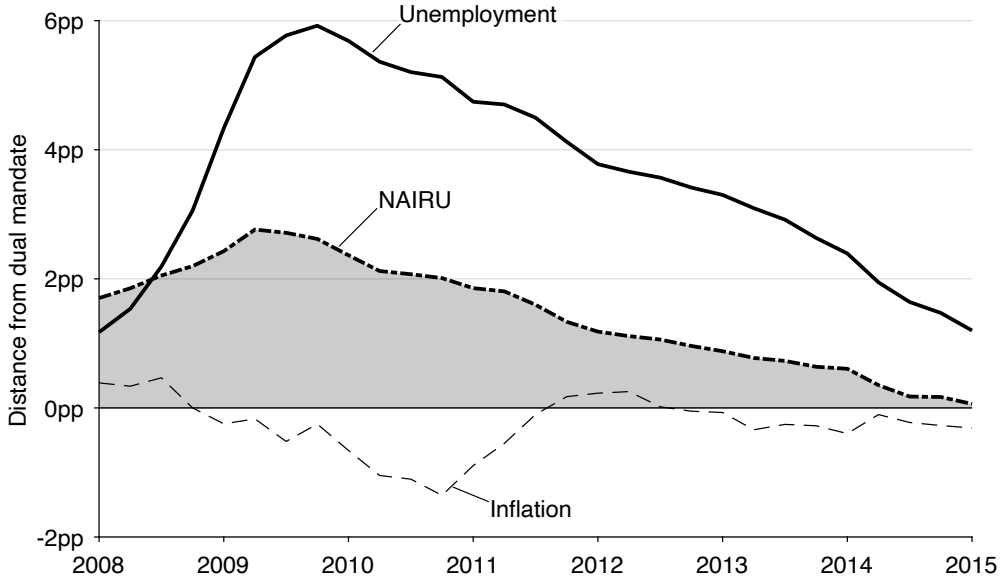

FIGURE 1. Costs of ignoring slack during the Great Recession in the United States

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 departures from the full-employment rate of unemployment (FERU), which is described in chapter 14. 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 2pp too high at the worst of the Great Recession.

By contrast, it immediately comes out of a model with slack that the full-employment rate of unemployment (FERU) was just below 4% in 2008—and below 4.5% at any point of the recession and its recovery. As shown in figure 1, the difference between FERU and NAIRU 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 produced unemployment targets that were materially more permissive, allowing for an additional 16 million worker-years of unemployment. This focus on inflation, embodied in the NAIRU, is odd given that inflation

remained close to target throughout that period. 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.[2] 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% at the beginning of 2008 to 4.3% in 2010 and 4.5% in 2012. Since the FERU did not increase much, but the unemployment rate

[2] 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 in the Beveridge curve and the lack of theory to translate that shift into a new full-employment target, the policy response remained muted, contributing to the slow recovery from the recession.

Before bringing slack to 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 or services. 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 are 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 generally operate inefficiently. They are 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, such as how much interest rates should fall as unemployment rises or how large stimulus spending should be as the economy enters a recession. We will see that fluctuations in slack can even be used to detect recessions.

I have aimed to write this book as a text in quantitative social science. As such, the book requires some basic mathematical training, at roughly the undergraduate level, as well as a curiosity about the social sciences, since it draws at various points on evidence and theories from psychology, sociology, public health, and economic history. 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 later apply the framework developed here to their own work on slack, business cycles, or related topics.

Although the technical analyses are essential to the argument, 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, data, and findings accessible to readers who wish to follow the central argument without every mathematical detail. I have also attempted to place the technical arguments in a broader historical and intellectual context—one that connects economic data and policy decisions with theories of business cycles. My hope is that such readers will find in these pages some insight and perspective on the cyclical contractions and expansions experienced by all modern economies.

I realize, of course, that the book may challenge professional economists in a certain way. Because researchers are fully ensconced in their paradigms—as they should be—it may 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".[3] Romer is one of the most accomplished scholars of the Great Depression; an expert on business cycles; and one of the leading authorities on monetary and stabilization policy.[4] 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. 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 reveals how strongly the modern paradigm links full employment to price stability, even among its most thoughtful practitioners. Nevertheless, I hope that macroeconomists interested in business cycles will read the book and consider the framework that it proposes and its policy implications.

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

[3]The quote can be found in the 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`. You will see that Romer's skepticism was largely shared by the audience.

[4]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.

fluctuate and a practical framework for stabilization policy. A goal throughout is transparency, coherence, 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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