Inflation Is a Supply Phenomenon

Pablo Cuba-Borda and Jean-Paul L'Huillier*

March 2025

Abstract

A *sine qua non* condition for inflation bursts is supply deficiency—caused either by exogenous shocks to aggregate supply (supply disruptions), or by excessive aggregate demand (supply-constrained demand booms). Aggregate demand booms, even big ones, that do not trigger supply deficiencies, are not inflationary. We survey the literature on the topic and discuss the evidence. Absent glaring macroeconomic mismanagement, we argue that viewing supply issues as the root cause for inflationary episodes provides an accurate account of when and where inflation occurs. Supply deficiencies typically lead to high, but ultimately moderate, inflation rates.

Keywords: Phillips curve, inflation, price setting, monetary policy tradeoffs.

JEL codes: E00, E32, E65.

*Board of Governors of the Federal Reserve; Brandeis University. We thank Ina Hajdini and Carol Osler for comments. The views expressed herein are solely those of the authors and do not necessarily reflect the views of the Board of Governors of the Federal Reserve, or the Federal Reserve System. All errors are ours.

1 Introduction

Milton Friedman coined the celebrated claim that "Inflation is always and everywhere a monetary phenomenon". Less celebrated is the second sentence of that quote that reads, "..., *in the sense that it is and can be produced only by a more rapid increase in the quantity of money than in output.*" [Friedman (1970), p. 11, emphasis added]. An analysis of this second sentence is at the heart of this paper. With this additional focus, we explore the validity of an alternate, almost opposite, claim: inflation is, instead, a *supply phenomenon*.

Our main point is that, precisely, there is a more rapid increase in money than output when supply constraints do not allow for production to expand following the impulse to aggregate demand. This is when inflation occurs. In contrast, when supply is slack—and hence output increases together with nominal demand, little or no inflation is observed. As the evidence we will review indicates, the latter appears to be a possible macroeconomic equilibrium over the medium term (say, within 5 years) and possibly even in the longer term.[1]

The supply deficiencies we have in mind are broad in nature. Exogenous shocks to the supply side of an economy, such as supply chain disruptions or labor force contractions, can trigger aggregate supply deficiencies. Supply deficiencies can also emerge from exogenous shocks to non-supply factors, such as shocks that trigger pent-up aggregate demand, demand rebalancing from goods into services, or excessive fiscal stimulus like "helicopter drops". In our discussion, we view these shocks as endogenously triggering supply shortages.

Recent developments lend significant credence to the view that, in developed economies, inflation is invariably linked to supply shortages. As shown in Figure 1, by 2020, inflation had been a non-story for decades and had remained stubbornly low despite extraordinary monetary policy efforts, such as forward guidance and several rounds of quantitative easing in the U.S., Europe, and

[1] In fact, it is not clear that money is neutral even one decade after a shock, see the evidence in Jorda, Singh, and Taylor (2024) and Bernanke and Mihov (1998).

Asia. This led to commentaries of the type "The Phillips curve may be broken for good" (The Economist 2017) and "Is Inflation Dead?" (Bloomberg Magazine 2019). However, as soon as supply constraints became widespread in 2020-2021, a remarkable and synchronized inflationary episode occurred worldwide.

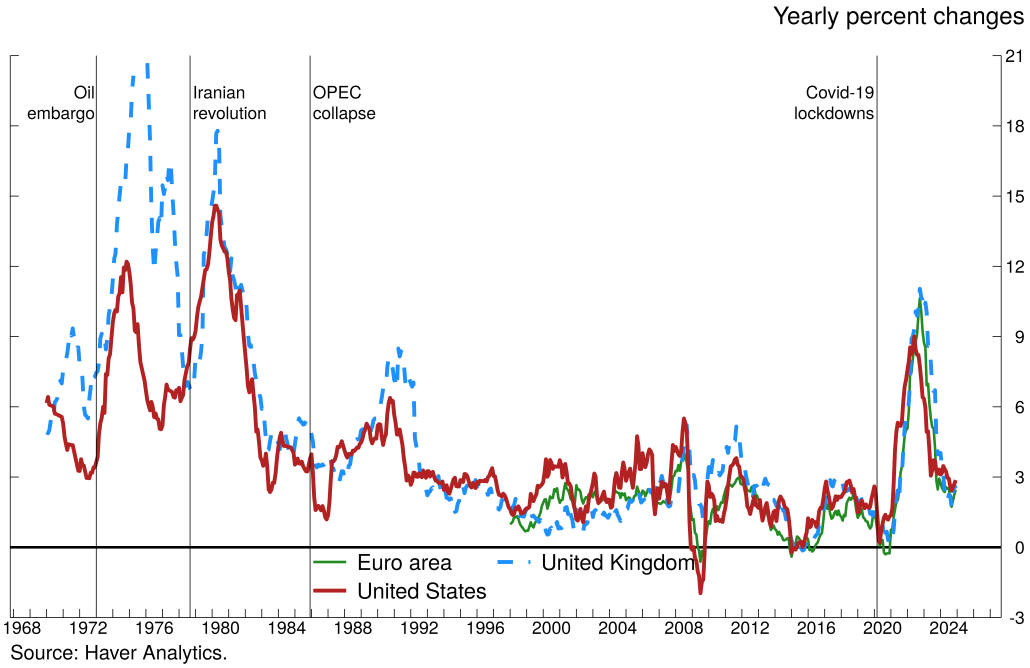

Figure 1: Inflation in the United States and Other Advanced Economies

Notes: Year-on-year percent changes for the Consumer Price Index in the United States, the Harmonized Index of Consumer Prices for the United Kingdom and the Euro area.

Another period with high inflation was the 1970s, again with synchronized dynamics, when several factors also constrained aggregate supply worldwide. Looking at these episodes, we find the link between high inflation and supply deficiencies hard to overlook.

We review evidence that suggests that demand expansions that do *not* trigger supply constraints do not lead to inflation. This appears to be the case for even important and large demand expansions (Beaudry and Portier 2014), confirming that the root cause of inflation surges can consistently be found in various kinds of supply deficiencies. Similarly, major demand contractions, such as the collapse of investment and consumption during the Great Recession, do not necessarily lead to deflation as the large literature on the missing disinflation

has discussed—see Coibion and Gorodnichenko (2015), among others.

What distinguishes this view from the monetarist view? We argue that there are two main distinctions. Both are articulated as a pivotal implication of the anchoring of inflation expectations in the private sector that has been achieved by monetary policy in the post-Friedman era.

First, there is little doubt that inflation is a monetary phenomenon in episodes of irresponsible monetary financing of fiscal spending. In such cases, inflation rates are typically quite high (say, comfortably above 20% per annum). However, nowadays, most central banks have largely adopted a sound monetary policy framework featuring credible central bank independence and are mainly focused on price stability. Such policies have successfully anchored inflation expectations. Under anchored inflation expectations, prices can be very sticky to changes in nominal demand, consistent with empirical evidence that the Phillips curve is very flat. Also, it is consistent with the subdued inflation experience in developed countries in the decade following the Great Recession. Between 2009 to 2019, and despite years of zero interest rates, forward guidance policy, quantitative easing, and record-low unemployment levels (as observed in the U.S. in 2018), inflation rates kept hovering comfortably below 2%.[2]

Second, the horizon of monetary neutrality matters. That is to say, even if money is neutral at very long horizons, say decades following a shock, a theory of such long-run inflation developments (based on money supply) has limited practical use. This is especially true when the evidence suggests that real supply disturbances can, on the other hand, generate large and sharp inflation fluctuations at short horizons. These fluctuations can become the center of attention in societies, and therefore, it is important to understand their welfare implications.

Hence, we aim to articulate an alternative view of inflation dynamics that emphasizes the effect of supply forces.

We structure the discussion as follows. Section 2 lays out a conceptual

[2]Again, inflation remained stable despite the collapse in aggregate demand at the onset of the Covid pandemic, and came alive only when supply deficiencies of various sorts came to be, starting in 2021.

framework. Section 3 reviews microeconomic evidence on the nature of price adjustments. In Section 4 we discuss the role of supply disruptions. Section 5 discusses the Volcker disinflation. Section 6 concludes.

2 Conceptual Framework

We set up a simple framework that captures the idea that inflation emerges whenever the prevailing quantity demanded exceeds the productive capacity of the economy. The gist of our argument can be expressed graphically using aggregate supply (S) and aggregate demand (D) diagrams. We consider a limiting case of convex supply curves in which y^{max} is the maximum amount of output that can be produced; at this point, the supply curve becomes vertical. Figure 2 shows our diagram, where D_1 depicts the aggregate demand schedule, and S_1 corresponds to the initial aggregate supply schedule. Point A depicts the initial equilibrium, with price p_A and output $y_A < y_1^{max}$. Our setup captures the type of nonlinearities of quantitative models with capacity constraints as in Boehm and Pandalai-Nayar (2022), Comin, Johnson, and Jones (2023), and Fornaro (2024).

There are multiple ways to microfound our convex aggregate supply curve. For instance, we can obtain a kinked supply curve if we assume downward wage rigidity as in Schmitt-Grohe and Uribe (2017), even if prices are fully flexible. The key insight is that on the upward-sloping portion of the supply curve, the economy operates with spare capacity, which can lead to a muted response of prices to changes in aggregate demand. On the vertical segment of the aggregate supply curve, the economy is at "full employment," and price increases are the only mechanism to clear excess demand.

2.1 Why Do Supply Shocks Cause Inflation?

Consider a shock that shifts the aggregate supply curve to the left, from S_1 to S_2. This shock also moves the maximum amount of output that can be

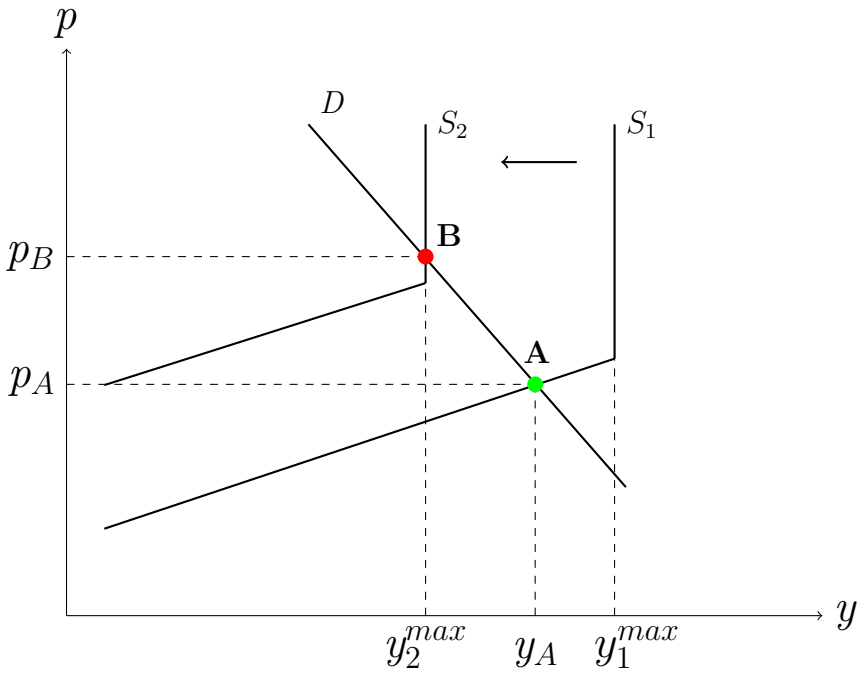

Figure 2: Supply Shock With Supply Constraint

produced to $y_2^{max} < y_1^{max}$. The new equilibrium is depicted in point B, where prices are higher $p_B > p_A$. Intuitively, supply shocks cause less output to be produced at any given price, but critically, these shocks also lower the maximum amount of output that can be produced. At the initial price level p_A, output supply under the schedule S_2 is deficient relative to the quantity demanded, y_A. This supply deficiency increases prices from p_A to p_B.

The supply deficiency is made clear by observing that the maximum level of output, y_2^{max} is now below the level of demand that prevailed in the initial equilibrium, y_A. Although the new equilibrium does not need to be located on the vertical portion of the supply schedule, the central point is that inflation emerges when the maximum output that can be supplied falls short of demand at the initial price p_A.

2.2 When Do Demand Shocks Cause Inflation?

We emphasize the role of supply constraints as the fundamental underlying source of inflation by analyzing the response to demand shocks in our simple

framework, as follows. Figure 3 shows the effect of a demand shock when supply constraints are not binding. The initial equilibrium is at point A, with prices p_A and output $y_A < y^{max}$. A shift in the aggregate demand curve, from D_1 to D_2, represents a positive demand shock.

At the initial price, p_A, the new quantity demanded is y_B. This quantity is feasible because of the economy's capacity constraint $y^{max} > y_B$. Can the economy settle in point B, at least temporarily? The answer, in our simple framework, depends on the slope of the supply curve. If firms were infinitely responsive to prices, their production could, in principle, expand with no price movement. Supplying y_B is feasible even if the demand shock is large as long as the capacity constraint of the economy remains slack.

In addition to slack, other mechanisms are consistent with the economy remaining at point B. It is well-accepted that, in the short-run, firms' prices might be slow to adjust as in canonical New Keynesian models, which empirically feature a fairly flat price Phillips curve—see Hazell, Herreno, Nakamura, and Steinsson (2022). But how long is the 'short-run'?[3] Do prices fully adjust after, say, 10 years of a shock?

Our reading of the literature is that it is well-accepted that money is neutral in the long run, and hence, the answer to the ending question of the previous paragraph ought to be a resounding 'yes.' The micro price data indicates that almost all prices *change* after, say, 7 years[4], but, as we will argue in Subsection 3.2—different from the prediction of standard pricing frictions—it is not entirely obvious that a price change signifies adjustment to all macroeconomic and microeconomic firm-relevant factors, in particular, to aggregate demand.

Furthermore, there is evidence that money is *not* neutral in the long run

[3]It is well-known that Friedman was somewhat vague about this question. For instance, in Friedman (1970) he states, "On the average, the effect on prices comes about six to nine months after the effect on income and output" but, further down, in the same article, "In the short run, which may be as much as five or ten years, monetary changes affect primarily output. Over the decades, on the other hand, the rate of monetary growth has primarily affected prices."

[4]Bils and Klenow classify 'coin-operated apparel laundry and dry cleaning' as the most sticky entry-level item of the CPI, which has a duration of 79.9 months.

(Jorda, Singh, and Taylor 2024).[5] Aside from the importance of nominal rigidities that we emphasized, these authors, find that nominal shocks have supply effects by changing TFP or the drivers of technological innovation, potentially explaining how—even in the absence of Keynesian frictions—money could have long-run effects—see also Ma and Zimmermann (2023). In sum, for all we know, that economy might remain at point B for a long time, say, a decade or more.

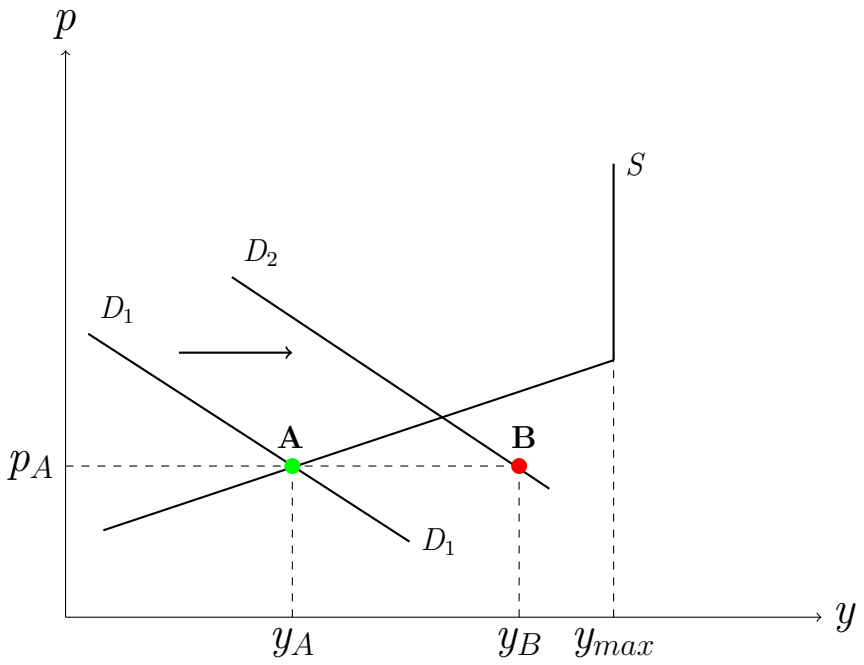

Figure 3: Demand Shock Without Supply Constraint

Figure 4 shows our final experiment in which a demand shift causes the supply constraint to bind. Like before, the shock shifts the demand schedule from D_1 to D_2. In this case, however, at the initial price, p_A, the quantity demanded y_B is greater than the capacity constraint of the economy y^{max}. So even if supply were very elastic when excess capacity exists, the equilibrium is not feasible since $y_B > y^{max}$. When the supply constraint binds, firms can no longer meet the quantity demanded, and the price level has to increase.

The two experiments discussed in this section are consistent with econometric evidence in Boehm and Pandalai-Nayar (2022), who find that demand

[5]Although Jorda, Singh, and Taylor (2024) emphasize the long-run effects of contractionary monetary shocks, and the effects are not symmetric in general, long-run labor input does increase persistently following an expansionary monetary shock.

shocks cause price increases when industries produce near capacity. In contrast, the price response is muted when industries operating far below capacity constraints. Moreover, Sun (2024) shows that excess capacity is a pervasive feature in industrialized economies and uses a model to show that demand shocks translate into large fluctuations in output when there is a buildup of excess capacity, even when prices are flexible.

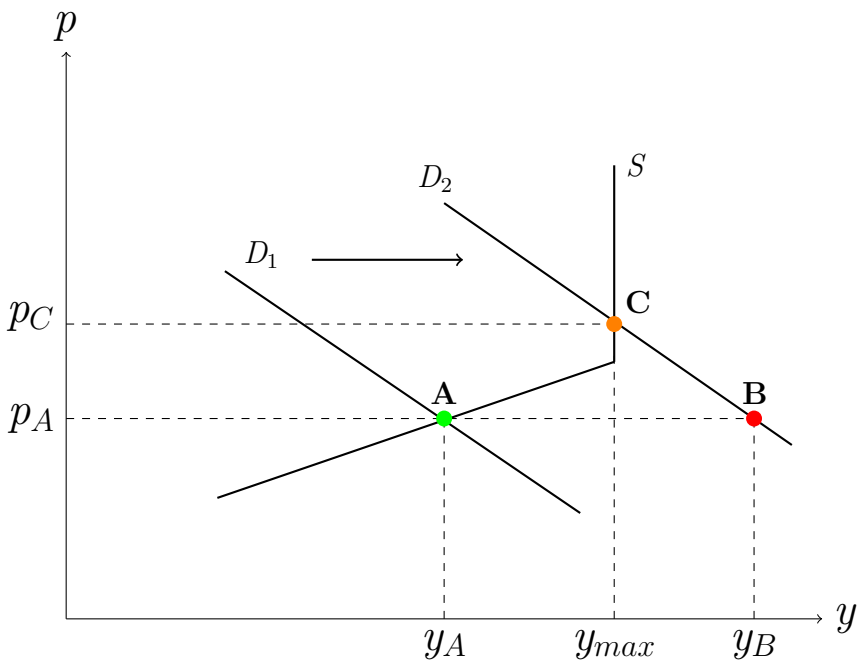

Figure 4: Demand Shock With Supply Constraint

Our takeaway is that supply, particularly capacity constraints, is the primitive factor behind large aggregate price movements. Inflation arises whenever $y > y_{max}$. To put our framework in context and consistent with the large literature estimating flat Phillips curves, we view the world as one in which supply constraints were slack since the early 1990s through the Covid pandemic, but the post-pandemic inflation exhibited a mix of binding capacity constraints, either because of negative supply shocks that tightened capacity constraints, large shifts in aggregate demand that made capacity constraints binding, or, as it is more likely, a combination of both forces.

2.3 Variance Decompositions Versus Economic Channels

We end this section by distinguishing two questions that the growing literature addressing inflation dynamics is asking (Shapiro 2024; Benigno and Eggertsson 2023; Cerrato and Gitti 2022; Gagliardone and Gertler 2024). The first question is, "Which shocks drive inflation?" This is a variance decomposition question. The second question is, "Why did these shocks cause inflation?" This is a question about economic channels.

To see why this distinction matters, consider a researcher who performs a variance decomposition exercise using a statistical model, for example, a structural VAR, and finds that demand shocks explain the largest share of inflation forecast errors. The seemingly obvious conclusion would be: "aggregate demand generates the bulk of observed inflation dynamics".

However, as illustrated in Figure 4, this conclusion is not warranted with a kinked aggregate supply curve. Suppose an increase in demand triggers the supply constraint. In that case, a wrong interpretation of the statistical results could attribute the bulk of inflation to the aggregate demand when, in fact, the bulk of inflation is the result of the economy's capacity constraint. In such a scenario, a supply shortfall better describes the economic channel driving inflation. Given that our focus is on the second question, the next sections discuss different economic channels that generate inflation, or the lack thereof, through strategic pricing decisions, changes in production costs, and supply disruptions.

3 What Triggers Price Adjustment?

The price level is not an asset price that seamlessly adjusts to close gaps between supply and demand. This is an obvious consideration when conceptualizing the reasons that put upward pressure on the price level. Older-style models with simplistic price level dynamics, such as those based solely on government budget constraints or Friedman's monetarist arguments of the quantitative theory of

money, miss this point.

Instead, the price level results from the aggregation of the price-setting decisions of a large number of firms. Accordingly, a large body of modern evidence and theory emphasizes the role of theoretical frictions of different types, such as menu costs, exogenous constraints on price adjustment as in the Taylor or Calvo model, or information frictions.[6] Hence, it is crucial to turn to micro-level theories of price adjustment to shed light on what triggers aggregate price adjustments.

3.1 Menu costs Versus Kinked Supply Curves

As menu cost models emphasize, price adjustment is lumpy, leading to nonlinear price level adjustments. Regarding nonlinearities, menu cost models emphasize the size of shocks and their implications for price gaps: the gap between a firm's current and desired prices. Smaller shocks are less likely to trigger adjustment than large shocks (Ball, Mankiw, and Romer 1988; Blanco, Boar, Jones, and Midrigan 2024; Karadi, Nakov, Nuño, Pastén, and Thaler 2024).

The nonlinear implications of menu cost models are compelling and find strong support in theory and evidence. For instance, Alvarez, Beraja, Gonzalez-Rozada, and Neumeyer (2018) develop theoretical results of the predicted frequency of price as a function of expected inflation and show evidence that prices become more flexible at a cutoff of 14% inflation. More recently, Cavallo, Lippi, and Miyahara (2024) documented evidence of a sizeable increase in the frequency of price adjustments following the large energy shocks of 2022.

However, other evidence indicates that this nonlinearity captures only part of the story. Indeed, if the size of the shocks is the prime explanation for movements in the price level, why did the Great Recession not lead to a massive drop in the price level? This puzzle, known as the 'missing disinflation', has been the topic of robust literature starting with the seminal contribution by

[6]See Golosov and Lucas (2007), Nakamura and Steinsson (2008), and Alvarez, Le Bihan, and Lippi (2016), (Midrigan 2011), among others.

Coibion and Gorodnichenko (2015). Similarly, other episodes tell the story of large demand *booms* that, accompanied by previous large increases in productivity, did not lead to inflationary pressures. A clear case in point is the boom of the early 2000s. It was fueled by rosy expectations about income growth, financial innovation, and rapidly growing prices in real estate, which followed the productivity increases of the I.T. revolution of the 1990s. This is a salient case of a large and positive demand shock that was non-inflationary.

One way to reconcile this dimension of the evidence is to bring a complementary view of nonlinearities to the one offered by menu cost models. This view emerges from kinked supply curves, as emphasized in Section 2. Assume a supply curve with a kink at a maximum output level, as in Figures 2-4. There, supply and demand shocks have nonlinear effects, not only as a function of their size, but *especially* depending on the economy's location on the supply curve. If a shock triggers capacity constraints, where output at the prevailing price of a given firm is simply unfeasible (or hardly so), prices will adjust rapidly. Under this narrative, the demand boom of the early 2000s did not trigger capacity constraints, whereas the pent-up demand boom post-Covid did. Whereas we do not offer a formalization of this idea, it is a natural nonlinear prediction within the conceptual framework outlined above.

3.2 Covering Costs as an Argument for Price Increases

Stepping away from our kinked supply curves framework, an old body of literature emphasizes the role of exogenous cost changes as the main reason firms increase prices. An early analysis is provided by Okun, who argues that incentives for "continuity of a given offer" is a key consideration in product markets.[7] But, "It is easy for anyone to understand that cost increases can force the firm

[7]The literature offers several formalizations for consumer-based frictions to price adjustment. For example, Benabou and Gertner (1993) considers a search environment where price adjustment triggers consumer search and leads to customer losses (see also Liu (2025)). Ravn, Schmitt-Grohe, and Uribe (2006) shows that deep habits generate market share concerns and Gilchrist, Schoenle, Sim, and Zakrajsek (2017) is a more recent contribution along same lines. L'Huillier (2020) and L'Huillier and Zame (2022) consider a strategic environment where firms cannot commit to truthfully revealing private information about the state of demand, leading to price stickiness.

to break the continuity of its offer [...] Price increases that are based on cost increases are "fair", while those based on demand increases are viewed as unfair" (p. 153).

A highly-cited study by Kahneman, Knetsch, and Thaler (1986) provides survey evidence based on household phone calls consistent with Okun's view. They find that consumers judge price increases that seek to exploit demand increases as unfair. However, price increases are deemed acceptable when profits are threatened, for instance, when costs have increased. Similarly, Blinder, Canetti, Lebow, and Rudd (1998) provide *firm* survey evidence that "when costs increase, [...] customers normally tolerate price increases" (see Table 7.3, p. 157) and Bils and Chang (2000) provide industry-level evidence that prices respond more to exogenous marginal cost increases than to demand-driven marginal cost increases. In sum, this strand of the literature provides a consistent message: Firms' prices respond more when costs increase than when demand rises.[8]

More recently, Eyster, Madarasz, and Michaillat (2019), Butters, Sacks, and Seo (2022), and Kohler, L'Huillier, Phelan, and Weiss (2025) revisit the evidence that firms adjust prices quicker to changes in costs than to changes in demand. Eyster et al. (2019) offer photographic evidence that firms actively justify price increases as a need to cover cost increases (Figure 1, p. 26). Butters et al. (2022) present micro-evidence that local cost shocks are passed through to local prices, whereas other research has documented that prices are insensitive to local demand conditions. Their findings suggest that retailers respond asymmetrically to local cost and demand shocks. Kohler et al. (2025) provides survey evidence of why German firms increased prices when the economy reopened after the second Covid lockdown (in March 2021). Their main finding

[8]It is also worthwhile mentioning that this kind of idea inspired Julio Rotemberg's influential cost-function approach to price setting. Quoting Rotemberg (1982): "This paper presents a theory that justifies price stickiness, namely, that firms, fearing to upset their customers, attribute a cost to price changes." More recently, in a paper on "fair pricing", Rotemberg (2011) explicitly entertains the idea that "The desire to appear benevolent [...] can also explain why prices seem to be more responsive to changes in factor costs than to changes in demand that have the same effect on marginal cost".

is that, despite the presence of pent-up demand and rationing in their sample, firms opt not to close excess demand gaps in their pricing decision but do react to the higher costs induced by the pandemic. They also provide an incentive-based theoretical explanation for this finding. A calibrated version of their model finds that most upward price changes were due to higher costs, despite excess demand.

A few open-box responses reported in Kohler et al. (2025) are worth mentioning here. One respondent explains that increasing prices can antagonize customers (sic, "*Price transparency and 'price verity' are most important in our business... We use customer retention instruments, like a loyalty card*"). Another makes it clear that it is important to pass on cost increases to the customer (sic, translated from German, "*Price increases at the moment are NO enrichment into own pockets. All the losses [...] must be financed [...].*"). Another emphasizes that they can generate revenue through higher quantity, consistent with production staying at point B of Figure 3 (sic, "*We decided not to increase the price because at the moment we can reach our revenue target through quantity...*").

Our takeaway from this literature is that there is evidence in favor of price adjustment that is *shock dependent*: the type of shock—demand versus supply—matters, and hence, the economic mechanism triggering price adjustment is of first order. Cost shocks trigger more rapid price adjustments than demand shocks, especially if cost increases are exogenous.

3.3 Consistent Macro Aspects: Evidence from DSGE Estimation and the Slope of the Phillips Curve

Imperfect price adjustment is the central element in modern DSGE models. Evidence from these models about inflation dynamics aligns with the relevance of exogenous cost changes discussed in the previous section.

Over two decades of structural macroeconometric modeling, especially within the New Keynesian tradition, has shown that the lion's share of inflation fluc-

tuations is explained by cost-push shocks rather than demand-pull shocks. For example, the seminal work by Smets and Wouters (2007) shows that roughly 75% of inflation's short-run forecast error variance is attributed to price markup shocks. Several other studies have delivered similar findings—see Justiniano, Primiceri, and Tambalotti (2010), among others. For price adjustment frequencies consistent with micro-evidence, exogenous changes in marginal costs are the main driver of inflation. These studies focus on U.S. data, but to the best of our knowledge, this finding has been replicated in other countries—see, for instance, Smets and Wouters (2003) for similar evidence in Europe.

Of course, it is easy to criticize DSGE models on the grounds that they are plagued with misspecification. However, their message resonates with evidence from a completely separate literature that identifies the slope of the Phillips using cross-sectional variation. For instance, the landmark paper by Hazell, Herreno, Nakamura, and Steinsson (2022) finds that "the slope of the Phillips curve is small and was small even during the early 1980s."[9] This means that unemployment changes due to demand shocks have muted inflation effects.[10] To give an idea of the orders of magnitude, their baseline specification estimates the slope of the Phillips curve to be $\kappa = 0.0062$. This means a one percentage point reduction in unemployment increases inflation by a meager 0.0062 percentage points. This estimate of the Phillips curve slope is similar to the one obtained by DSGE literature.[11]

Building on similar evidence, L'Huillier and Phelan (2025) argue that a flat Phillips curve and volatile inflation from supply shocks are inconsistent with the pricing behavior predicted by the New Keynesian model. The reason is that, in that model, the optimal reset price reacts to all shocks. This means that once firms are allowed to adjust prices, they will do so when strong demand is the

[9]Even the study by Cerrato and Gitti (2022), which explicitly incorporates the possibility of non-linearities in the slope of the Phillips curve in the face of large shocks, finds that a large share of the post-Covid rise in inflation is due to supply shocks.

[10]Their instrumental variable specifications explicitly bring in exogenous variation in demand to identify the targeted parameters.

[11]For instance, Del Negro, Lenza, Primiceri, and Tambalotti (2020) estimates a marginal cost slope parameter $\lambda = 0.0015$.

reason behind cost increases or when exogenous supply factors increase costs. However, if the Phillips curve is as flat as suggested by existing estimates, then prices are so sticky that firms cannot adjust prices quickly enough. To reconcile this theoretical puzzle, L'Huillier and Phelan (2025) develop a model incorporating the idea that firms flexibly increase prices to supply but not to demand. This is consistent with the evidence discussed in Section 3.2. Other mechanisms, such as the one of kinked supply curves, would also alleviate this shortcoming.[12]

In sum, the lesson we draw from two distinct approaches, the one on DSGE estimation and the one on the empirical analysis of the slope of the Phillips curve, is that demand factors do *not* easily move inflation, but supply factors do.

4 Globalization, Supply Chains, and Inflation

The degree of globalization is another aspect that can shape inflation dynamics through its effect on the global supply of goods. In fact, in the late 2000s, global market integration was singled out as one of the key factors in lowering inflation in advanced economies—see, for instance, Helbling, Jaumotte, and Sommer (2006), among others. More recently, the disruption to supply chains during the Covid pandemic increased the cost of shipping goods across countries directly measured in terms of freight costs, time delays, and inventory stock-outs (Alessandria, Khan, Khederlarian, Mix, and Ruhl 2023), generating inflation as documented in Bai, Fernández-Villaverde, Li, and Zanetti (2024) and Caldara, Iacoviello, and Yang (2024).

One clear manifestation of the process of globalization can be seen in the significant reduction of the time needed to deliver goods across countries starting

[12]The recent paper by Gagliardone, Gertler, Lenzu, and Tielens (2025) estimates a steeper Phillips curve based on marginal cost variation. However, it is worthwhile noticing that their baseline specification is based on exogenous supply variation (firm-level productivity), and therefore potentially consistent with the possibility that prices are flexible with respect to supply shocks, but sticky with respect to demand shocks.

around 1980. Figure 5 shows the lead delivery times to the U.S. from the Purchasing Managers Survey of the Institute of Supply Management. This index measures the average days from order to delivery of various input categories, such as production materials (red line), and supplies needed to maintain, repair, and operate (MRO) factory equipment or facilities (blue line). The time series for these indices begins in January 1969, and we plot its evolution through May 2024.

Two aspects are noteworthy.

First delivery times declined over 150 percent from their peak in the 1970s and through the 1980s, stabilizing between 20 and 40 days in the 1990s. It took an enormous shock to disrupt global trade and financial linkages and reverse this trend (Eaton, Kortum, Neiman, and Romalis 2011). Following the great trade collapse in 2008-2009, delivery times crept up steadily, and from 2010 to 2017—the period associated with a declining pace of globalization—delivery times rose nearly 50 percent from their lowest levels.

Second, perhaps more important to our analysis, are episodes in which delivery times spiked. For example, production materials delivery times surged from an average of 60 days in 1972 to nearly 120 days in 1974, following the Nixon-Ford tariffs and new energy policy in response to the OPEC oil embargo. Another example is the spike in delivery times in 1979, as geopolitical tensions between Iran and the U.S. disrupted Iran's oil production. Perhaps the more salient episode of mangled supply chains happened with the Covid pandemic, which led to a sharp and persistent increase in delivery times. We take these global events as direct evidence of negative supply shocks for the U.S. economy, leading to inflation of imported goods prices.

The view that globalization had played a significant role in creating a low-inflation environment became particularly entrenched with the rise of trade flows in the early 2000s. Forbes (2019), for instance, argues in favor of global factors in determining inflation in advanced economies. Moreover, this analysis raised the concern that a reversal in these foreign factors, such as disruptions

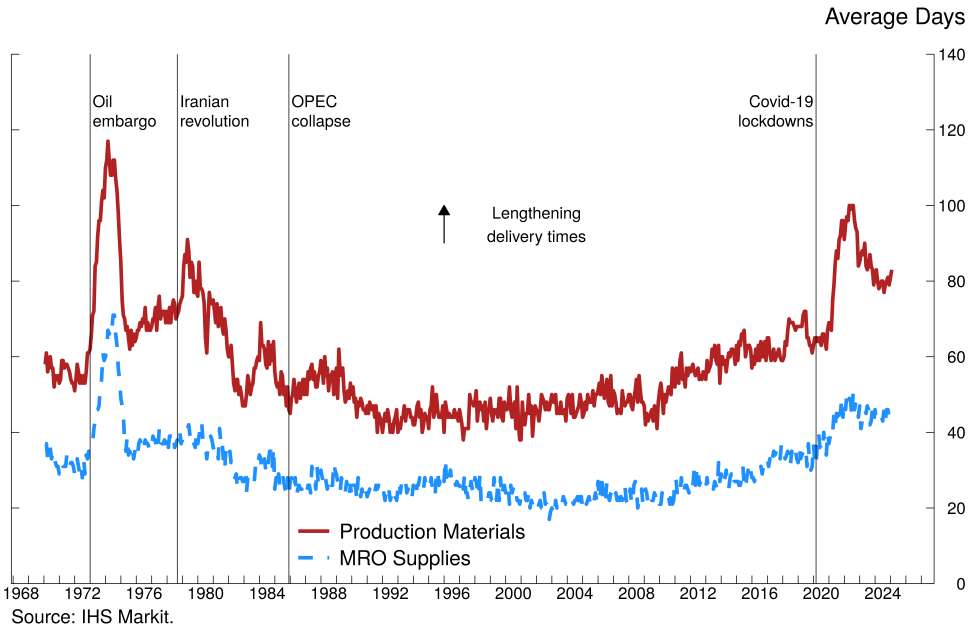

Figure 5: Lead Delivery Times in the United States

to global supply chains, would not only lead to sudden and sharp increases in inflation but also pose a stabilization challenge with larger interest rate adjustments needed to stabilize inflation. It seems that such a prediction has come to pass.

Our takeaway is that trade liberalization and trade disruptions affect import prices, which supports our view that supply shocks matter for inflation. The next section zeroes in on this point by examining the role of other supply factors in the U.S. disinflation process of the 1980s.

5 Volcker and the Disinflation: Commitment, or Good Luck?

The standard narrative of the successful disinflation of the early 1980s is one of policy success (Clarida, Gali, and Gertler 2000). After years of high inflation, Paul Volcker was appointed Chairman of the Federal Reserve in August 1979. Volcker had a disciplined and frugal reputation. His appointment as Chairman marked a renewed commitment to fight inflation, and his tenacious personality

brought focus to the institution.[13] During Volcker's early years, the Federal Funds Rate rose to levels not seen in decades. Inflation expectations declined, and inflation ceded. A straightforward story of a credible regime change and the start of a renewed era of central banking around the world, it is also consistent with the prevailing and popular monetarist doctrine of the late 1970s and the forward-looking behavior of modern macroeconomic models where agents have rational expectations.

To us, it is interesting to notice that, while appealing, this narrative stands in stark contrast with a common explanation for the recent disinflation of 2024, which emphasizes various sources of supply normalization. But, a striking parallel exists between this view and the evolution of supply factors in the early 1980s. Indeed, several *favorable* inflation developments occurred in the early 1980s as well. In addition to the policy success, these other factors could have potentially contributed to the disinflation process. The role of these factors has been overlooked.

Specifically, oil prices, arguably one of the main sources of the 1970s inflation surge, not only stopped increasing. These prices also started to *fall* gradually in September 1980—see Figure 6. By 1985, the price of a barrel of oil was half of its 1979 level. Furthermore, the 1980s witnessed a large rise in trade openness, globalization, and international cooperation and coordination that helped reduce the cost of imports, as discussed in Section 4. These observations raise the question of whether the disinflation was partly the result of these favorable supply developments, and whether it would have occurred even in their absence.

Related to this, notice also that the credibility of the policy shift against inflation was not immediate. Despite Volcker's clear announcement of tighter monetary policy and the rapid increase in interest rates in October of 1979, inflation kept rising, peaking in January 1980, much in line with the increase in energy costs caused by the 1979 oil shock. Inflation only started declining

[13] See The New York Times (December 9th, 2019) for an informal account.

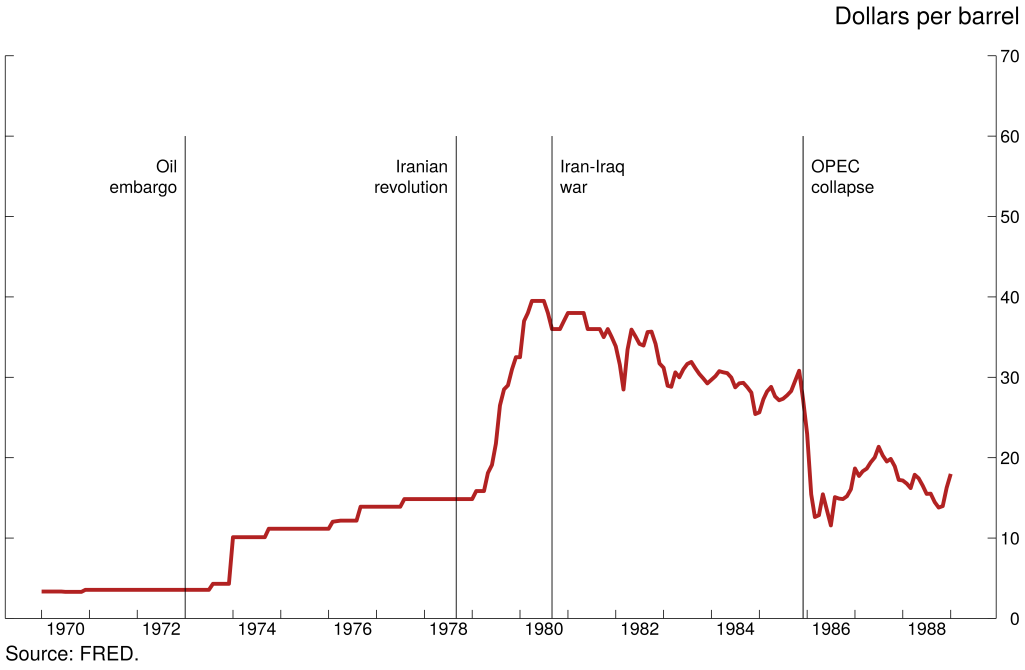

Figure 6: Spot Crude Oil Price: West Texas Intermediate (WTI)

after oil prices eased. Moreover, the decline in inflation took time, and it was not as sudden as one would expect after a credible regime change.

We are not the first to puzzle about this fact. Erceg and Levin (2003) interpret it as the result of a regime shift with imperfect credibility. Their simulation results (Figure 6A, p. 933) indicate that a slow credibility build-up leads to a slow deceleration in inflation over 5 years (from 1979 to 1984), as observed in the U.S. experience. Their results also show that full credibility would have led to a decline in inflation of a similar magnitude but occurring more rapidly, roughly within 1 year. This opens the door to the possibility that other factors intervened in the disinflation process.[14]

While the narrative of a shift in the monetary regime is appealing and might hold much truth, the evolution of supply factors such as oil prices and trade globalization indicators should make one consider that monetary policy was not the only force behind the gradual fall in inflation from 1979 to 1984. Our

[14] An example of a regime shift that did bring down inflation rapidly is the Bolivian stabilization program of 1985. In that case, after experiencing chronic inflation followed by hyperinflation, the stabilization program reduced the annual inflation rate from over 8,000 percent in 1985 to less than 15 percent by 1987 (Morales and Sachs 1989).

analysis here is observational and perhaps even speculative. However, parsing out the role of these additional factors is crucial to a complete understanding of the disinflation episode.

6 Should We Care?

Yes. In our view, whether inflation is best qualified as a monetary or a supply phenomenon has important implications for macroeconomics and policy making.

First, as shown in our framework, identifying what triggers inflationary episodes is especially challenging. It is not enough to catalog shocks as demand or supply. Inference of the economic channels from linear statistical models can be misleading due to nonlinearities, such as kinked supply curves. The key point we raise is that it is crucial to identify if the shocks lead to capacity constraints and how these shocks affect incentives for price adjustment. Hence, for structural modeling, microfounding pricing frictions is crucial.

Second, we note that policy can successfully lower demand to control inflation without sacrificing activity by moving the equilibrium away from the vertical portion of the supply curve. Thus, soft landings are a real possibility with kinked supply curves. This situation seems to correspond to the U.S. disinflation after Covid.

Third, firms are unlikely to adjust prices when the Phillips curve is flat and excess capacity exists. In this scenario, the central bank's policy may operate mainly through anchored inflation expectations. When supply constraints emerge, instead, the first order of business to ensure price stability is to help ease capacity constraints.

Admittedly, but on purpose, we have remained heuristic and did not go beyond looking at charts and reviewing the literature. Careful econometric analysis and models are needed to answer the following questions: What is the threshold where monetarism starts being relevant? What does it depend on?

Is there a threshold on average inflation, say above 20%? Does it depend on the institutional framework? How do modeling frameworks with kinked supply curves modify our conclusions on the optimal conduct of policy?

Our main takeaway is that, for proper economic theorizing and sound policy making, it is critical to understand if demand shocks interact with supply constraints to generate inflationary episodes.

References

Alessandria, G., S. Y. Khan, A. Khederlarian, C. Mix, and K. J. Ruhl (2023). The aggregate effects of global and local supply chain disruptions: 2020-2022. *Journal of International Economics 146*.

Alvarez, F., M. Beraja, M. Gonzalez-Rozada, and P. A. Neumeyer (2018). From hyperinflation to stable prices: Argentina's evidence on menu cost models. *The Quarterly Journal of Economics 134*(1), 451–505.

Alvarez, F., H. Le Bihan, and F. Lippi (2016). The real effects of monetary shocks in sticky price models: A sufficient statistic approach. *American Economic Review 106*(10), 2817â51.

Bai, X., J. Fernández-Villaverde, Y. Li, and F. Zanetti (2024). The Causal Effects of Global Supply Chain Disruptions on Macroeconomic Outcomes: Evidence and Theory. NBER Working Papers 32098, National Bureau of Economic Research, Inc.

Ball, L., N. G. Mankiw, and D. Romer (1988). The New Keynesian economics and the output-inflation trade-off. *Brookings Papers on Economic Activity 1988*(1), 1–82.

Beaudry, P. and F. Portier (2014). Understanding noninflationary demand-driven business cycles. *NBER Macroeconomics Annual 28*(1), 69–130.

Benabou, R. and R. Gertner (1993). Search with learning from prices: does increased inflationary uncertainty lead to higher markups. *Review of Economic Studies 60*(1), 69–93.

Benigno, P. and G. Eggertsson (2023). It's baaack: The inflation surge of 2020s and the return of the non-linear phillips curve. *NBER Working Paper No. 31197*.

Bernanke, B. S. and I. Mihov (1998). Measuring monetary policy. *The Quarterly Journal of Economics 113*(3), 869–902.

Bils, M. and Y. Chang (2000). Understanding how price responds to costs and production. *Carnegie-Rochester Conference Series on Public Policy 52*,

33–77.

Blanco, A., C. Boar, C. Jones, and V. Midrigan (2024). Non-linear inflation dynamics in menu cost economies. *NBER Working Paper No. 32094*.

Blinder, A., E. Canetti, D. Lebow, and J. Rudd (1998). *Asking About Prices: A New Approach to Understanding Price Stickiness*. New York. Russell Sage Foundation.

Bloomberg Magazine (2019). Businessweek: 2019.

Boehm, C. E. and N. Pandalai-Nayar (2022). Convex supply curves. *American Economic Review 112*(12), 3941â69.

Butters, R. A., D. W. Sacks, and B. Seo (2022, May). How do national firms respond to local cost shocks? *American Economic Review 112*(5), 1737â72.

Caldara, D., M. M. Iacoviello, and D. Yang (2024). Measuring Shortages Since 1900. Mimeo.

Cavallo, A., F. Lippi, and K. Miyahara (2024, December). Large shocks travel fast. *American Economic Review: Insights 6*(4), 558â74.

Cerrato, A. and G. Gitti (2022). Inflation since COVID: Demand or Supply. Technical report, SSRN.

Clarida, R., J. Gali, and M. Gertler (2000). Monetary policy rules and macroeconomic stability: Evidence and some theory. *The Quarterly Journal of Economics 115*(1), 147–180.

Coibion, O. and Y. Gorodnichenko (2015). Is the Phillips curve alive and well after all? Inflation expectations and the missing disinflation. *American Economic Journal: Macroeconomics 7*(1), 197–232.

Comin, D., R. Johnson, and C. Jones (2023, June). Supply Chain Constraints and Inflation. CEPR Discussion Papers 18205, C.E.P.R. Discussion Papers.

Del Negro, M., M. Lenza, G. E. Primiceri, and A. Tambalotti (2020). What's up with the Phillips curve? *Brookings Papers on Economic Activity*, 301–

357.

Eaton, J., S. Kortum, B. Neiman, and J. Romalis (2011, January). Trade and the global recession. Working Paper 16666, National Bureau of Economic Research.

Erceg, C. J. and A. T. Levin (2003). Imperfect credibility and inflation persistence. *Journal of Monetary Economics 50*(4), 915–944.

Eyster, E., K. Madarasz, and P. Michaillat (2019). Pricing under fairness concerns. *Mimeo*.

Forbes, K. J. (2019). Inflation dynamics: dead, dormant, or determined abroad? *Brookings Papers on Economic Activity* (Fall Edition), 257–338.

Fornaro, L. (2024). Fiscal stimulus with supply constraints. CEPR Discussion Papers 19404, C.E.P.R. Discussion Papers.

Friedman, M. (1970). The counter-revolution in monetary theory. *IEA Occasional Paper 33*.

Gagliardone, L. and M. Gertler (2024). Oil prices, monetary policy and inflation surges. *Mimeo*.

Gagliardone, L., M. Gertler, S. Lenzu, and J. Tielens (2025). Anatomy of the Phillips curve: micro evidence and macro implications. *American Economic Review, Forthcoming*.

Gilchrist, S., R. Schoenle, J. Sim, and E. Zakrajsek (2017). Inflation dynamics during the financial crisis. *American Economic Review 107*(3), 785â823.

Golosov, M. and R. E. Lucas (2007). Menu costs and Phillips curves. *Journal of Political Economy 115*(2), 171–199.

Hazell, J., J. Herreno, E. Nakamura, and J. Steinsson (2022). The slope of the Phillips curve: Evidence from U.S. states. *The Quarterly Journal of Economics 137*(3), 1299–1344.

Helbling, T., F. Jaumotte, and M. Sommer (2006). *How Has Globalization Affected Inflation?* In World Economic Outlook: Globalization and Inflation, April.

Jorda, O., S. R. Singh, and A. M. Taylor (2024). The long-run effects of monetary policy. *The Review of Economics and Statistics*, 1–49.

Justiniano, A., G. Primiceri, and A. Tambalotti (2010). Investment shocks and business cycles. *Journal of Monetary Economics 57*(2), 132–145.

Kahneman, D., J. L. Knetsch, and R. H. Thaler (1986). Fairness as a constraint on profit seeking: Entitlements in the market. *American Economic Review 76*(4), 728–741.

Karadi, P., A. Nakov, G. Nuño, E. Pastén, and D. Thaler (2024). Strike while the iron is hot: Optimal monetary policy with a nonlinear phillips curve. *Mimeo*.

Kohler, T., J.-P. L'Huillier, G. Phelan, and M. Weiss (2025). Why do supply disruptions lead to inflation? *Mimeo*.

L'Huillier, J.-P. (2020). Consumer imperfect information and endogenous price rigidities. *American Economic Journal: Macroeconomics 12*(2), 94–123.

L'Huillier, J.-P. and G. Phelan (2025). Can supply shocks be inflationary with a flat Phillips curve? *forthcoming, International Journal of Central Banking*.

L'Huillier, J.-P. and W. R. Zame (2022). Optimally sticky prices: Foundations. *Journal of Economic Dynamics and Control*, 104397.

Liu, X. (2025). Information asymmetry and monetary non-neutrality: A sequential search approach. *Mimeo*.

Ma, Y. and K. Zimmermann (2023, September). Monetary Policy and Innovation. NBER Working Papers 31698, National Bureau of Economic Research, Inc.

Midrigan, V. (2011). Menu costs, multiproduct firms, and aggregate fluctuations. *Econometrica 79*(4), 1139–1180.

Morales, J. A. and J. D. Sachs (1989). Bolivia's Economic Crisis. In *Developing Country Debt and the World Economy*, NBER Chapters, pp. 57–80.

National Bureau of Economic Research, Inc.

Nakamura, E. and J. Steinsson (2008). Five Facts about Prices: A Reevaluation of Menu Cost Models. *The Quarterly Journal of Economics 123*(4), 1415–1464.

Ravn, M., S. Schmitt-Grohe, and M. Uribe (2006). Deep habits. *The Review of Economic Studies 73*(1), 195–218.

Rotemberg, J. J. (1982). Sticky prices in the United States. *Journal of Political Economy 90*(6), 1187–1211.

Rotemberg, J. J. (2011). Fair Pricing. *Journal of the European Economic Association 9*(5), 952–981.

Schmitt-Grohe, S. and M. Uribe (2017). Liquidity traps and jobless recoveries. *American Economic Journal: Macroeconomics 9*(1), 165–204.

Shapiro, A. H. (2024). Decomposing supply-and demand-driven inflation. *Journal of Money, Credit and Banking*.

Smets, F. and R. Wouters (2003). An estimated dynamic stochastic general equilibrium model of the euro area. *Journal of the European Economic Association 1*(5), 1123–1175.

Smets, F. and R. Wouters (2007). Shocks and frictions in US business cycles: A bayesian DSGE approach. *American Economic Review 97*(3), 586–606.

Sun, T. (2024). Excess capacity and demand-driven business cycles. *The Review of Economic Studies*, rdae072.

The Economist (2017). The Phillips curve may be broken for good.

The New York Times (December 9th, 2019). Paul A. Volcker, Fed chairman who waged war on inflation, is dead at 92.