Monetary Finance

BRIAN GALLE & YAIR LISTOKIN*

INTRODUCTION

"Taxation is the process by which a government transfers resources (almost always money) from the private to the public sector." So opens a leading tax casebook. But the assertion is at best incomplete. Printing new money also transfers resources from the private sector to the public. By printing new units of currency—dollars, yen, renminbi—a government can finance the purchase of goods, services, and financial assets from the private sector, reducing current and future tax burdens. In its contemporary forms, money need not be stamped in gold or rolled off the printing press, but even newly issued electronic funds (often in the form of a financial instrument called "reserves") finance the issuing government.

People are willing to accept money, and trade things to the government in exchange for it, even when money pays no (or little) interest because money provides "transaction services." As a result, a government that prints more money (or issues reserves), sating more of the demand for transaction services in the population, can borrow less and raise less tax revenue until inflation begins to accelerate. This power was historically known as "seigniorage," but because many people associate that term with traditional, physical currency, we call this power

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* Galle: Professor of Law, Georgetown University Law Center.
Listokin: Shibley Family Fund Professor of Law, Yale Law School. The authors are grateful for helpful comments from Bruce Ackerman, Ben Alarie, Ian Ayres, Will Bateman, Giacomo Brusco, Peter Conti-Brown, Dhammika Dharmapala, Anna Gelpen, Rohan Grey, Andrew Hayashi, James Hines, Jr., Christine Jolls, Rosa Lastra, Adam Levitin, Zachary Liscow, Emma Jordan, Daniel Kelly, Jonathan Macey, Maria Macia, Daniel Markovits, Claire Priest, Roberta Romano, Susan Rose-Ackerman, Emily Satterthwaite, David Schleicher, Allan Schwartz, Darien Shanske, Michael Smart, David Super, Avishalom Tor, David Wishnick, and Taisu Zhang, as well attendees of presentations at the American Law & Economics Association, the Law & Macroeconomics Conference, the National Tax Association, the Boston College, Georgetown, Notre Dame, Toronto, and Yale law schools, and the Florida-Michigan-Virginia Law & Economics Workshop.

to acquire goods and services in exchange for reserves or currency “monetary finance.”

In fairness to the textbook authors, until 2008, looking exclusively at taxation and debt issuance and ignoring monetary finance was a reasonable way to understand government budgeting. Governments financed themselves either by taxing in the present or by borrowing conventionally and then repaying with future tax revenues. The monetary base (i.e., the amount of currency and reserves in circulation) increased slowly and monetary finance made little fiscal difference (well under 1% of GDP) in the United States, the eurozone, and Japan, as shown in Figure 1.3

In 2008 and the decade plus that followed, however, the money floodgates opened. Central banks issued unprecedented sums of money (largely in the form of reserves) to stimulate moribund economies, acquiring valuable assets with newly created money. In many Western countries, the base money supply increased by 800% or more (see Figure 1). These purchases are often called “open market operations,” because central banks are buying bonds issued by their own governments from private investors on the open market.4 In the United States, cumulative monetary finance (equal to the change in assets owned by the Federal Reserve Bank) from 2008 to 2021 exceeded $7.2 trillion—over 38% of U.S. federal debt issued during this period.5 The U.S. experience is no outlier. Eurozone monetary fi-

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3 Figure 1 graphs central bank assets. The base money supply, which will be the focus of this Article, represents a component of central bank liabilities. Because central banks have minimal capital accounts (they remit profits to Treasury), the two move in near tandem. Increases in assets are met by equivalent increases in liabilities, the most important of which is the monetary base. For reasons that are unclear to us, data about central bank assets are much more readily available than data about central bank liabilities at the St. Louis Fed’s international macroeconomic data library known as “FRED.” Federal Reserve Economic Data, Fed. Rsrv. Bank of St. Louis (last visited Jan. 31, 2022), https://fred.stlouisfed.org. As a result, the figures in this Article display central bank assets rather than monetary base or other measures of central bank liabilities.


nance, for example, exceeded €6.4 trillion over the same period. And Japanese monetary finance neared ¥600 trillion, in a much smaller economy.

**Figure 1**

**The Post-2008 Monetary Finance Explosion**

![Graph showing monetary finance explosion](image)

In acquiring their own government's debts, central banks are of course not directly providing the public with goods or services. Instead, they are relieving their governments of a portion of the burden that public borrowing would otherwise impose. For example, in the United States, when Treasury pays interest to the Federal Reserve on Treasury notes owned by the Fed, the Fed is legally obligated to return those interest payments back to Treasury, less any expenses the Fed incurred. Because the Fed typically pays interest on the reserves it issues, the net payment back to Treasury may be less than what Treasury initially paid. But even if so, in effect the portion of the U.S. debt held by the Fed has been refinanced. In addition, the Fed's massive purchases of Treasuries reduce the interest rates the United States must pay to all bondholders, further lowering the government's net interest burden. In recent years these savings have exceeded the money raised through the U.S. corporate income tax.

Central banks did not set out to provide trillions in cheap financing to their governments. Indeed, in important respects we detail here, most political institutions have failed to even register that it happened. Instead, central banks acquired vast piles of debt issued by their own governments as by-products of the bankers' efforts to stabilize the

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8 We explain the points here in more detail in Parts III.B and III.C.
global economy. By purchasing public debt, a central bank drives down interest rates, which in turn encourages economic activity.

The accidental nature of these vast new transfers does nothing to diminish their importance. To the contrary, because monetary finance was largely unplanned, and was almost inconceivable at this scale as recently as the beginning of the Obama presidency, contemporary thinking about the design and operation of the fiscal state does not yet reflect its potential centrality. Few commenters outside the modern monetary theory (MMT) perspective, which has not penetrated contemporary tax and public budgeting scholarship, confront the idea that monetary finance can be used to affect the long-term tax and debt burden. Conversely, those who study the design of central banks mostly ignore fiscal policy, even if central banks are effectively financing an important portion of government spending.

The rise of monetary finance as a source of government finance has important implications for both central banking and fiscal policy, however. To avoid inflation and keep legislatures disciplined, the conventional wisdom argues that monetary and fiscal policy should be kept firmly separate. Yet the macroeconomic conditions of the period spanning 2008 to the present teach us the importance of explicitly

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10 See Part II.
13 A highly technical summary is Matthew Canzoneri et al., The Interaction Between Fiscal and Monetary Policy, in 3B Handbook of Monetary Economics 935, 984-992 (Benjamin M. Friedman & Michael Woodford eds., 2011).

As a quick refresher, “monetary” policy usually refers to questions such as a central bank’s decisions about how much money to “print” (these days, to create by electronic funds transfer) and what interest rate to charge when it lends to other banks. “Fiscal” policy is instead usually seen as the realm of legislatures and encompasses things like whom to tax and how much to spend.
linking monetary and fiscal policy rather than treating them as distinct policy spheres. When monetary finance accounts for such a large percentage of government financing, their separation grows untenable. Monetary and fiscal policy become inextricably intertwined. And the rapid increase in inflation in 2022 renders this linkage even more urgent, as central banks balance their inflation fighting responsibilities with concern for the effect of rising interest rates on government debt burdens. This Article explores the implications of this monetary/fiscal hybrid.

Our first claim is a descriptive one: We argue that monetary finance actually can make (and over the past decade-plus has made) an important contribution to governments’ fiscal capacities. That is, we say that printing money can sometimes be a way for governments to pay their bills. Conventional macroeconomists argue instead that monetary finance can safely be ignored as a source of financing because of its enormous costs.\textsuperscript{14} Issuing money usually—or, according to some accounts, always—causes inflation, which in turn undermines the economy in a variety of damaging ways.\textsuperscript{15} Efforts to finance governments through monetary finance are thus said to offer no net gains, once inflation and other factors are taken into account.\textsuperscript{16}

On the flip side, the modern monetary theorists have asserted (as best we can discern) that printing money is only weakly connected with inflation, and indeed that tax systems are totally unnecessary as sources of revenue.\textsuperscript{17} In the MMT view, monetary finance should always be an important source of government financing.

\textsuperscript{14} See Haliassos \& Tobin, note 2, at 903 (“Seigniorage [used in the broad sense to include profits on reserves and other central bank money creation] on base money is small[,]”); Matthew Canzoneri et al., note 13, at 944 (“Seigniorage [in its broad sense] is a tiny fraction of total revenue in OECD countries.”). For a summary of this perspective, see Ricardo Reis, Can the Central Bank Alleviate Fiscal Burdens?, in The Oxford Handbook of the Economics of Central Banking 131 (David G. Mayes, Pierre L. Siklos & Jan-Egbert Sturm eds., 2019).

\textsuperscript{15} N. Gregory Mankiw, Macroeconomics 93, 100-04 (7th ed., 2010); Reis, note 14, at 4 (“Printing banknotes . . . invariably comes with higher inflation[,]”).

\textsuperscript{16} We summarize these arguments in more detail in Part III.

\textsuperscript{17} E.g., Stephanie Kelton et al., We Can Pay for a Green New Deal, Huffington Post (Nov. 30, 2018, 9:00 AM) (“Congress can pass any budget it chooses, and our government already pays for everything by creating new money.”), https://www.huffpost.com/entry/opinion-green-new-deal-cost_n_5c0042b2e4b027f1097bda5b; L. Randall Wray, Modern Money Theory: A Primer on Macroeconomics for Sovereign Monetary Systems 4 (2d ed. 2015); L. Randall Wray, From the State Theory of Money to Modern Money Theory: An Alternative to Economic Orthodoxy, in Money in the Western Legal Tradition: Middle Ages to Bretton Woods 632, 651 (David Fox \& Wolfgang Ernst eds., 2016); Warren Mosler, The Seven Deadly Innocent Frauds of Economic Policy 17 n.1, 25-30 (2010). These theories draw on the early heterodox macroeconomist Abba Lerner, especially his work claiming that taxes serve only to limit inflation, not to raise revenue. Abba P. Lerner, Functional Finance and the Federal Debt, 10 Soc. Rsch. 38, 40 (1943).
We are in neither of these camps. A dollar “raised” by printing money is not the same as a dollar raised by taxation. But a dollar raised by printing money is also not the same in fiscal terms as a dollar raised by issuing debt. And this liminal form of finance deserves much more attention than it has received.

We do not think that central banks are money machines—printing money to finance government has significant costs that we carefully explore. In 2022, for example, expanding the money supply will not decrease the debt burden because expansion will raise inflationary expectations so that government interest rates climb rather than fall. As a result, governments need tax revenue, now and in the future, to pay for public spending. This should not mean, however, that central banks should or even can ignore government finance. At times, monetary finance offers the least damaging way of financing the government, even if it is not a free lunch. And even in inflationary environments, central banks may reasonably allow public finance concerns to affect the money supply, even as they raise interest rates to cool an overheating economy.\(^\text{18}\)

We thus part ways with MMT scholars because we agree with conventional accounts that, in most macroeconomic environments, monetary finance is not an efficient (or even plausible) means of transferring significant resources from the private sector to the government. Most of the time, the costs of monetary finance far exceed the costs of taxation. Under the right conditions, however, printing money can be a cheaper incremental source of finance than taxation or conventional debt issuance. If money can be printed without inflation because demand for holding money is nearly inexhaustible, then monetary finance offers the potential for much more efficient revenue raising than traditional taxation. In effect, issuing money in those circumstances resembles \textit{benefit taxation}, in which the government’s efforts to raise funds come bundled together with something of value to the taxpayers, so that on net tax has little negative impact on behavior.\(^\text{19}\) Crucially, though, these conditions, once thought implausible, described much of the developed world between 2009 and 2021.

Around the world, the institutions of fiscal policy have been designed on the assumption that monetary finance is not a meaningful possibility, and we argue that these systems need significant rethinking in a world where monetary finance in fact constitutes a critical but highly variable source of government finance. The availability of mon-

\(^{18}\) We detail these processes more carefully in Part III.

etary finance reduces long-term government revenue requirements, so that spending should rise and taxes should fall accordingly.

Because monetary finance opportunities are limited, however, effectively implementing these fiscal adjustments requires careful institutional design. If legislators assume that monetary finance will continue indefinitely, they will overspend and need to tighten fiscal policy dramatically or succumb to hyperinflation when monetary finance ceases to be noninflationary. We sketch how existing budget rules can adapt to incorporate the possibilities of monetary finance without overspending. For example, a central bank can use monetary finance as a politically insulated connector, enabling new spending when the economy is depressed and debt concerns might otherwise prevent fiscal stimulus.20

Monetary finance affects central bank institutional design, too. The Fed and other central banks were not designed for the kinds of institutional pressures that monetary finance exerts, perhaps because of a long-standing neglect of the connections between law and macroeconomics more generally.21 We therefore suggest some key procedural rules central banks might consider implementing to limit the pressures and dangers monetary finance poses. For example, we posit that a central bank should also commit itself (or, conceivably, be limited by statute) to make monetary finance decisions only following principles set well in advance.

Perhaps our boldest claim about how central banks should operate is that the possibility for monetary finance should be one of the factors central banks weigh when they decide how to regulate the economy. When conditions are right, central banks can and should aim to provide monetary financing to the national government. That is, central banks should consider the public fisc in addition to worrying about inflation and unemployment.22 Monetary finance should be tapped (more money created) until the marginal social cost associated with inflation and other potential risks of incremental money equal

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22 Throughout this Article, we take central banks at their word when they claim that they are seeking solely to stabilize the economy (conduct monetary policy) rather than affect government budget constraints. The reality may, of course, be very different. If central banks are being disingenuous in their claims to not be concerned about the cost of finance, then this Article should be viewed as an attempt to rationalize and systematize what central banks are already doing implicitly.
the social cost of raising funds by taxation. Most of the time, this will mean no monetary finance. Because inflation has substantial social cost, creating even an additional dollar simply to spend the money will typically impose costs that exceed those of taxation. When demand for money is sufficiently high that the extra dollars don’t translate quickly into inflation, however, then the central bank should take advantage of the transitory opportunity for cheap finance. Unfortunately, the point at which the additional demand for money is sated and additional attempts at monetary finance translate into inflation is uncertain. In the face of this uncertainty, the central bank should continue pursuing cheap finance for fiscal reasons until the expected cost of possibly overshooting the mark and triggering socially costly inflation exceeds the social costs of taxation.

In the eurozone, this reorientation will require statutory or even constitutional revision. In the United States, however, this change in focus arguably comports better with the Federal Reserve’s statutory mandate than the current regime focused primarily on inflation control.

In short, we aim to make several key contributions. Most centrally, we hope to highlight the importance of monetary finance as a real and potentially major contributor to government balance sheets. Along the way, we also contribute to the small but growing literature on the administrative law and architecture of central banks that may be of interest even to those unconvinced by our claims about the efficiency of monetary finance.23 Even within macroeconomics, study of open market operations in this new environment—one with massive central bank balance sheets and significant payments of interest on reserves (a practice that only became legal in the United States in 2008)—is just emerging, with most of the key papers appearing only over the past few years.24 We add to this developing economic understanding, while also contributing among the first analyses of the institutional and legal implications of this new landscape.


24 Guillaume Rocheteau et al., Open Market Operations, 98 J. Monetary Econ. 114, 114 (2018) (noting that open market operations are “important” but have “received little formal analysis” and “are not completely understood”); see also Aleksander Berentsen et al., Exit Strategies for Monetary Policy, 99 J. Monetary Econ. 20, 21 (2018) (“[C]entral banks have little experience with these new policies”). For other key recent contributions, see Huberto Ennis, A Simple General Equilibrium Model of Large Excess Reserves, 98 J. Monetary Econ. 50 (2018); Robert E. Hall & Ricardo Reis, Achieving Price Stability by Manipulating the Central Bank’s Payment on Reserves (Nat’l Bureau of Econ. Rsch., Working Paper No. 22761, July 2017), https://www.nber.org/papers/w22761.
It’s also worth emphasizing that few of our claims turn on the U.S. inflation rate over the next few years. As we write, projections of inflation for that period range quite widely, perhaps because of the massive influx of fiscal stimulus Congress already has provided and to which it may soon add. And we aim to write not just for this moment but also for all future times when monetary financing may plausibly be available.

The rest of our argument proceeds in five steps. Part I provides an introduction to the structure and mission of a central bank, with particular attention to the U.S. Federal Reserve. In Part II we compare monetary finance to other forms of government finance and explain why the conventional macroeconomic wisdom shuns monetary finance. Part III then explains why central bank practices since 2008 undermine the conventional wisdom’s core assumptions. In Part IV we argue that important fiscal policy institutions, such as the federal debt ceiling and the ten-year budget window, need to adjust for monetary finance, lest they produce outcomes that conflict with their underlying goals. Part V examines the consequences of the new macroeconomic reality for central bank institutional design. We argue that monetary finance deserves a place among the central bank’s statutory objectives and discuss how central bank governance needs to change to manage this transition. We then conclude.

I. Background: Central Banks and Monetary Policy

In order to understand the traditional case against monetary finance, and to grasp our arguments for why that case sometimes fails, it’s first necessary to have a sense of how central banks use money creation to regulate the economy. Readers already familiar with that story may prefer to skip to Part II.

Money provides a service—it enables transactions: the purchase of goods, services, and productive assets. Money can be created by both the government (e.g., cash) and the private sector (e.g., checking accounts). In a fiat currency system, the central bank is the monopoly provider of “base money,” which consists of both cash and reserves held by ordinary banks in accounts at the central bank. Private banks can in turn lend these reserves to the public. The cash in

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26 Haliassos & Tobin, note 2, at 904-05.
the economy as well as the reserves that banks hold with the Fed thus form the base for most of the money created by the private sector.29 The amount of money circulating in the economy (of all types) helps determine economic output and employment.30 Imagine if every checking account, credit card, and dollar of cash were suddenly disabled. People would purchase much less, and economic output would fall short of the economy’s production capacity. Unemployment would rise. Conversely, if money suddenly became more abundant—if cash started falling from the sky—people would likely purchase more, pushing production higher.

The central bank uses its control over base money to stimulate or restrain the economy.31 To stimulate the economy, the central bank creates new base money and uses it to buy assets. Expanding the supply of base money stimulates the economy and lowers interest rates.32 Statutes govern how central banks exercise control over the supply of base money. In the United States, the Federal Reserve Act provides that the Fed “shall maintain long run growth of the monetary and credit aggregates commensurate with the economy’s long run potential to increase production, so as to promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates.”33 The Fed has interpreted this mandate as directing it to expand the money supply when employment rates fall short of their sustainable maximum34 and to contract the money supply when inflation exceeds some target set by the Fed, often 2%.35 The statutes governing other central banks, such as the European Central Bank (ECB), give priority to price stability over employment and interest rates in their conduct of monetary policy.36

To understand the central bank’s role in the economy, imagine that every good, service, and asset must be purchased with physical cash.

29 Id.
30 See id. at 8.
31 See id. at 4, 7; Conti-Brown et al., note 23, at 39-40.
Cash constitutes the economy's circulatory system. If cash stops changing hands, the economy slumps. Without an effective flow of cash, the economy cannot produce at its theoretical capacity.

Changes in the frequency with which money changes hands—its "velocity"—affect output and employment. To illustrate, suppose there is $1 million in cash in the economy. If the economy produces $5 million in goods and services at current prices in a typical year, then the average dollar of cash must change hands five times per year. People want to use cash for savings in addition to using it to facilitate purchases. If people become nervous about the future and want to increase their savings by holding $800,000 in cash, for example, then demand for money has increased. With $800,000 of the $1 million in cash outstanding sitting in savings, the remaining $200,000 has to change hands impossibly quickly to support $5 million in transactions. People who can't get their hands on cash to purchase things reduce their spending, decreasing output below $5 million even though the economy has the capacity to produce $5 million. Because prices cannot adjust instantaneously, unemployment rises as firms reduce their output due to the absence of demand. The economy is no longer constrained by its capacity to produce, but rather by impairments to the flow of money. Thus the increase in demand for cash savings triggers a cash shortage that may bring output well below $5 million—say, to $3 million.

If the central bank does not respond to this recession, then low output and excess unemployment follow. Over a long period of time, unemployment and excess capacity drag down prices, a process known as deflation. Deflation can become a self-fulfilling prophecy, as the expectation of future price declines encourages people to defer spend-

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37 Mankiw, note 15, at 280.


39 For a discussion of the robust evidence that prices adjust slowly, see Alessandro Barattieri et al., Some Evidence on the Importance of Sticky Wages, 6 Am. Econ. J. Macroeconomics 70, 82-86 (2014). If prices adjusted instantly, the shortage of money could be addressed by a fall in prices. A fall in prices reduces the frequency with which a given dollar of cash needs to change hands to support a given amount of real output. According to the quantity theory, real output equals money times velocity divided by the price level. A fall in price (from 1 to 3/5) proportionate to the fall in velocity (from 5 to 3) enables real output to remain the same.
ing, contributing to a lasting reduction in the velocity of money, output, and employment.⁴⁰

A central bank charged with keeping output near capacity and prices stable can prevent this outcome, however. Using its control over the supply of base money, the central bank responds to the shortage of money by printing more cash and using it to purchase assets from individuals.⁴¹ For example, the central bank can exchange $800,000 in newly printed cash for government bonds owned by individuals. The amount of base money in the economy (all cash) now equals $1.8 million. The injection of the additional cash into the economy alleviates the shortage of money. Adequate cash is now available to all those who want to use it to purchase goods and services as well as those who want to use cash to save. Money—the economy’s circulatory system—no longer constrains spending. Output recovers to its capacity of $5 million while prices remain stable. Deflation risks dissipate. The central bank has exercised its control over base money in accordance with its mandate.

In practice, most monetary expansions take the form not of cash infusions but rather expansions in bank reserves. That is, the central bank does not print massive quantities of physical cash to expand the money supply.⁴² Instead, central banks usually purchase government bonds from private sector banks by crediting the private banks’ “reserve” accounts at the central bank.⁴³ For example, the central bank may purchase $800,000 in government bonds from a private bank by crediting its reserve account instead of using cash. The private bank now has $800,000 more reserves in exchange for the bonds.

Issuing reserves creates more money in the real economy. Private banks are required to hold a portion of their assets in the form of reserves at the central bank.⁴⁴ By crediting a private bank’s reserve

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⁴¹ Labonte, note 28, at 15.
⁴² This is not to say that central banks do not also print cash when expanding the money supply. Between March and October 2020, for example, the amount of U.S. currency in circulation rose by more than $200 billion—a record increase. See Bd. of Governors of the Fed. Rsrv. Sys., Component Currency of M1, FRED, Fed. Rsrv. Bank of St. Louis (last visited Jan. 21, 2022), https://fred.stlouisfed.org/series/CURRENCY. In general, though, central banks prefer to create money through reserves because reserves are the more flexible instrument. See Hall & Reis, note 24, at 3-5 (explaining that ability of central banks to control real value of reserves is an “effective solution to the central problem” central banks face).
⁴³ Bernanke, note 9, at 105; Labonte, note 28, at 15.
account, the central bank effectively frees up extra money for private bank lending that had previously been locked up in government bonds (we provide a numerical example in the footnotes). So by lending out its increased reserves, the private bank increases the money supply by $800,000 and stabilizes the economy—just as if the amount of cash was increased.

According to the conventional wisdom, changes in the velocity of money (whether cash or electronic money such as checking accounts) are temporary. At some point, money's velocity returns to "normal" (in our example, back to five transactions per year), perhaps because people's propensity to spend returns to its historical norm as their attitude toward risk returns to normal. When velocity returns to normal, the central bank needs to reduce the money supply accordingly. It does this by selling bonds in exchange for cash or a reduction in a bank's reserves, taking this money out of the financial system. If the central bank does not reduce base money at this point, then there is too much cash changing hands relative to the economy's capacity. In the short run, the economy produces above its capacity—creating a boom with low unemployment. In the long run, however, inflation follows, as with more money chasing a relatively fixed amount of goods and services, prices will tend to rise.

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45 Hallssos & Tobin, note 2, at 906. For example, suppose Countybank has $2 billion in assets and is required to hold $1 billion in reserve at the Fed or chooses to hold $1 billion there to preserve liquidity in the face of a possible run. Countybank is able to lend out the other $1 billion to its customers. Now suppose that the Fed credits Countybank with an additional $500 million to its reserve account. Countybank may withdraw the $500 million in its own funds, still leaving $1 billion on deposit, and lend out the withdrawn $500 million. By crediting Countybank's account, the Fed has indirectly placed $500 million in cash (electronic funds) in the hands of businesses and consumers. If, instead, Countybank chooses to keep $1.5 billion in reserves after it sells $500 million in bonds to the Fed, then the money supply does not increase. In this case, the only effect of the bond purchase is the fiscal effect on the government (lower interest rates).

46 In reality, private sector banks can create much more than $800,000 in new money in response to an $800,000 increase in reserves, in a phenomenon known as the "money multiplier." For an explanation, see Sal Khan, Banking 4: Multiplier Effect and the Money Supply, Khan Academy, https://www.khanacademy.org/economics-finance-domain/core-finance/money-and-banking/banking-and-money/v/banking-4-multiplier-effect-and-the-money-supply (last visited Feb. 2, 2022). For simplicity, however, we assume that reserves add to the money supply one for one, as they have more or less done since late 2008.

47 See Alex Tabarrok, Changes in Velocity, MRU, https://mru.org/courses/principles-economics-macroeconomics/velocity-aggregate-demand (last visited Feb. 2, 2022). In general, the theory is that changes in velocity are tied to the amount of real economic activity, which varies with the business cycle. Velocity might slow during downturns when not as many transactions are taking place, but then turn back upward when the economy recovers. Id.

48 As Milton Friedman famously asserted, "Inflation is always and everywhere a monetary phenomenon in the sense that it is and can be produced only by a more rapid increase in the quantity of money than in output." Milton Friedman, The Counter-Revolution in Monetary Theory (1970), reprinted in Issues in Monetary Policy: The Relationship Be-
To avoid inflation when money’s velocity returns to normal, expansionary monetary policy may be followed by a monetary contraction shortly thereafter. Empirically, this pattern proved extremely robust before 2008. Figure 2, for example, shows the change in the U.S. base money supply, controlled by the Federal Reserve, between 1970 and 2020. Before 2008, the annual change in the monetary base was small (under $50 billion), stable, and generally positive, reflecting underlying growth in the economy rather than dramatic changes in monetary policy.

**Figure 2**

**Annual Change in U.S. Monetary Base, 1970–2020**

While money supply and velocity are critical determinants of inflation, the public's expectations regarding future inflation also play an important role. If everyone expects high inflation, then high inflation will follow, even if the money supply does not increase significantly. High inflation expectations raise money's velocity, as people rapidly spend cash that they expect to lose value. As a result, low inflation expectations benefit society by enabling lower inflation for any given level of money.

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51 See Mankiw, note 15, at 99-100.

52 See id.

53 See id.
One way to lower public inflation expectations is to convince the public that the central bank, which controls the base money supply that is the other critical determinant of inflation, dislikes inflation. It is thus in the interest of every central bank to proclaim its inflation-fighting commitments and thereby reduce the public's inflation expectations.

But the central bank's low inflation claims may not be credible. A central bank concerned about employment as well as inflation will always be tempted to cheat on its inflation-fighting commitments, allowing some surprise inflation in the long run to enable a short-lived boom that temporarily reduces unemployment. Knowing the central bank's conflicted incentives, the public may disbelieve its inflation-fighting promises. As a result, inflation is higher for any given amount of central bank monetary creation.

Instituting a credible central bank aversion to inflation is the most robust means of lowering public inflation expectations. This aversion can be achieved in a number of different ways. One strategy is to appoint central bankers with a credible aversion to inflation. Paul Volcker was a noted historic example. Another is to legally bind the central bank to focus primarily on inflation, leaving maximum employment as an inferior goal. This strategy was adopted by the designers of the ECB. Unlike the Fed, which is instructed to balance inflation with maximum employment, the Treaty of Lisbon instructs the ECB to focus primarily on hitting a target price or inflation level. Only if this condition is satisfied can the ECB begin to turn its attention to other goals, such as employment. With a central bank focused primarily on keeping inflation down, people do not expect loose monetary policy. As a result, they revise their inflation expectations downward.

According to the conventional wisdom, these inflation-fighting designs offer a nearly free lunch. By keeping inflation expectations down, central banks minimize inflation for any given level of money. What's more, output and employment do not suffer. Because the central bank retains control over the money supply, it can continue to respond to shocks to velocity such as the one in our example. So long as the public believes that the central bank dislikes inflation, they will

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54 Id. at 455.
56 Conti-Brown et al., note 23, at 40.
57 Id. at 42-43.
58 Bernanke, note 9, at 107.
59 TFEU art. 127, ¶ 1.
consider the increase in the money supply temporary. The $800,000 increase in the money supply therefore stimulates output without raising inflation expectations. As we will see, this important role for inflation expectations has significantly shaped central bank design and policy.

II. THE CONVENTIONAL WISDOM: LITTLE ROLE FOR MONETARY FINANCE

With that background out of the way, we will now explain the position we intend to critique: that central bank acquisition of government debts cannot have substantial effects on the fiscal system. That is, the claim is that central banks can’t do much to reduce their government’s tax burdens. Premised on the theory that the central bank’s ability to lower the fiscal burden is limited,61 conventional wisdom insists that taxation and/or borrowing are the only feasible sources of significant financing.62 And because printing money “invariably comes with higher inflation, it creates fewer real resources.”63 Further, as we’ll also explain, the conventional story assumes that when the central bank issues reserves to acquire government debts, the central bank is simply swapping one debt for another, with no net gain in total government resources.

MMT takes the opposite position.64 MMT rejects the claim that governments with fiat currencies need taxation for revenue generation.65 Monetary finance alone suffices.66 Taxation may be warranted for other purposes, such as providing a use for currency, minimizing inflation, or regulating behavior.67 Translating MMT’s claim into our terms, modern monetary theorists believe that monetary finance gen-

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61 Reis, note 14, at 42.
63 Reis, note 14, at 4.
64 See sources cited in note 12.
66 Bell, note 65, at 3 (“[N]ewly-created money is . . . the source of all government finance”).
eraly offers the lowest-cost source of government finance. We’ll explain where this position goes wrong in the next Part.\footnote{68}

A. Inflation, the Bailey Curve, and Inflation Expectations

In the conventional account, inflation constitutes the primary cost of depending on monetary finance. In this account, increases in prices inevitably follow the increases in the money supply necessary for monetary finance to provide significant financing.\footnote{69} As a result, the central bank monetary expansions described above are inflationary. When the central bank increases the base money supply from $1 million to $1.8 million, then inflation will follow once the velocity of cash returns to its normal value. With money now abundant and people willing to spend, everyone buys more.

The empirical evidence for this assertion is mixed. Over the short term—periods of a few years—the link between monetary expansion and inflation is relatively weak.\footnote{70} Over the long term, however, the link between growth in the money supply and inflation is strong. Across decades, there is a tight link between central bank money creation and inflation.\footnote{71} What’s more, countries with long-term deficits—the countries most likely to turn to monetary finance—are particularly prone to rapid growth in the base money supply and subsequent episodes of high inflation.\footnote{72}

The inflation associated with monetary finance imposes significant costs. While a full account of the costs of inflation is beyond the scope of this Article,\footnote{73} we highlight a few salient costs of inflation. Changing prices is costly, demanding an investment of time and effort.\footnote{74} In a

\footnote{68} See particularly text accompanying notes 138-146, 239-251.

\footnote{69} Mankiw, note 15, at 92-93.


\footnote{71} Mankiw, note 15, at 90-91.


\footnote{73} Economists sometimes struggle to identify the inefficiencies associated with fully anticipated inflation, particularly if effective inflation indexation is available. Regardless of these costs, inflation is extremely unpopular with the public. In most of the 1970’s, more than 50% of Americans reported that they considered “inflation or the high cost of living” as the single biggest problem facing the country. Tail Risks: A Surge in Inflation Looks Unlikely, The Economist (Dec. 10, 2020), https://www.economist.com/briefing/2020/12/12/a-surge-in-inflation-looks-unlikely.

\footnote{74} See Mankiw, note 15, at 102-03.
world of rapidly changing prices—high inflation—businesses must change prices frequently, repeatedly incurring the cost of changing prices. To reduce these costs, businesses also sometimes allow the relative prices they charge to move out of balance with their competitors’ prices, distorting the pattern of purchases.\textsuperscript{75} Both adjustments impose significant costs on society.\textsuperscript{76}

Individual transaction costs also increase. People need cash and checking accounts to facilitate purchases. Inflation increases the cost of holding such assets. As a result, people hold less cash and checking relative to other assets.\textsuperscript{77} This raises transaction costs. To purchase goods and services, people need money. To minimize the amount of money they hold, people spend more time converting interest-bearing assets into money to facilitate purchases. The time and effort devoted to converting assets into more liquid forms to facilitate purchases is another cost of inflation.\textsuperscript{78}

Tax rates and design influence the extent to which inflation distorts economic decisions.\textsuperscript{79} Employers and entrepreneurs can respond to inflation by paying out more in nominal terms, maintaining the same real value of payments to workers and investors. But most fiscal systems impose tax on nominal earnings, interest, or profits, so that these adjustments leave the workers and investors worse off after tax.\textsuperscript{80} Employers and entrepreneurs could respond by “grossing up” their payments to account for higher taxes, but then in effect they are the ones paying the tax (and contributing further to wage-push inflation). Either way, taxes take a larger bite out of long-term contracts when inflation is higher.

Notice that this problem only arises because of how the tax system is designed. Taxes could instead include a variety of inflation adjusters. Some countries only tax inflation-adjusted profits.\textsuperscript{81} And indeed over time the U.S. system has evolved to better accommodate inflation, reducing the tax distortions associated with inflation.\textsuperscript{82}

\textsuperscript{75} See id. at 102.

\textsuperscript{76} Fernando Alvarez et al., From Hyperinflation to Stable Prices: Argentina’s Evidence on Menu Cost Models, 134 Q. J. Econ. 451, 456 (2019).

\textsuperscript{77} Mankiw, note 15, at 102.

\textsuperscript{78} Id. (describing “shoe-leather” costs).

\textsuperscript{79} See id.

\textsuperscript{80} See id.

\textsuperscript{81} This can be accomplished, among other ways, by adjusting tax basis to reflect inflation.

\textsuperscript{82} For several decades, the Alternative Minimum Tax (AMT) imposed steadily rising effective tax rates on upper middle-class earners, as the AMT was triggered when earnings crossed a threshold that was not adjusted for inflation. However, Congress ended that in 2013 when it installed inflation adjusters to the AMT brackets.
At relatively low inflation rates, these inflation costs are tolerable. Prices stay in rough balance in these conditions, and transaction costs are relatively low. Tax distortions are similarly minor. At high inflation rates, however, these dominate economic life, as people who have lived through episodes of hyperinflation vividly describe. In episodes of hyperinflation, people attempt to spend money instantaneously. Businesses devote significant resources to keeping prices from becoming obsolete. Recent evidence, for example, suggests that inefficient price distortion alone reduces GDP by almost 10% when inflation enters the triple digits, even though prices are updated rapidly. The existence of such high costs supports the consensus favoring low inflation as a core goal of monetary policy.

Behavioral changes caused by inflation also limit the scope of monetary finance. As first described by Bailey, printing money has two offsetting effects on government finance. On the one hand, printing money expands the government’s purchasing power directly, just as ordinary borrowing does. The government buys a valuable asset, good, or service with newly created money. But printing money also results in inflation, which reduces the real value of the new money the central bank creates. In theory, there comes a point at which the second effect outweighs the first. At this point, printing more money reduces real government resources.

Empirical evidence suggests that this second effect can be important. Cross-country studies suggest that inflation rates over 100% to 200% annually are actually counterproductive from a monetary finance perspective. Above this rate, each additional unit of currency printed by the central bank actually reduces the central bank’s purchasing power—the incremental direct benefit of additional money is outweighed by its detrimental devaluation effect on all the units of currency produced by the central bank. And even these high

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84 Alvarez et al., note 76, at 501-02.
85 For more on the consensus, see Marvin Goodfriend, How the World Achieved Consensus on Monetary Policy, 21 J. Econ. Persp. 47, 61 (2007).
87 With modern central banks, the effect on the government budget constraint is more indirect. The central bank prints money and uses the money to buy assets. The assets produce profits, which the central bank remits to the treasury. The treasury can then use the profits to purchase goods and services that would otherwise have required additional tax revenues, either in the present or in the future.
89 The Bailey Curve is thus sometimes called “the Laffer Curve” for money.
90 Easterly et al., note 88.
(though not infinite) rates of inflation do not generate extraordinary amounts of cheap financing; the value of monetary finance peaks at only 4% of GDP at inflation rates between 100% and 200%.91

Finally, the pivotal role of inflation expectations strengthens this case for shunning monetary finance. Inflation expectations help determine inflation. For any given money supply, higher inflation expectations cause higher inflation.

A central bank charged with financing the government likely increases public inflation expectations. To finance government spending, central banks need to expand the money supply—a recipe for high inflation. Instructing central banks to finance government therefore muddies the central bank’s inflation-fighting credentials. This interferes with its ability to credibly convince the public that it will dislike inflation.

Inflation expectations among potential government creditors closes off another potential route to using the printing press to relieve government burdens. In this route, inflation is actually useful, because it reduces the real (i.e., noninflation adjusted) burden of existing government debts.92 It is easy to pay a government debt of $1 trillion when workers start earning $1 billion per week.

The problem is that this is a trick that can only be pulled once; when lenders expect inflation, they demand higher interest up front to account for their possible losses later.93 At that point, inflation needs to exceed expectations to improve government finances. And inflation constantly in excess of expectations is unsustainable, causing socially destructive hyperinflation.94 Over the long run, inflating away debt increases, rather than decreases, the government’s tax burden on the population. As a result, we exclude unexpected inflation as a tool of central bank finance. Instead, we focus exclusively on the public finance effects of an expansion of the money supply (monetary finance), which in some circumstances (explained below) lowers rather than raises the long-term tax burden.

It may seem difficult to directly compare these various possible economic costs of inflation to the potential benefits of monetary finance, but in fact there is now a fairly straightforward instrument for measurement. While inflation costs may seem remote from debt-financing costs, the presence of central bank payments of interest on reserves brings the two costs into one metric. For the past decade, central banks have paid interest on private bank reserves held with the cen-

91 See id. at 599 (“Seigniorage collection reaches a maximum of 4.0 percent of GDP”).
92 Reis, note 14, at 11-12; see Canzoneri et al., note 13, at 975 (summarizing theories describing this approach).
93 Reis, note 55, at 21; Canzoneri et al., note 13, at 993.
94 Mankiw, note 15, at 106.
central bank. By paying interest on reserves, central banks can influence a private bank’s desire to lend funds to firms and households, thus controlling inflation. By reducing their own profits in this way, central banks therefore signal how much they are willing to give up to reduce inflation, providing an implied cost of inflation. We can therefore evaluate the costs of inflation relative to the costs of financing debts by comparing the interest rate paid on reserves with the interest rate paid on government bonds.

B. The Balance Sheet Argument

In addition to claims about inflation, there is the argument that monetary finance cannot create new resources because it is just a shell game, a swapping of one debt for another. The macroeconomist Ricardo Reis calls this the “no Ponzi” rule: He says that governments can’t escape from promises just by making more promises.

In particular, when modern central banks buy their government’s debts, they usually do so by issuing reserves. Again, reserves are like deposits into a savings account, only the depositor is a commercial bank, and the account issuer is the central bank. Savings account deposits are booked as liabilities at most banks because depositors can withdraw their deposits on demand.

The argument thus seems to be that as a balance sheet matter, central bank purchases result in no net gains. The central bank might relieve the fiscal authority of the need to repay debts purchased by the bank. But the bank has itself taken on an equal amount of liability.

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97 Reis, note 14, at 5, 18-19, 32-34 (“Reserves are just another form of government liability”).
98 Labonte, note 28, at 15.
99 Bernanke, note 9, at 105.
100 Stuart I. Greenbaum et al., Contemporary Financial Intermediation 285 (3d ed. 2016).
101 Ricardo Reis, QE in the Future: The Central Bank’s Balance Sheet in a Fiscal Crisis 13 (Nat’l Bureau of Econ. Rsch., Working Paper No. 22415, 2016) (“When the central bank buys government bonds with reserves, it is only exchanging one type of government liability for another.”); id. at 24 (“[Quantitative easing, or “QE”] does not generate any extra resources for the fiscal authority . . . ”). However, Reis appears to concede that substituting reserves for long-term debts can have large effects. Id. at 16-18 (explaining that when the central bank shortens bond terms, the fiscal budget can balance with a smaller amount of inflation because a larger share of outstanding bonds is affected).
102 This view also seems to underlie the claim that open market operations cannot change prices. See, e.g., Christophe Chamley & Herakles Polemarchakis, Assets, General Equilibrium and the Neutrality of Money, 51 Rev. Econ. Stud. 129, 137 (1984). That posi-
Reis also appears to argue that common central bank accounting rules prevent central banks from providing fiscal support to their governments.103 The Fed, for example, is obligated to repay its “profits” to Treasury.104 In practice, this means that whenever the Fed holds U.S. debts, interest payments travel a round-trip from Treasury to the Fed, and then back again, less any costs the Fed incurs.105 The Fed typically does not return principal payments, however. Instead, it only treats payments received from Treasury as “profit” if these payments exceed what the Fed paid, which usually happens only if bond prices fell between issuance and when the Fed acquired the debt from banks.106 Reis’s argument thus seems to be that these accounting rules mitigate or eliminate any fiscal benefit from open market operations, as Treasury must repay the face amount of its debts when they come due (unless, as we will emphasize below, they are simply refinanced perpetually). If that is his claim, it ignores the potential benefits of lower interest rates, as we will detail.

As we’ll now argue, we think both these sets of criticisms are mistaken. While the threat of inflation limits the range of optimal central bank actions, there are conditions under which open market operations do not contribute meaningfully to inflation. And even if acquiring government debt with reserves swaps one obligation for another, it turns out that not all liabilities are the same.

III. The Failure of the Conventional Wisdom

In this Part, we argue that these conventional theories have mostly failed to reflect facts on the ground. Where the theory predicts that massive increases in central bank purchases would have caused sharp spikes in inflation, in practice inflation was flat even as balance sheets rose to six or more times their historic levels. Simply put, the convention relies on the assumption that government debts are equally costly to taxpayers whether held by the public or by the central bank. See id. (arguing that prices change only if Fed purchases result in net transfers to the public).

103 Although this is not explicit in Reis’s article, it seems to be the foundation for his assumption that “QE does not generate any extra resources for the fiscal authority” (quoted in Reis, note 101, at 24).


tional wisdom is wrong. In some economic conditions, monetary finance does not contribute significantly to inflation. We also will argue that the "balance sheet" argument against the possibility of meaningful monetary finance misses the possibility that monetary finance provides a cheaper source of financing than conventional borrowing. And we point out that even the conventional wisdom in fact recognizes avenues for meaningful central bank influence on fiscal affairs, though for whatever reason existing accounts have underplayed these possibilities. While we thus argue against the position that monetary finance is never available, we also challenge the MMT position that it is always available. Instead, we argue that monetary finance is typically available only at rare times, such as in the wake of deep recessions.

A. The 2010’s and the Failure of the Inflation Argument

Events since 2008 undermine most of the core assumptions underlying what we’ve called the conventional wisdom related to inflation. As we’ve just explained, the consensus against the existence of meaningful monetary finance assumes that: (1) Monetary expansions cause costly inflation; (2) this inflation makes holding money unattractive, meaning that there is a limited amount of cheap financing available even if inflation is not viewed as costly (the "Bailey Curve" argument); (3) the pursuit of monetary finance raises inflation expectations—imposing unneeded costs on the economy; and (4) inflating away debt burdens raises rather than lowers long-term revenue requirements as future interest rates increase. Of these, only the presumption that inflating away the value of debt backfires remains unscathed today.

Before 2008, central banks could control interest rates with small movements in the monetary base.\textsuperscript{107} If the economy was sputtering, a small increase in the monetary base and the resulting decrease in short-term interest rates was enough to revive spending.\textsuperscript{108} Conversely, a small decrease in money usually proved enough to raise interest rates and nip inflation in the bud. All increases and decreases in short-term interest rates in the 1990's and early 2000's in the United States were accomplished through the minimal fluctuations in the monetary base depicted in Figure 2. In these conditions, an increase in the money supply sufficient to meaningfully finance government spending would have likely caused interest rates to plummet, causing inflation to accelerate.

\textsuperscript{107} Mankiw, note 15, at 320-21.
\textsuperscript{108} Berentsen et al., note 24, at 29.
During the financial crisis of 2008 and its prolonged aftermath, however, short-term interest rates hit the "zero lower bound." At the zero lower bound, the old rules of monetary policy do not apply. Cash always offers a nominal return of 0%. Efforts by central banks to offer stimulus by moving short-term interest rates significantly below zero will thus fail as savers prefer to hold cash instead of short-term instruments with negative yields. Put another way, central bank efforts to increase the amount of base money in the economy do not diffuse into the real economy because banks and citizens simply hold the newly created cash and reserves. The central bank thereby loses its control over the overall money supply (which includes bank-created money as well as base money) and interest rates.

Stimulating a depressed economy at the zero lower bound therefore requires much more active monetary policy. Instead of trying to reduce short-term interest rates below zero, central banks must aim to bring down still-positive, long-term interest rates. Long-term bonds, however, trade in much higher volumes than short-term instruments. As a result, central banks will have to purchase many more bonds to meaningfully affect interest rates. After 2008, governments financed such purchases by expanding the base money supply dramatically.

We saw the results in the United States, the eurozone, and Japan in Figure 1 above. Before 2008, central bank assets—which are roughly equal to the monetary base—in each currency zone expanded slowly and stably. (A similar pattern would apply in the United States before the figure begins in 2000.) At the beginning of 2008, combined cen-

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110 Because holding cash is not cost-free, interest rates on short-term noncash assets can move slightly below zero, reflecting a convenience premium. Therefore, the zero lower bound is sometimes called the "effective lower bound."
111 This policy is known as "quantitative easing." See Brett W. Fawley & Luciana Juvenal, Quantitative Easing: Lessons We've Learned, Reg'l Economist (July 1, 2012), https://www.stlouisfed.org/publications/regional-economist/july-2012/quantitative-easing-lessons-weve-learned.
112 Over 75% of outstanding U.S. Treasury debt, for example, has a maturity longer than one year. See Peter G. Peterson Found., What Types of Securities Does the Treasury Issue? (Jan. 25, 2021), https://www.pgpf.org/blog/2021/01/how-does-the-treasury-issue-debt#:--text=treasury%20Bonds%20have%20maturities%20of%20more%20than%2010%20years&text=treasury%20Inflation%20Protected%20Securities%20%20or%20months%20on%20the%20principal (noting that 25% of Treasury debt consists of bills with a maturity of one year or less). For a description of the effect of large-scale bond purchases on asset prices, see Joseph Gagnon et al., The Financial Market Effects of the Federal Reserve's Large-Scale Asset Purchases, 7 Int'l J. Cent. Banking 3 (2011).
113 See Bd. of Governors of the Fed. Rsrv. Sys., Assets: Total Assets: Total Assets, note 5 (select "1975" and "2002" in the date drop-down menus) (showing total assets between $5
tral bank assets in the three regions barely exceeded $3 trillion. After 2008, however, central bank assets exploded as central banks printed money to stimulate moribund economies. By late 2020, the combined value of central bank assets in the United States, eurozone, and Japan exceeded $21 trillion, an almost sevenfold increase in combined assets in just over twelve years.

In the conventional wisdom, this monetary explosion should cause inflation, as more money chases the same amount of goods and services. Many macroeconomists predicted exactly this. But this monetary expansion caused little noticeable change in inflation in the United States, eurozone, or Japan before 2021 as demonstrated in Figure 3. Indeed, average U.S. and eurozone inflation in the 2008 through 2020 period (as measured by the GDP deflator) falls short of average inflation before 2008. As we write in late 2021, inflation has increased in recent months. Although the causes of that trend are controversial, the phenomenon seems linked to massive shifts in demand from goods to services, and perhaps to large fiscal stimulus in the United States, not primarily to the monetary expansions of 2020 and 2021, which are similar to the post-2008 expansions that did not trigger inflation.

**Figure 3**
**Implicit Measure of Inflation 2000–2021 (U.S., Eurozone, and Japan)**

Monetary expansion without inflation undermines one of the core arguments against monetary finance as a viable source of government finance. According to the conventional wisdom, inflation is the pri-

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and $40 billion for this entire period), https://fred.stlouisfed.org/series/WALCL (last visited Nov. 28, 2021).
mary detriment of pursuing monetary finance. If inflation does not always follow massive monetary expansion, then monetary finance offers the possibility of government finance with very low social cost (at least in some macroeconomic environments).

Why didn't monetary expansion cause inflation? Macroeconomists haven't yet agreed on an answer.\textsuperscript{115} As an empirical matter, base money's velocity decreased.\textsuperscript{116} Increasingly, money is used for savings rather than exclusively to facilitate transactions.\textsuperscript{117} This increases the total demand for money and decreases its velocity; velocity has fallen by more than 60% in the United States since 2008.\textsuperscript{118} Although there is more money outstanding, it changes hands less frequently. As a result, total spending remains relatively stable and inflationary pressures are quiescent.

In addition to rising demand for money as a store of value, private sector banks have become less responsive at translating increases in base money into increases in the total money supply. Before 2008, banks never held "excess reserves"—reserves in excess of those mandated by the central bank.\textsuperscript{119} When central banks increased private bank reserves by purchasing assets from the private banks, the private banks quickly used the reserves for new lending, increasing the amount of money in use in the economy. As a result, expansions in the base money supply quickly translated into expansions of the total

\begin{thebibliography}{119}

\bibitem{bernanke} Ben Bernanke, The New Tools of Monetary Policy, Brookings Inst. (Jan. 4, 2020) ("For example, worries about high inflation were based on a crude monetarism, which did not adequately appreciate that the velocity of base money would fall in the face of low interest rates. If anything, of course, inflation has recently been too low rather than too high."); https://www.brookings.edu/blog/ben-bernanke/2020/01/04/the-new-tools-of-monetary-policy.

\bibitem{andersen} Richard G. Andersen et al., Money and Velocity During Financial Crises, 81 J. Econ. Dynamics & Control 32, 41-42 (2017). There is also evidence that crises increase the "convenience" value of money and other very safe assets, making them relatively more desirable than assets that might become illiquid during a crisis. Williamson, note 115, at 156; Andersen et al., at 38; Jules H. Van Binsbergen et al., Risk-Free Interest Rates, 143 J. Fin. Econ. 1 (2022).


\end{thebibliography}
money supply, making inflation more likely. Since 2008, however, private banks have been willing to hold excess reserves.\textsuperscript{120} Like the rest of the population, banks now view money as an asset worth holding voluntarily.\textsuperscript{121} When banks hold excess reserves instead of lending them out, base money expansions (monetary finance) cause less of an increase in the overall money supply.\textsuperscript{122} As a result, the link between monetary finance and inflation weakens.

The failure of massive increases in the supply of base money to cause a reduction in the demand for money also undermines the Bailey Curve argument that monetary financing opportunities are limited. In 2020, for example, U.S. monetary finance, as measured by the increase in Federal Reserve assets, exceeded 11\% of GDP, roughly equal to that year’s record-setting budget deficit.\textsuperscript{123} In Japan, monetary finance has exceeded 10\% of GDP almost every year since 2012.\textsuperscript{124} At these levels, monetary finance accounts for an important share of government financing, refuting the conventional wisdom that monetary finance can safely be ignored.

There is, though, no reason to assume that these conditions are permanent. Indeed, economic historians suggest that over centuries the velocity of money has often slowed during recessions, but then eventually recovered to its precrisis levels.\textsuperscript{125} Fed economists have cautioned that commercial banks’ current high level of enthusiasm for


\textsuperscript{121} This willingness is likely tied directly to another new policy of central banks, the paying of interest on excess reserves, as we will detail shortly. See Ennis, note 24, at 63.

\textsuperscript{122} See Andersen et al., note 117, at 35 (discussing the connection between excess reserves and decline in money velocity).


\textsuperscript{125} Andersen et al., note 117, at 38.
holding assets in the form of reserves (i.e., essentially in the form of cash) could easily change in the future.\textsuperscript{126}

In addition to the conventional wisdom concerns we’ve addressed here, it might also be argued that although monetary finance can expand a government’s fiscal capacity, it cannot replace taxation because it lacks a tax system’s power to redistribute wealth. It is hard to envision how monetary finance could be implemented in a way that re-created the progressive structure of most modern income tax systems.

That is certainly an important limitation but not a disqualifying one. Governments can use the combination of taxes and spending programs to achieve their preferred amount of redistribution.\textsuperscript{127} If temporarily cheap monetary finance reduces a government’s revenue requirements, thereby displacing some progressive taxes, then other tax rates or spending programs may need to adjust.

\section*{B. The Failure of the Balance Sheet Argument}

The balance sheet argument also overlooks some essential facts. In our view, since government debts can be “revolved,” or refinanced, continually, the cost of government debt is best thought of as a stream of interest payments. Professor Reis and others seem to emphasize instead the potential cost of repaying the principal on the loans.\textsuperscript{128} In this Section we argue that, even under Reis’s framing, the face amount of a central bank obligation is not an accurate measure of the cost of repayment.

We first illustrate the holes in the argument using physical currency, which pays no interest. Although currency is technically a government liability, it differs from other obligations because in a fiat money system it is not redeemable.\textsuperscript{129} In such a system, the central bank is under no obligation to redeem cash. This would not be true under a gold standard or fixed currency regime, which obligates the government to exchange cash for gold or another currency.\textsuperscript{130} The government is also not required to make any ongoing interest payments to cash holders.


\textsuperscript{127} Edward D. Kleinbard, We Are Better Than This: How Government Should Spend Our Money 335-71 (2015).

\textsuperscript{128} See notes 102-103.


\textsuperscript{130} Grey, note 12, at 59.
Debt, by contrast, has a maturity date (when it must be redeemed or refinanced) and requires interest payments.\textsuperscript{131}

The absence of redemption or interest means a dollar raised by printing cash approximates a dollar in tax revenues more closely than a dollar raised by issuing government debt. By exercising its rights as the monopoly issuer of cash, a branch of the government (the central bank) acquires private assets without incurring definite future obligations.\textsuperscript{132} As a result, seigniorage changes the government’s budget constraint in much the same way as raising incremental tax revenue would.\textsuperscript{133}

To see this, suppose that a government has two options for retiring $1 billion in outstanding debts: It can raise $1 billion in tax revenue to repurchase the debts, or it can have its central bank repurchase the debts with newly printed physical currency, then retire them. The differences between the two scenarios are that with newly printed cash, (1) the central bank, rather than the treasury, holds the government debt and (2) the economy has more cash. The first point matters from an institutional design perspective, but not as a fiscal matter. In either case, the government has the same amount of debt in external hands. Similarly, the presence of more cash (the second point) creates a risk of inflation but does not affect the government budget constraint. The presence of more cash does not require any future government payments.

Thus, setting aside any possible inflation effects, printing money has the same impact on the government budget constraint as raising tax revenue. Indeed, commentators recognize that, in a world without a gold standard, printing currency creates no real obligations for the government.\textsuperscript{134} The balance sheet argument therefore fails: If governments printed cash to acquire their debts, there would be no offsetting obligations to pay interest or redeem principal.

Are reserves, which are now the dominant form of monetary finance, any different? Although a central bank is not obligated to allow banks to obtain cash in exchange for their reserve balances, it’s typically desirable for the central bank to do so on demand, in order to allow reserves to operate as a highly secure source of capital for


\textsuperscript{132} See Grey, note 12, at 57-59.

\textsuperscript{133} See Marco Bassett & Todd Messer, Fiscal Consequences of Paying Interest on Reserves, 34 Fiscal Stud. 413, 418-29 (2013) (arguing that currency and reserves should not be considered central bank liabilities because they do not have to be backed by other assets).

\textsuperscript{134} Id. at 418.
commercial lenders, among other reasons. But the central bank can satisfy these demands by printing new money. As a result, bank reserves resemble physical cash in terms of redemption risks.

Unlike cash, however, bank reserves create real future liabilities for the government. Central banks now pay interest on reserves. Paying interest on reserves induces banks to keep their money on deposit at the central bank rather than lending it to customers, giving central banks more control over the economy. Without interest on reserves, central banks could lose control over inflation after a rapid balance sheet expansion. While interest on reserves is a critical central bank instrument, the interest paid on reserves means that financing the government with bank reserves imposes costs, unlike financing the government with physical cash. Some economists therefore claim that monetary finance is equivalent to debt.

Even if reserves are a form of government debt, they offer borrowing on terms that are much more favorable than treasuries can usually access. Recall that when a government pays interest to its central bank, the central bank returns that interest to the government, less the

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137 Central banks sometimes choose to repurchase reserves for policy reasons, such as to control the money supply, but in modern practice this function is instead filled by paying interest on reserves, as detailed in the next paragraph.

138 Before 2020, the Fed required banks to hold reserves equal to a certain percentage of their total assets. If interest-free, required reserves are the equivalent of a tax on banks, Reis, note 14, at 143. When banks hold reserves that exceed this minimum requirement, the extra reserves are known as “excess reserves.” Before 2008, excess reserves were almost unheard of, and indeed were only statutorily authorized in the United States in 2006. See Financial Services Regulatory Relief Act of 2006, Pub. L. No. 109-351, 120 Stat. 1666. Since 2008, however, they have become commonplace. To make the holding of excess reserves more or less attractive (and so influence the money supply), the Fed began paying interest on excess reserves in October 2008. Federal Funds and Interest on Reserves, Fed. Rsrv. Bank of N.Y. (“Federal Reserve Banks have been paying interest on reserves to DI’s since October 2008.”), https://www.newyorkfed.org/aboutthefed/fedpoint/fcd15.html (last updated Mar. 2013). Starting in 2020, the Fed eliminated required reserves and now pays interest on all bank reserves. See Bd. of Governors of the Fed. Rsrv. Sys., Reserve Requirements (last updated Jan. 4, 2022), https://www.federalreserve.gov/monetarypolicy/reservereq.htm.

139 Central banks could also raise reserve requirements to unprecedented levels to restrict lending after a monetary expansion, but this would impose a heavy tax on banks. See Reis, note 14, at 143.

140 See Ennis, note 24, at 62-63; Gagnon, note 96.

141 Reis, note 14, at 148 (“[R]eserves are just another government liability. They count for the fiscal burden, and they could be included in the public debt.”).
cost of paying interest on reserves. In effect, then, the use of reserves allows governments to borrow at the central bank’s interest rate, which typically is much lower than the government’s interest rate generally. For one, because reserves are essentially payable on demand, central banks can pay the low rates that usually accompany very short-term debt. When it buys government debt, the central bank provides its government with a free term premium: The discretionary interest rate paid by the central bank on extremely liquid bank reserves almost invariably falls short of the interest rate paid on longer term and less liquid bonds.

The interest central banks pay is especially low when inflation risk is minimal. The discretionary nature of the interest payments on reserves is critical because it allows central banks to eschew payment whenever there is an option with lower social cost. That is, central banks choose to pay interest because that alternative is superior, from a policy perspective, to alternatives such as either allowing inflation to rise, or using some other tool for managing inflation that is not as efficient as interest on reserves. If the risk of inflation is low, interest on reserves can be kept to a very low rate.

C. Other Balance Sheet Impacts on Fiscal Policy

Finally, we want to briefly highlight several other established reasons to expect that balance sheet operations can have fiscal benefits.

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142 See notes 106-107.

143 While mandatory reserves are by definition not redeemable, a private bank can effectively cash out mandatory reserves if it has been credited by the central bank by lending against them.

144 Stephen D. Williamson, Interest on Reserves, Interbank Lending, and Monetary Policy, 101 J. Monetary Econ. 14, 18 (2019). Reis concedes this point, but seems to argue that interest on reserves will usually be just as expensive as government borrowing. Reis, note 101, at 153-54.

145 Ennis, note 24, at 56-57; Cavallo et al., note 136, at 12; see Berentsen et al., note 24, at 32 (showing through empirically grounded simulations that, in absence of interest on reserves, inflation would have increased sharply in Swiss economy following large balance sheet expansion).

146 See Corsetti & Dedola, note 136, at 1331 (suggesting that reserves backed by currency are “subject only to the risk of inflation”); Williamson, note 115, at 156 (pointing to recent example of Bank of Japan as instance where central bank acquired large amounts of government debt using reserves, kept interest on reserves low, and there was no inflation).
Again, although these arguments are familiar, as best we can tell the policy debate around monetary finance does not reflect them.

First, balance sheet operations play an important indirect role in government budgeting through their power to serve as economic stimulus, as we described in Part I. With an income tax, successful economic stimulus translates directly into higher tax revenues. In our Part I example, the central bank’s monetary expansion kept output at $5 million rather than shrinking to $3 million. The monetary expansion prevented a 40% decline in government income tax revenue, holding tax rates constant. With lower deficits in the present, the government needs lower future tax revenues to pay for any desired level of spending.

Second, balance sheet operations reduce the government’s interest burden. Central banks purchase government bonds with newly created money. The increase in demand for government bonds raises their price and lowers interest yields (which move inversely with price). Large quantities of central bank government bond buying can significantly lower interest rates on government bonds. By reducing the cost of borrowing, monetary finance reduces tax revenue requirements for any level of government spending.

A 2013 internal Fed memo used these two effects (plus savings on the difference between interest on reserves and short-term interest rates, not the difference between reserves and long-term rates we emphasized above) to estimate the fiscal impact of an incremental $500 billion in long-term U.S. bond purchases by the Fed. The Fed memo estimated that, over ten years, the monetary expansion would reduce public debt by $300 billion. Increases in income tax revenues and decreased social welfare spending as a result of monetary stimulus caused most (over $200 billion) of this estimated reduction. Almost $70 billion of the estimated total effect was the result of lower federal

148 The change in tax revenues may exceed the change in aggregate income. Because income tax rates are progressive, increases in output and income raise average tax rates in addition to increasing the income tax base. See id.
149 That is, if demand for government bonds rises, the government can offer a lower interest rate and still hit its sales target. Bernanke, note 9, at 104.
150 DeLong & Summers, note 20, at 252.
152 For a broader survey of these profits at central banks around the world, see Jörg Bibow, Unconventional Monetary Policies and Central Bank Profits: Seigniorage as Fiscal Revenue in the Aftermath of the Global Financial Crisis, at 25-80 (2018).
interest payments and higher Fed profits—the monetary finance effects of increasing the base money supply.

If we extrapolate the estimated effects of a $500 billion monetary expansion to the roughly $3.5 trillion in monetary expansion undertaken by the Fed between late 2008 and 2014, we find that monetary finance reduced government debt by an estimated $2 trillion through 2023. For comparison, annual income tax revenues were approximately $1.5 trillion in 2016.153 Thus, even under the well-accepted standard accounting the Fed already follows, open market operations significantly affected U.S. public finances in the post-2008 period. Any fiscal policy perspective that overlooks these effects is decidedly incomplete.

* * *

We’ve argued that monetary finance can make a major difference in a nation’s fiscal situation. In spite of this virtue, monetary finance does not offer a free lunch. The social cost of monetary finance depends crucially on inflation. Increasing currency causes inflation in some circumstances but not others, while reserves burden the economy only when the central bank must choose either to pay interest on them or see inflation rise to undesirable levels. While the interest costs of money are typically below those of long-term debt, there will be times when interest on reserves is higher, particularly when inflation risks are acute. As we will now argue, this contingent nature of the cost of monetary finance—costly sometimes, cheap at others—is central to understanding how it should be used.

IV. Monetary Finance and Institutional Design: Lessons for Fiscal Authorities

The possibility of meaningful monetary finance can transform a nation’s finances. It would make sense then for budgeting institutions to change when monetary finance is realistically on the table. In this Part, we survey some common legal rules governments use to inform the public about their fiscal standing, and statutory and other constraints that fiscal authorities impose on themselves to keep budgets in balance. Section A reviews common instruments of budget control and their supposed purposes. We’ll then argue in Section B that many of these approaches are no longer sensible when the central bank can and does supply meaningful financing. Budget rules instead should

more closely reflect the economic reality that debts held by a government's own central bank as a result of monetary finance are not equivalent to, and usually not nearly as costly in interest terms, as other debts. At the same time, huge, onetime influxes of cheap central bank money can powerfully distort a legislature's spending. Fiscal institutions should help channel legislative decisions so that legislatures are more likely to prudently spread the funds out over time.

A. Instruments of Budget Control

Governments regulate their own ability to spend money for many of the same reasons that they establish independent central banks. Borrowing offers rewards now but pain later, when the current legislature may be out of office. Precommitments can be a way to overcome this inter-temporal problem. Governments may also limit their own fiscal freedom in order to attract credit, as lenders may be wary of investing in a project when the borrower may be unable to repay all its debts.

Most budget limits come in one of three basic flavors. The first of these are direct legal limits on spending or borrowing. For example, some developed countries and all of the U.S. states have balanced-budget provisions that require the fiscal authority to spend no more

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156 There is some evidence that this tactic is effective. Craig L. Johnson & Kenneth A. Kriz, Fiscal Institutions, Credit Ratings, and Borrowing Costs, 25 Pub. Budgeting & Fin. 84, 87, 100-02 (2005). It is still unclear, though, whether this is due mostly to investor perceptions rather than reality. See Friederich Heinemann et al., Sovereign Risk Premia: The Link Between Fiscal Rules and Stability Culture, 41 J. Int'l Money & Fin. 110, 121-24 (2014) (reporting that limits are more effective at reducing borrowing costs for governments with a perceived lack of stability).

than current-year revenues.\textsuperscript{157} The federal debt limit in the United States offers another example.\textsuperscript{158}

Procedural rules make up the second set of budget limitations. These are generally obstacles that make it more difficult to enact legislation that will tend to increase deficits. The United States has an assortment. In the House of Representatives, statutory PAYGO rules adopted in 2010 restrict introduction of legislation that would have the effect of increasing deficits on net.\textsuperscript{159} There is a similar self-imposed rule in the Senate.\textsuperscript{160}

Finally, many budget limits operate primarily through disclosure and public pressure.\textsuperscript{161} Public disclosure of the federal government’s debt operates through a combination of Treasury regulations and informal congressional practices. The Constitution requires a regular public statement of the government’s income and expenditures,\textsuperscript{162} Congress and Treasury both track and report the public debts.\textsuperscript{163}


\textsuperscript{159} Statutory Pay-As-You-Go Act of 2010, 2 U.S.C. § 931 et seq.


\textsuperscript{162} U.S. Const. art. I, § 9, cl.7.

Daily changes in the total debt are disclosed online, presumably so that voters can take them into account when evaluating their elected officials' performance. Disclosure measures are said to help the public overcome their collective action problems and mobilize against overborrowing.

B. Monetary Finance and the Design of Budget-Control Rules

How, if at all, should the possibility of monetary finance affect the design of these budget-control mechanisms? In this Section we make the case that to the extent that budget-control rules are defensible, they should be based on debts held by the public and should partially discount debts in the hands of the nation's own central bank. In this, we partly agree with modern monetary theorists. We'll argue, though, that most budget limits aren't particularly defensible, except in the case of time-limited resources such as oil reserves. But, since monetary finance is itself time limited, our analysis suggests that the presence of monetary finance actually strengthens the case for budget rules: Budget rules reduce some possible unwanted side effects of monetary finance, while monetary finance can act as a budget control rule safety valve, mitigating such rules' harmful effects during deep recessions.

First, budget rules that depend on the total amount of government obligations, such as the U.S. debt ceiling or public disclosures like the "debt clock," should discount government obligations held by the central bank. Recall that government payments on debts held by the government's own central bank travel a round trip from government coffer to central bank account, and then back to government coffer via central bank profit remittance. In exchange, the central bank typically issues reserves.

These are not the kinds of risks that debt ceilings or disclosure rules are meant to address. The best case in favor of a debt limitation, as we have mentioned, is that it might constrain the legislature's ability to commit society's future resources, or in the case of disclosures to at least make the legislature accountable for doing so. As we have explained, debt held by the central bank need not directly consume future government resources. Instead, at worst those debts increase the

166 See, e.g., Grey, note 12.
167 See notes 106-107.
risk that there might be situations where the central bank would have to choose between paying interest on reserves or permitting some inflation, leading to a positive expected future interest rate on excess reserves. Including central bank–owned public debt thus overstates the real size of the government’s commitments.168 And this is not a minor error: In 2021, the Fed held nearly 25% of all the outstanding U.S. debts.169

This is not to say that central bank balance sheet operations should be invisible to the public, but only that reporting them as though they were the same as real public debts makes no sense. It would be more accurate to report, and potentially limit, each category of obligations separately. If for some reason only one measuring stick is possible—say, if we thought the public needs one simple number to focus on—then central bank–held debts could be counted at a heavy discount, such as 20%, to reflect the possibility that they pose some future interest rate cost.170

Our argument is limited to debts held by the government’s own central bank. U.S. treasuries owned by the Chinese central bank or Illinois bonds owned by the Fed, for example, will still have to be paid with tax revenues, as any other debt would, with no offsetting repayment from the central bank.

Now, let’s turn from total debt limits to annual-spending rules. We begin with a deep skepticism of most budget-control tools. Most budget limits are fairly ineffective at limiting spending and borrowing, but often require costly or inflexible work-arounds.171 For instance,

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168 See Krishnakumar, note 158, at 182 (arguing on different grounds that intra-governmental debt should not be counted toward the debt limit).


170 This is a crude approach, but then so are budget limits. Realistically, the burden of government borrowing depends on its real (i.e., inflation-adjusted) stream of future costs. Haliassos & Tobin, note 2, at 902-03. Assuming constraints are desirable at all, legislatures should be more constrained when the real interest rate is higher than when it is extremely low. But thus far no real-world budget system has achieved this level of nuance. If a government were to try to implement a more rigorous budget along those lines, our prescription for central bank–held debt would involve central bank experts estimating the likely long-run social costs of issuing reserves and reporting the ratio of that cost to the social cost of an additional dollar of true debt. As we have argued, the typical costs of central bank–held debts will be rather lower than debts held by other creditors.

balanced-budget rules, however incomplete, have seriously hampered both U.S. and EU efforts to respond to economic crises. 172 More generally, by adding another “veto gate,” or impediment that proponents have to clear to enact legislation, many budget-control tools put power, including the power to charge a toll, in the hands of the small group of actors who control the veto point. 173

There is also a more fundamental conceptual problem with a number of budget limits—many of them assume that the best way to protect our future is to spend less money. 174 Recall that one of the key problems budget limits aim to solve is that current legislators don’t “internalize,” or care about, the costs of paying off debts in the future. 175 But, by this same token, present lawmakers also don’t internalize the benefits that present spending projects might produce. This is, of course, the dilemma of infrastructure, of financial regulation, 176 and of regulating against climate change. 177 If anything, it is arguable that most societies’ biggest problem today is not that we borrow too much, but that we are borrowing and investing far too little. 178

172 Zsolt Darvas et al., European Fiscal Rules Require a Major Overhaul, 47 Notes du Conseil D’Analyse Economique 1, 5 (2018); Arick Levinson, Balanced Budgets and Business Cycles: Evidence from the States, 51 Nat’l Tax J. 715, 717-19 (1998); Gary A. Wagner & Erick M. Elder, Revenue Cycles and the Distribution of Shortfalls in U.S. States: Implications for an “Optimal” Rainy Day Fund, 60 Nat’l Tax J. 727, 728 (2007). To be clear, we do not argue that prudent management of debt levels has no value. A country that accumulates a very high debt overhead during boom times may then lack the fiscal ability to borrow adequately during busts. Martin Larch et al., Do EU Fiscal Rules Support or Hinder Counter-cyclical Fiscal Policy?, 112 J. Int’l Money & Fin. 102328 (2021), manuscript at 16-17. But preserving fiscal space for recession-time borrowing is fruitless if borrowing during recessions is limited to levels too low to create effective stimulus. Neil H. Buchanan, Social Security, Generational Justice, and Long-Term Deficits, 58 Tax L. Rev. 275, 294 (2005).


174 Even simple debt reporting rules face this problem, as they spotlight government debts without any effort to catalogue the positive-value future investments the government is ignoring. By highlighting debts and ignoring the opportunity costs of not spending, disclosure rules reinforce the mistaken perception that we are spending too much.

175 Sterk & Goldman, note 157, at 1365-66.


177 Nicholas Stern, The Economics of Climate Change, 98 Am. Econ. Rev. 1, 12-13 (2008); see Richard L. Revesz & Matthew R. Shahabian, Climate Change and Future Generations, 84 S. Cal. L. Rev. 1097, 1150-51 (2011) (noting that even if individuals rationally account for future costs, they may fail to factor in “aggregate-level” changes such as irreversible climate damage).

Nonrenewable resources, such as mineral wealth, offer an important exception to our general skepticism of budget-limiting rules. Many oil-rich nations have established sovereign wealth funds, in effect setting aside large portions of their oil revenues for use in the future. This is good economic planning. Nations with onetime income shocks should save for much the same reason that humans save: Spending all your money at one time is wasteful, because at some point you are buying a second platinum-rimmed champagne glass, when in the future you may lack for food or clean water. Similarly, it doesn’t make sense to use unexpected savings to cut other taxes to the bone one year and hike them again later; since the economic damage of a tax rises exponentially with its rate, a 10% rate every year is much preferable to two years of 0% and 20%, respectively. Therefore, temporary revenues should be smoothed over time. Some governments use a mechanism (analogous to sovereign wealth funds), known as a rainy day fund or “lockbox,” for transferring tax revenue from boom times to recessions.

As we’ve already emphasized, monetary finance is not a permanent source of cheap finance. Fiscal authorities in countries where monetary finance is viable should therefore follow the playbook of oil extractors, and set rules for themselves to spread out the spending enabled by temporarily cheap monetary financing over time. Thus, spending should increase and taxes should decrease by the amount that the long-term cost of funds has been reduced. And the long-term

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We acknowledge that these second-best arguments don’t hold as clearly when the costs of debt can spread across borders or tiers of government rather than time. See Jonathan Rodden, Hamilton’s Paradox 48-82 (2005) (discussing the vertical externality problem). Mainly, the difference is that it isn’t so clear that spending will also produce positive spillovers for the governments that will have to bail out the debtor or suffer damaged credit ratings from their neighbor’s default. Is it a net positive for a state government if its cities have unlimited borrowing capacity? David Schleicher, Hands On! Part I: The Trilemma Facing the Federal Government During State and Local Budget Crises 14-15 (July 28, 2020), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3649278, offers a thoughtful framework. We reserve more detail on whether seigniorage matters in these cases for elsewhere.

costs of funds includes years with and without monetary finance. If
governments increase spending and lower taxes to reflect the costs of
public funds in monetary finance years alone, then they will go too far.

Our prescription is therefore that annual budget deficit calculations,
such as the U.S. PAYGO procedures and EU balanced-budget rules,
should aim to strike a balance, allowing some but not all of monetary
finance interest savings to be spent each year. Central bank purchases
of government debts should create “pay-fors,” allowing the fiscal au-
thority to increase its spending by the amount of the purchase, or at
least a substantial fraction of it.\textsuperscript{184} Potentially, this expanded spending
authority could be limited to investments in long-run assets, but be-
cause money is fungible this often wouldn’t be a fully binding con-
straint.\textsuperscript{185} In effect, our rule would allow governments to spend
significantly in excess of their annual limits as long as the central bank
would purchase the resulting debts.

Critics of central bank involvement in fiscal affairs often argue that
rules like ours would dangerously distort legislative spending pol-
icy,\textsuperscript{186} but we think these claims miss some of the key aspects of mo-
tary finance we’ve highlighted. For example, one argument might be
that “easy money” from central banks would lead legislatures to bor-
row and spend too much. If monetary finance brings in money at
lower interest cost than traditional government borrowing could, then
it’s easy to see why a legislature might spend more. But that is exactly
what the legislature should do.\textsuperscript{187} Governments should invest in public
projects until the social return from their investment from the next-
best project is lower than the cost of raising public funds.\textsuperscript{188} If the cost
of financing government is lower, it is cost-effective to fund more
projects.\textsuperscript{189}

\textsuperscript{184} Cf. DeLong & Summers, note 20, at 265 (arguing that central banks should declare
that they will monetize some debts in order to induce extra fiscal stimulus during reces-
sions).

\textsuperscript{185} That is, imagine that a government is already planning to spend $90 billion on short-
run projects and $10 billion on long-run projects. The central bank purchases $10 billion
worth of government debt, allowing the legislature to spend $10 billion on long-run
projects. In response, the legislature simply spends the long-run $10 billion it already
planned, and increases short-run spending to $100 billion.

\textsuperscript{186} E.g., Peter N. Ireland, Interest on Reserves: History and Rationale, Complications

\textsuperscript{187} Particularly during recessions, when seigniorage is most likely available. See DeLong
& Summers, note 20, at 263-64 (setting out argument for fiscal stimulus and accommoda-
tive monetary policy). Note that government spending in the presence of monetary finance
should go up for the same reason that government spending goes up when oil is found. The
monetary finance, like the oil, expands the government's budget constraint. And, like oil,
the expansion in government spending should not equal the current year's monetary fi-
nance. The monetary finance is a windfall and should be allocated across years.

\textsuperscript{188} Bev Dahlby, The Marginal Cost of Public Funds 229-33 (2008).

\textsuperscript{189} Id.
A more persuasive version of the argument might be that central bank monetary financing could lead a legislature to authorize projects that have negative social value because the legislature likely does not fully internalize the costs of monetary finance generated by the central bank.\textsuperscript{190} Taxes, by contrast, are blamed on the legislature. Though of course politics is much more complicated than this, holding all else equal the legislature probably doesn’t want the blame for costing society $1.50 via taxation to create $1.00.\textsuperscript{191} But a legislator may fail to internalize the cost of projects unless voters hold her accountable for those costs.\textsuperscript{192} It seems quite plausible the legislature would be happy to take the credit for creating $1.00 in new spending when the blame for the $1.50 in inflation costs rests with someone else, like the central bank.\textsuperscript{193} The internalization problem is particularly dangerous when combined with the ephemeral availability of monetary finance: Legislatures will face temptation to spend excessively quickly on low-value projects, leaving future high-value projects unfunded.\textsuperscript{194}

But this turns out not to be as serious a concern because of the close relationship we’ve sketched between monetary finance and recessions. Historically, meaningful amounts of monetary finance have been available mostly during recessions.\textsuperscript{195} The typical recession is driven by aggregate demand shocks in which not enough people are buying goods and services.\textsuperscript{196} Providers of goods and services thus have less

\textsuperscript{190} See Canzoneri et al., note 13, at 940 (noting that fiscal and monetary authorities may not internalize each other’s costs); Thomas J. Sargent & Neil Wallace, Some Unpleasant Monetarist Arithmetic, Fed. Rsv. Bank Minneapolis Q. Rev., Fall 1981, at 1, 7 (arguing that fiscal authorities will force central banks into monetizing the debt unless they are “discipline[d]” by the bank).

\textsuperscript{191} In the standard public choice account of politics, the legislature often creates negative value projects of this kind because of how the benefits and burdens are distributed. See Russell Hardin, Collective Action 20-22 (Dorothy Sawicki ed., 1982). Rational political actors free ride on the efforts of others. So, if a benefit or burden is shared equally among a large group, each member of the group will tend to wait for others to act to support or oppose it. Concentrated costs or benefits affecting a small group make it easier for members of that group to mobilize individually or to coordinate. Thus, the legislature will impose taxes on the many to create benefits for the few. Our point is that this dynamic would be even more powerful if the legislature does not even need to impose the tax.


\textsuperscript{193} Cf. Buchanan & Dorf, note 23, at 51-52 (observing that Congress will be tempted to spend and then blame the president for consequences). This argument presumes that the central bank tolerates inflation rather than raising the interest rate on reserves. If, instead, the central bank raises the interest rate on reserves, then the reduction in central bank remittances to the treasury is ultimately a problem for the legislature, even if the mechanism is more indirect.

\textsuperscript{194} See Bernstein et al., note 179, at 222-23 (discussing legislative incentives to favor present over future).

\textsuperscript{195} See notes 117-120.

\textsuperscript{196} Mankiw, note 15, at 275.
money, which means they then buy fewer goods and services themselves, and so on. To break this spiral, the standard prescription is for government to put money into people's hands, whether via spending or tax cuts.197 In an important sense it doesn't even matter what the money is for, as long as it ends up in the hands of people who are likely to spend it. Some economists call anti-recessionary spending "helicopter money" (i.e., it might as well just be tossed out of a helicopter) for this reason.198 Taking into account spending's demand-stimulating benefits, even projects that would have negative value during boom times are good spending projects in recessions.199

Thus, the monetary finance windfall is most likely to be available at opportune moments from a public finance perspective. In governments where the legislature's ability to spend during crisis is constrained, many cost-effective crisis projects are left on the table unused.200 Under our proposed budget rule, monetary finance would allow the government to make use of these productive investments in ways the legislature acting alone could not. This is a familiar benefit of "lockboxes," "rainy day funds," and other government savings vehicles.201 Our argument, in essence, is that monetary finance functions as a fortuitous rainy day fund. Up to a point, the tendency of legislatures to treat transitory monetary finance as permanent may improve, rather than harm, fiscal policy. Monetary finance-induced increases in spending look more appealing during hard times, which may well be most of the time that monetary finance is available.

To be sure, legislatures could adopt explicit "lockbox" rules to further protect against overspending, such as by setting aside a large portion of annual monetary finance savings for future spending, but we think the benefits of that approach would be fairly limited. It is hard for legislatures to commit themselves, because a legislature that creates lockbox rules can also repeal them.202 The most effective lockbox designs include both mandatory contribution rules as well as relatively inflexible, formula-driven withdrawals,203 which means that it will be

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197 See notes 117-120.
harder in the future for the legislature to respond to unexpected crises.

Also, in practice the share of monetary finance savings committed to the lockbox may often be modest. A typical lockbox formula permits increased withdrawals during economic slowdowns, when the economic returns to government spending are higher. As we’ve seen, monetary financing is most likely to be available during deep recessions and their immediate aftermath. Thus, it is possible that most or all of a recession year’s monetary finance will be immediately spendable.

An independent central bank can also substitute for formal lockbox rules, without the inflexibility that they entail. Legislatures might fear that the central bank will reduce or eliminate monetary finance if the bank observes that the legislature fails to follow sound fiscal planning with the resulting revenues. If the central bank announces this policy publicly, it could serve as a potential disciplinary device for would-be lockbox crackers.

Central bankers can also make long-run investment commitments more meaningful through the same methods, since central bankers are harder to game through the fungibility of money than are rigid legal formulas. That is, as long as a spending project also delivers benefits that are spread out over relatively long periods of time, it is replicating the economic results the lockbox would achieve. Central banks could announce that investing monetary finance revenues in long-run projects satisfies the banks’ “sound fiscal planning” requirement. This exception could encourage legislatures to invest in the future-oriented projects they would otherwise neglect due to inter-temporal externalities. Even if the legislature doesn’t get as much political credit for repairing a bridge as it would for more present-oriented spending, it still probably gets some reward, and that’s more than it likely would get from watching funds flow into a lockbox.


205 In this respect the central bank’s role could resemble past calls for independent agencies to help Congress achieve budget discipline. E.g., Daniel Shaviro, Do Deficits Matter? 268-71 (1997); Theodore P. Seto, Drafting a Federal Balanced Budget Amendment That Does What It Is Supposed to Do (and No More), 106 Yale L.J. 1449, 1512-15 (1997).

206 Cf. Poterba, note 178, at 177-82 (reporting that establishing a separate budget for capital projects increases capital investment).
V. Central Banks and Monetary Finance

We now move from legislatures to central banks themselves. If we are right that leading central banks around the world are now playing major roles in their respective fiscal systems, what does that fact mean for the organization, decision-making, and law of central banks? In Section A, we first suggest that a central bank’s fiscal role should be a subject of explicit and public deliberation by the bank, and those decisions should be guided by procedural protections similar to those already in place for monetary policy. That is, we reject the claim that because monetary finance is closely related to taxation, it should be subsumed into the ordinary political process, rather than the politically insulated world of monetary policy.

In Section B, we move from process to substance, asking how the fiscal impact of monetary finance should affect central bank decisions. Here, we adopt a middle position between two contending camps. We reject the conventional wisdom, and suggest instead that central banks should acquire more government debt than they need simply to stabilize the economy, as a way of providing fiscal assistance to their governments. But we caution that this policy will make sense only in extraordinary circumstances, and so reject claims by modern monetary theorists that the printing press is a bottomless bag of cash. We close by considering whether our position is consistent with existing legal constraints in the United States and Europe.

A. Decision Mechanisms for Central Banks

Once a central bank is convinced that monetary finance in fact has major fiscal effects, how should the bank go about deciding how much monetary financing to provide? In this Section, we argue that, because of the extreme political sensitivity of monetary finance, central bank independence will prove essential. If independence proves inadequate, statutory limits might be worth considering. And the central bank’s decision should be predetermed according to established rules and formulas about the inflation risk associated with printing more money.

As Professors Buchanan and Dorf have carefully set out, there are potentially powerful arguments in favor of subjecting central bank decisions to the kinds of political control common for other executive agencies. After all, by shaping whole economies, central banks have major effects on who thrives and who struggles, exactly the types of

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207 Buchanan & Dorf, note 23, at 31; see also Conti-Brown et al., note 23, at 60-61 (suggesting the Fed voluntarily adopt administrative law procedures common at other agencies).
distributional questions and hard trade-offs that democracies expect elected officials to resolve. These arguments become even more powerful if central banks will exercise, in effect, the traditional legislative power of the purse.

Even so, monetary finance decisions should be independent of fiscal authorities, as more traditional aspects of monetary policy generally are in most countries, because of their close resemblance to, and deep intertwining with, monetary policy. Central banks are independent for good reasons, and those reasons extend equally, if not more so, to monetary finance policy.

As other commentators have argued, the case for central bank independence rests mostly on the unique inter-temporal aspects of monetary policy. As politicians are quite aware, elections often turn on the state of the economy. Monetary policy’s powerful influence on economic conditions thus offers a constant temptation to resort to political meddling. The problem is that when a political actor triggers inflation for short-run political gain, that act likely also increases inflation expectations. This in turn raises the costs of national borrowing and the velocity of money, both of which can drive additional inflation, and so on. Thus, a politically expedient decision today causes long-run, hard-to-reverse damage.

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210 E.g., TFEU art. 130. HM Treasury can “direct” Bank of England monetary policy in extraordinary circumstances, but this power has reportedly never been invoked. Salib & Skinner, note 209, at 909.


213 Id. at 619.

214 Id.


The United States has mostly overcome this enticement through a combination of formal central bank independence and social and political norms.\textsuperscript{217} Formal independence itself is somewhat fragile, tracing most directly to 1950's agreements between Treasury and the Fed, and subject to revision at any time by Congress.\textsuperscript{218} But existing legal lines are buttressed by a combination of other factors, including the collective lobbying of industry fearful of the economic volatility political interference might bring.\textsuperscript{219}

Monetary finance decisions, even if distinct in some ways from other aspects of monetary policy, share this key inter-temporal ingredient. In particular, as a time-limited opportunity available only in select economic conditions, monetary finance presents the risk that—like oil reserves or diamond mines—it might be overly exploited by the present legislature to fund low-value projects, leaving future high-value projects to wither.\textsuperscript{220} We've already noted that the power to print money without stoking inflation is not so different, economically speaking, from sitting on an oil well. Both offer a valuable resource, available only for a limited time.\textsuperscript{221} Each can be generated and controlled by relatively few people—as opposed, say, to a nationwide income tax. And both might therefore suffer from what's often termed the "resource curse."\textsuperscript{222} Mineral-rich nations often struggle through long periods of political conflict as factions vie for control of the riches.\textsuperscript{223}

\textsuperscript{219} See Conti-Brown, Ulysses, note 212, at 625; Salib & Skinner, note 209, at 913-14, 977; Tan, note 218, at 355-56. The Fed critic Tim Canova sees this dependency on outside interests as a vulnerability of central banks, making them prone to capture by the banking industry. Timothy A. Canova, Central Bank Independence as Agency Capture: A Review of the Empirical Literature, Banking & Fin. Serv. Pol'y Rep., Nov. 2011, at 11, 20-21. In describing a central bank as "independent," we take no position on Canova's point, but only on the question of whether the bank is subject to direction by other governmental actors.
\textsuperscript{221} Seigniorage opportunities arguably differ from oil in that they may recur again once exhausted. But mineral riches, too, can have their ups as well as downs, depending on new technologies (say, deep-sea wells or fracking) or global supply and demand.
\textsuperscript{223} Ross, Political Economy, note 222, at 320-21 (suggesting that conflicts over control of resources explain the resource curse). But see Christa N. Brunsschweiler & Erwin H. Bulte, Natural Resources and Violent Conflict: Resource Abundance, Dependence, and the Onset of Civil Wars, 61 Oxford Econ. Papers 655, 664 (2009) (arguing that wars cause
The power to print money to finance the government could also be used opportunistically for political purposes.\footnote{Cf. Kimberly A. Clausen, Fixing Five Flaws of the Tax Cuts and Jobs Act, Colum. J. Tax L., Summer 2020, at 31, 38 ("[I]t is unwise to put Congress in charge of managing inflation . . . ").} Imagine that a central bank sympathetic to the government in office pumped out financing in the months before an election, allowing the government to cut checks or slash taxes without borrowing from the public. Alternatively, an unsympathetic central bank might shut off the printing presses in the year prior to an election, threatening to crater government financing.

Even if a central bank never were to act so opportunistically itself, political actors are unlikely to neglect the potential of trillions in cheap finance. Experiences with the monetary finance era post-2008 have been largely positive thus far. But the potential remains for increased political pressure on the bank. In the United States, appointments to the governing body of the Fed, the Board of Governors, have been relatively less political than, say, appointments to the U.S. Supreme Court. Since the time of the Korean War, there has been a norm of depoliticized hiring and firing of Board Governors.\footnote{Tan, note 218, at 335-36.} The reappointments of chairs Janet Yellen (who failed to secure a second term) and Jerome Powell were relatively more politicized than in the past, though. Monetary finance could be changing the apolitical dynamic, which of course would be damaging to the overall independence and efficacy of the central bank.

To be sure, there are other policies that present inter-temporal dilemmas but still have traditionally been left to political control.\footnote{Buchanan & Dorf, note 23, at 70-71; Sterk & Goldman, note 157, at 1306.} If tax cuts or spending binges are deficit-financed, they too can cause long-run effects.\footnote{Shaviro, note 205, at 221; Robert P. Inman, Public Debts and Fiscal Politics: How to Decide?, Am. Econ. Rev., May 1990, at 81, 84; see Galle & Klick, note 156, at 200-01 (explaining failure of local voters to internalize long-run debt costs).} We agree that the difference is one of degree, not kind, but it is still a meaningful one. Marginal increases in the national debt don’t pose the same degree of inter-temporal trade-offs as monetary policy and don’t generally raise the danger of a hyperinflationary spiral.\footnote{Buchanan & Dorf, note 23, at 71.}
of a central bank's authority could well jeopardize the independence of its monetary policy decision-making.\textsuperscript{229} Shared authority or a veto point controlled by political actors raises the possibility of holdups or vote trading. Treasury could gain power over monetary authority in exchange for yielding to the Fed on financial regulation.\textsuperscript{230}

Although we urge independent central bank control over monetary finance, we also think central banks should impose significant limits on their own power. The Fed already employs formulaic decision-making to shield itself from political influence over monetary policy. For example, the Fed announces an “inflation target” and then uses this preannounced target as a constraint and guide point for all its major decisions.\textsuperscript{231} The inflation target is reset only rarely and after careful deliberation.\textsuperscript{232} In effect, the Fed commits itself to a preset technocratic objective, giving itself less room to respond to importuning from elected officials.\textsuperscript{233} The target is public so that if the Fed reneges on its commitment, it will pay a price in institutional credibility that its governors are typically unwilling to incur.\textsuperscript{234}

We prescribe similarly strong medicine for monetary finance decisions. Once a central bank’s authority expands to include the power to issue monetary finance, it is that much more tempting for political actors to attempt to influence it. This further heightens the case for central bank independence and ex ante public explanation of how the central bank intends to use its monetary finance powers.\textsuperscript{235} Monetary finance policy could accordingly be patterned on the inflation targeting method, but with additional features built in to make it harder for the central bank to reverse course on short notice, in time to influence an upcoming election.

\textsuperscript{229} But see Conti-Brown, Ulysses, note 212, at 629-30 (arguing that the Fed should not be independent with respect to its banking regulation authority); Salib & Skinner, note 209, at 941-42 (suggesting that a central bank’s need for independence depends on which function the bank is carrying out).

\textsuperscript{230} Cf. Duff, note 176, at 207 (noting that central bank failures in financial regulation could damage its credibility for purposes of monetary policy).


\textsuperscript{233} Conti-Brown et al., note 23, at 16, 43, 46. This is not to say that the Fed retains no discretion, an objective that is probably neither possible nor desirable. Buchanan & Dorf, note 23, at 40-43.

\textsuperscript{234} Conti-Brown et al., note 23, at 17, 43.

\textsuperscript{235} See Clausing, note 224, at 38 n.21 (suggesting that MMT approaches may be inconsistent with central bank independence).
Of course, central banks have been engaged in monetary finance—at a massive scale—since 2008. But improving public finances has not been an explicit goal of this monetary easing, which is instead justified as necessary for keeping inflation near its targets or promoting employment. As a result, ordinary citizens—or even other branches of the government—are left to wonder if the significant fiscal effects of monetary easing play any role in a central bank’s consideration of future monetary policy.

Although we support central bank independence, we see an important distinction between transparency and outright control by political authorities. Monetary finance decisions should not be secret, any more than traditional monetary policy decisions. Both should be regularly reported to the public, and their authors subject to questions from legislators. These are major policy choices, and if they cannot be safely left entirely to the political process, neither should they be hidden from it. In this way, elected officials can be held to account for the ways in which they interact with the monetary system, including potential failures to amend the system if it fails to deliver on its intended purposes.

### B. The Case for Making Money

Having set out the procedures for monetary finance decisions, we now want to address a key issue regarding their substance: Should central banks consider the value of their fiscal contributions when deciding how much government debt to acquire, or should they focus solely on monetary policy? To answer, we start with a seemingly uncontroversial premise. Governments should finance themselves at the lowest cost, all else being equal. Suppose, for a moment, that monetary finance can be increased with zero risk of inflation, now and in the future. If there is no threat of inflation, monetary finance offers government resources at very low social cost and should be accessed until it is no longer riskless. And if monetary finance generates inflation but no improvement in public finances, then taxation and debt-issuance should finance the government. More generally, we should

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236 Admittedly, monetary policy is itself not as transparent as most other administrative decision-making. Zaring, note 23, at 161-71, 173-74, 184.
238 Duff, note 176, at 204, 207.
239 Indeed, our approach follows the canonical model of Phelps, who asks what is the optimal mix of inflation and a distorting wage tax. For an overview, see Canzoneri et al., note 13, at 974-75.
use monetary finance for government financing if and only if it is cheaper for society than alternative forms of finance.

While “finance at lowest cost” sounds milquetoast, the proposition might be resisted by both the conventional wisdom and proponents of MMT. To remind the reader, conventional monetary theory holds that monetary finance can’t make important fiscal contributions, so the normative question of whether it should never arises.\footnote{Reis, note 14, at 1, 4.} In contrast, MMT maintains that printing money is effectively costless and should be used in place of taxes to fund governments.

We argue instead that there is a real but limited place for monetary finance in government finance. First, central banks should calculate their desired monetary policy from the perspective of inflation and (possibly) employment (as they do today). This optimum point may or may not entail significant monetary finance.\footnote{Central bank policy has included seigniorage in many years since 2008. Central banks insist, however, that the goal has been to stimulate the economy rather than to finance government. E.g., Cavallo et al., note 136, at 1.} Indeed, since 2008, if we take central bankers at their word, they have engaged in significant monetary finance with no concern for its fiscal effects.

Next, central banks should engage in additional monetary finance until the expected marginal social costs of printing another dollar equal the marginal cost associated with an additional dollar of revenue via taxation. Our discussion focuses on this latter recommendation.

Our position therefore sits in between conventional wisdom (monetary finance should never finance government) and MMT (monetary finance should always finance government). Sometimes monetary finance cannot finance the government and causes needless inflation. At other times, monetary finance offers government finance at the lowest social cost. The point at which the monetary finance macroeconomic state (the zero lower bound) ends and the inflationary state begins is not clear, however. In deciding when to cease providing monetary finance because the zero lower bound phase may be ending, the central bank should not simply consider inflation and unemployment. Rather, it should also consider the fact that forgoing a possible opportunity for relatively low-cost finance requires higher taxes, which are themselves socially costly. We thus think of noninflationary monetary finance as a time-limited windfall of cheap financing that may or may not be tapped by the central bank. If monetary finance is not tapped when it is available, the opportunity may not recur.

In our approach, central banks would measure the cost of monetary finance primarily by gauging its impact on the likelihood and magni-
tude of inflation, or equivalently by estimating the extra interest on reserves that must be paid to avoid such inflation.\textsuperscript{242} By construction, monetary finance imposes costs—it is not the central bank’s preferred monetary policy stance under its normal monetary policy objectives (inflation and possibly employment). In particular, monetary finance raises inflation risks and interest on reserve payments, now and in the future. Since central banks already study these costs in great detail as part of their traditional task of setting interest rates to achieve a target level of inflation,\textsuperscript{243} however, factoring in monetary finance should not offer any significant new informational difficulties.\textsuperscript{244}

Monetary finance does not have to be free to be worthwhile. Rather, it only needs to be cheaper than the alternative sources of government revenue. Collecting government revenue, from any source, entails costs. Taxation changes behavior. Some transactions that were profitable in the absence of tax become counterproductive once tax is imposed. The cost of forgone economic activity, termed “deadweight loss,” is significant.\textsuperscript{245} As a rule of thumb, public finance economists estimate deadweight loss of roughly $.30 to $.50 for each dollar of tax revenue raised.\textsuperscript{246} That is, it costs society $1.30 to $1.50 to raise a dollar by taxation. Economists call this the “marginal cost of public funds” (MCPF).\textsuperscript{247}

After deciding its optimal monetary policy stance with respect to inflation and employment, the central bank should ask: What are the costs of an additional dollar of monetary finance? If the costs of monetary finance are below the MCPF, then the central bank should print an additional dollar (i.e., increase reserves by one dollar). The central bank should continue creating money via monetary finance until the expected costs (in additional inflation risk) exceed the MCPF, or perhaps some number less than the MCPF to account for prudential concerns we describe below.

These calculations would likely ignore distributive considerations. That is, it is possible that monetary finance may be less costly to soci-

\textsuperscript{242} Some commentators argue that open market operations also pose some financial stability risks. Jagjit S. Chadha et al., The Ties That Bind: Monetary Policy and Government Debt Management, 29 Oxford Rev. Econ. Pol’y 548, 568-69 (2013). We take no position on that question, but simply note that central banks should account for any and all risks they believe bond purchases pose in determining the optimal policy.

\textsuperscript{243} Id. of Governors of the Fed. Rsrv. Sys., Credit and Liquidity Programs, note 4.

\textsuperscript{244} Id.


\textsuperscript{246} Id. (“That is, if taxes increase by $1, taxpayers bear a cost of $1.30 to $1.50—the $1 in revenue and 30 to 50 cents from accompanying distortions. This additional cost of 30–50 cents is known as deadweight loss.”).

\textsuperscript{247} Dahlby, note 188, at 1.
ety overall, but would be more regressive than the average dollar of tax revenue. Cost-benefit analyses can potentially account for the relative burdens of policies on the poor by using “social welfare weights” or similar measures that incorporate society’s preferences for distribution directly into the calculation.\textsuperscript{248} Although tentative, our recommendation would be that central banks should not do so in making monetary finance decisions. As we’ve noted, these kinds of distributive questions are central to democratic self-governance, and by design central banks are not usually well equipped to undertake them. Further, legislatures can use other taxing and spending levers to readjust any unwanted distributive impact of monetary financing.

Another consideration that central banks should address is that the MCPF may itself be a function of the central bank’s policy. The pursuit of monetary finance raises inflation and inflation expectations. In turn, higher inflation and inflation expectations worsen the economic distortions taxes cause because of the nonindexation of many components of the tax code.\textsuperscript{249} Using our terminology, the MCPF rises as a result of monetary finance.

We think that this effect should be included in the central bank’s estimate of the cost of higher inflation risk. One of the many costs of inflation is its adverse effect on the MCPF. If this effect is large, then the central bank should pursue monetary finance less aggressively because the resulting inflation risk is more costly.\textsuperscript{250}

The desirability of monetary finance in monetary policy thus needs to be evaluated in the context of both the MCPF and the costs of

\textsuperscript{248} E.g., Emmanuel Saez & Stephanie Stantcheva, Generalized Social Marginal Welfare Weights for Optimal Tax Theory, 106 Am. Econ. Rev. 24 (2016).

\textsuperscript{249} It’s a familiar point to economists that two distortions in combination are exponentially worse than either of those distortions would be alone. Jonathan Gruber, Public Finance and Public Policy 626-28 (6th ed. 2019). Even if a tax system only slightly affects our incentives to work or save, its added social cost can be very large when workers or investors already face other, similar disincentives caused by regulation or externalities. In effect, a 5% tax becomes 20% when there is already a distortion or market failure in place that acts like a 15% tax. It stands to reason that inflation, if it distorts the economy in the same ways that taxes or regulations do, could also have this compounding effect.

\textsuperscript{250} A natural question, though, is if the interaction effect depends on both inflation and tax rates, why should it be that the central bank should respond, rather than the legislature? Might it be better to set monetary policy optimally and adjust the tax code in response? The tax distortions caused by inflation are commonly cited as a reason for central banks to keep inflation lower than they might otherwise prefer. See, e.g., Martin Feldstein, The Costs and Benefits of Going from Low Inflation to Price Stability, in Reducing Inflation: Motivation and Strategy (Christina D. Romer & David H. Romer eds., 1997) (out of print), https://www.nber.org/system/files/chapters/c8883/c8883.pdf. Another approach is to have the central bank follow its inflation preferences and rely on the legislature to fix the tax code. Cf. Louis Kaplow & Steven Shavell, Fairness Versus Welfare 33-34 (paperback ed., 2006) (claiming that optimal regulations ignore distributive effects but use tax and transfer systems to correct for unwanted distributive outcomes).
inflation. Central banks in nations with higher costs of raising revenue by taxation should pursue monetary finance more aggressively than central banks in nations with more effective tax systems.\textsuperscript{251} Central banks in nations where the costs of inflation are high, by contrast, should be more reluctant to pursue monetary finance.

Interest on reserves can impose an additional limitation on monetary finance. We've argued that one of the main paths by which monetary financing expands a government’s fiscal capacity is the way in which it in effect allows the government to refinance central bank owned debts at the lower interest rate paid on reserves. If, however, inflation is such that the central bank would have to pay interest on reserves in excess of the government’s own long-term rate, there are no monetary finance gains to be had.\textsuperscript{252} For example, additional monetary finance for fiscal purposes would be misplaced in the eurozone under Covid-19-era conditions, when long-term government interest rates often yield less than the interest rate on reserves.\textsuperscript{253}

To demonstrate our proposal concretely, let’s calculate how much additional money the Fed would print if it included fiscal benefits, following some basic assumptions. Let’s presume that Fed economists predict an additional $500 billion in bond purchases would raise expected future interest rates on reserves by .04% for one year, as the injection of new money raises the risk of inflation and thus the risk that the Fed needs to pay higher interest on reserves to prevent future inflation. With $8 trillion in reserves, this means that monetary finance raises expected future interest on reserves costs by .0004*$8 trillion=$32 billion.\textsuperscript{254}

\textsuperscript{251} There is evidence that this normative recommendation has predictive power. Countries that pursue seigniorage most aggressively often have underdeveloped tax systems. Unfortunately, these countries often pursue seigniorage too aggressively, causing hyperinflation without raising much revenue. Even in a country without the ability to tax, seigniorage should only be pursued while it increases revenue. See Mankiw, note 15, at 108-09.

\textsuperscript{252} By paying the expected higher rate of interest on reserves, the Fed keeps expected inflation exactly where it would be if it did not engage in the extra monetary finance. Inflation risks are thus the same in the two scenarios, but monetary finance implies higher interest on reserves.


\textsuperscript{254} The estimate of .04% is not arbitrary, but instead derives from a series of other assumptions we think are plausible. For one, we assume that excess unemployment costs society $50,000 per job. That number is the midpoint of estimates of the U.S. government’s willingness to spend to reduce unemployment by one worker during the Great Recession. See, e.g., Gerald Carlino, Economic Insights: Did the Fiscal Stimulus Work?, Fed. Rsvr.
Now take a conservative estimate of the value of monetary finance. Following the Fed’s own estimates, an additional $500 billion in monetary finance improves government finances even if it does not lower unemployment.\textsuperscript{255} The reduction in government interest rates and increase in Fed profits from $500 billion in monetary finance saves the fisc approximately $70 billion over ten years.\textsuperscript{256} Raising an equivalent $70 billion in tax revenues when the MCPF is 1.5 entails $35 billion in costs avoided.

If the Fed expects interest rates on reserves to be .04\% higher for one year as a result of $500 billion in monetary finance, then it should engage in monetary finance because the benefits of the monetary finance to the public fisc are worth $35 billion while the additional interest costs on reserves are only $32 billion, and expected future inflation is the same under both scenarios. Fed policy should change accordingly. Monetary finance should be pursued because of its effect on government finances, even if it does not increase output directly.

Before 2008 (in the United States and other developed economies), this approach to monetary finance would not have changed policy significantly. During this era, monetary expansion translated into inflation quickly, and the inflation costs of monetary finance likely exceeded the marginal cost of public funds. If $500 billion in incremental monetary finance increases interest rates on reserves by 2\% rather than .04\%, for example, then monetary finance would not pass a cost-benefit test under our assumptions. Under these conditions, tax revenue and government borrowing constituted the dominant forms of government finance, and monetary finance was appropriately insignificant, as demonstrated by Figure 2. The conventional wisdom (appropriately) ruled.

As discussed above, events post-2008 defied conventional wisdom. Central banks issued tens of trillions of dollars in new money without any hint of accelerating inflation or decrease in demand for holding money.

\textsuperscript{255} Bd. of Governors of the Fed. Rsrv. Sys., note 144, at Table 1.

\textsuperscript{256} See text accompanying notes 151-153.
Central banks accessed trillions in monetary finance after 2008 without trying to raise a penny. Monetary finance was a mere byproduct of the pursuit of stable inflation and maximum employment. If central banks had explicitly pursued monetary finance at the cost of a marginal increase in inflation risk, then they likely could have raised trillions more. To give a sense of the possibilities, the Bank of Japan currently holds assets in excess of annual GDP.\footnote{The value of the Bank of Japan’s assets at the end of 2020 was approximately \$700,000 billion (\$6.7 trillion), Bank of Japan, Bank of Japan: Total Assets for Japan, FRED, Fed. Rsrv. Bank of St. Louis (last visited May 27, 2022), https://fred.stlouisfed.org/series/JPNASSETS. Japanese GDP for 2019 was roughly \$551,000 billion (\$5 trillion), Japan Cabinet Office, Gross Domestic Product for Japan, FRED, Fed. Rsrv. Bank of St. Louis (last visited May 27, 2022), https://fred.stlouisfed.org/series/JPNNGDPP. Central bank assets are thus approximately 127\% of GDP. (1.270 = 700,000 billion/551,000 billion).} If the Fed expanded its balance sheet for monetary finance purposes until it held the same assets as a percentage of GDP as the Bank of Japan (and, by assumption, saw the same low rates of interest persist here as obtained in Japan), then the Fed’s balance sheet would be approximately \$19.7 trillion.\footnote{Q3 2020 U.S. GDP (annualized) exceeded \$21 trillion. U.S. Bureau of Economic Analysis, Gross Domestic Product [GDP], FRED, Fed. Rsrv Bank of St. Louis (last visited May 27, 2022), https://fred.stlouisfed.org/series/GDP. To reach Japanese levels of central bank assets to GDP, the Fed would need assets of \$26.67 trillion. Actual Fed assets at the end of Q3 2020 were \$7.0 trillion. Bd. of Governors of the Fed. Rsrv. Sys., Assets: Total Assets: Total Assets, note 5, https://fred.stlouisfed.org/series/WALCL. The difference is \$19.67 trillion.} The Fed would be financing a large majority of U.S. public debt,\footnote{At the end of 2020, total U.S. federal debt was \$27.7 trillion. U.S. Dep’t of the Treasury: Fiscal Serv., Federal Debt: Total Public Debt, FRED, Fed. Rsrv. Bank of St. Louis (last visited May 27, 2022), https://fred.stlouisfed.org/series/GFDEBTN.} reducing tax revenue requirements by at least \$1.6 trillion over a decade.\footnote{To expand its balance from \$7.8 trillion (its level in April 2021), see Bd. of Governors of the Fed. Rsrv. Sys., Credit and Liquidity Programs, note 4, to \$19.67 trillion (assets equivalent to the Bank of Japan), the Fed would need to buy \$11.87 trillion in assets. In 2013, the Fed estimates that \$500 billion in monetary expansion would save the fisc \$70 billion from lower government interest rates and higher Fed profits, even if output was not directly affected by the monetary expansion. Bd. of Governors of the Fed. Rsrv. Sys., note 151, at 9. Extrapolating this estimate to an \$11.87 trillion expansion implies that seigniorage at Japanese levels would save the fisc \$1.66 trillion = \$11.87 trillion/\$5 trillion*\$70 billion over ten years.} And if expanded monetary finance were to cause the United States to keep unemployment in the next decade closer to its “natural” level than the Fed managed between 2008 and 2021, then the effect would be much larger, with a savings to the fisc of as much as \$7 trillion over a decade.\footnote{The Fed’s memo, note 151, at 5, estimated that, including the effect of expanding output on tax revenues and spending, \$500 billion in monetary policy saves the fisc \$300 billion over a decade. Extrapolating this estimate to an \$11.87 trillion monetary expansion leads to the \$7 trillion figure.} The Fed should pursue this course if the value of these cost savings, measured by the MCPF, exceeds the...
higher expected interest cost on reserves necessary to prevent the balance sheet expansion from triggering inflation.

The Fed, or any other central bank, does not need to print this amount all at once. Rather, it can proceed incrementally. If inflation pressure starts to rise, causing either inflation or a sharp increase in interest rates on reserves, it can cease pursuing monetary finance. It is worth bearing an incremental risk of higher inflation to open up the possibility of such an important and low-cost source of finance. While monetary finance was irrelevant before 2008, it may be the most important ingredient of fiscal policy under zero-lower-bound conditions.

It might be argued that allowing central banks to consider fiscal effects in their bond buying decisions will increase the public's expectations about future inflation, but this is actually a strength of the proposal. In recent recessions, we'd argue, inflation expectations have been too low, making recovery difficult. Low inflation expectations exacerbate the effects of the zero lower bound on interest rates. The zero lower bound affects nominal interest rates, preventing central banks from lowering interest rates even if the economy is sputtering. Real interest rates, which equal nominal interest rates minus the expected rate of inflation, however, are not constrained by the zero lower bound. And it is real interest rates that matter for economic activity, as investors typically care about real rather than nominal returns.262

One response to a sputtering economy hindered by the zero lower bound on interest rates is therefore to raise inflation expectations.263 Increased inflation expectations lower the real cost of borrowing at a zero nominal interest rate. With inflation, the loan principal that must be repaid in the future is expected to be worth less than it is now, making borrowing and spending more attractive. With enough of an increase in inflation expectations, any desired amount of economic stimulus should be available.

Raising inflation expectations, however, requires the public to be convinced that the central bank will permit higher inflation. The central bank needs to "commit to being irresponsible."264 This is ex-

262 Mankiw, note 15, at 63, 334.


It is extremely hard for central banks to do. As described above, the institutional design of central banks aims to credibly convince the public that the central bank will not tolerate inflation. We cannot be surprised if the public internalizes the message and refuses to believe a central bank that now claims it wants inflation.

Our policy proposal helps overcome this dilemma, particularly if it is implemented as we proposed in Part V.A: publicly, through forward-looking guidance that is hard for the central bank to change. In those circumstances, our policy amounts to a central bank promise to tolerate extra inflation risk during recessions, when monetary finance is feasible. That is exactly the prescription leading macroeconomists have suggested for the zero lower bound problem.265

Another potential counterargument to our suggested policy relates to fiscal authorities’ efforts to improve the tax system. We’ve highlighted the importance of the efficiency of the tax system, which usually is measured by MCPF. The MCPF is not a law of physics like earth’s gravity or Planck’s constant. It depends on how economic actors respond to taxes, and those responses can be shaped by government action.266 Monetary finance might make fiscal authorities more complacent about these responses, as we’ll now sketch.

To see the danger, consider that an important component of the social cost of taxation is how “elastic,” or responsive, taxpayers are to changes in tax rates and rules.267 For instance, it used to be the case that it was very difficult to escape from the U.S. corporate income tax.268 Over time, however, businesses learned that they could incorporate related entities in non-U.S. jurisdictions with zero tax rates, and “strip” or transfer paper profits from their high-taxed U.S. business to its zero taxed foreign affiliate.269 Thus, taxable income for U.S. multinationals is now much more responsive to the U.S. tax rate than it once was.270

Governments can change elasticities through policy. In 2017, for instance, the United States adopted new laws aimed at making it harder

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267 Id.
269 See, e.g., Edward D. Kleinbard, Stateless Income, 11 Fla. Tax. Rev. 699, 703 (2011). This “discovery” was aided by changes in the rules for intra-firm debt. See id. at 728-30.
270 E.g., id. at 720-21 (discussing the interplay between foreign and domestic tax rates that firms consider pursuant to subpart F); Rosanne Alshuler & Harry Grubert, The Three Parties in the Race to the Bottom: Host Governments, Home Governments and Multinational Companies, 7 Fla. Tax. Rev. 153, 170 (2005).
to strip income, such as tough caps on deductions for corporate debt; time will tell how effective these ultimately prove.\textsuperscript{271}

The availability of central bank monetary financing might affect legislative or executive incentives to undertake these kinds of efforts.\textsuperscript{272} Suppose the central bank has announced it believes the MCPF is $1.50, and so it will print money until the marginal cost of monetary finance exceeds $1.50 per dollar of savings via cheap finance. Congress is therefore aware that if it undertakes efforts to reduce the MCPF, such as by cracking down on multinationals, then the result will likely be that the Fed will print less money. In effect, Congress would incur the wrath of business owners while losing the goodwill of the parties who would have benefited from additional spending.

A central bank can greatly mitigate this concern, however, simply by setting its target somewhat below the MCPF. For instance, if the central bank concludes that the MCPF is $1.50, it might set its target at $1.35. In this way, fiscal authorities are still incentivized to invest in efforts to reduce the MCPF substantially below its current level. In addition, there is less room for negative social value expenditures motivated by Congress’s belief that inflation is someone else’s problem.

Finally, to demonstrate the utility of our proposal, consider the ongoing central bank debate over “central bank digital currencies.” These digital substitutes for money are under consideration by nearly all countries and are associated with a host of potential virtues and drawbacks that we cannot rehearse here.\textsuperscript{273} Interestingly, however, the debate is missing an important consideration—a digital currency’s fiscal advantage.\textsuperscript{274} By issuing a digital currency, the central bank will be expanding its role in the creation of money (perhaps by displacing banks and other private sector money providers). This will enable the central bank to provide more cheap financing for the government, without stoking inflation. If the costs and benefits of issuing a digital


\textsuperscript{272} Realistically, there is no one MCPF. Instead, the overall MCPF of an economy represents the weighted average of the costliness of all the tax instruments it employs. Bowman, note 266, at 287. So one way in which a government can “invest” in lowering the MCPF is to switch from less-efficient (but perhaps more politically expedient) options to more-efficient (but more politically costly) instruments. See Joel Slender & Christian Gilletzer, Tax Systems 93-112 (2014) for more detailed discussion of the optimal choice of tax systems.


\textsuperscript{274} Carapella and Fleming’s summary, for example, describes no papers looking at fiscal effects of central bank digital currencies. Id.
currency are otherwise in equipoise, then the central bank should institute a digital currency because of the fiscal savings, which can be valued at the MCPF.

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In sum, by neglecting their monetary finance powers, central banks have missed an important opportunity. When demand for money is historically high, monetary finance can finance government at lower social cost than other sources of funds. While these revenues and interest rate cuts are not unlimited, are not as progressive as an ideal income tax, and should likely stop short of the point where their cost would exceed the average cost of taxation, they can contribute importantly to most countries’ bottom lines.

C. Legal Authority to Pursue Monetary Finance

Do central banks have legal authority to pursue our proposal? This Section tries to answer that question for the United States and the eurozone. In the United States, we argue that the Fed’s governing statute at least arguably permits our proposal, and perhaps even encourages it, though it seems the Fed disagrees. The Fed’s current practice should change accordingly. In the eurozone, the Treaty of Lisbon, which governs the ECB, explicitly prohibits monetary finance. Although the meaning of this phrase is subject to some dispute, we consider the pursuit of monetary finance by the ECB to violate even a narrow reading of the ECB’s mandate. As a result, we recommend constitutional reform.

1. Monetary Finance and the Federal Reserve’s Governing Statute

The Federal Reserve Act charges the Fed with conducting monetary policy “to promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates.”275 This mandate, promulgated in the 1970’s, fits uneasily with the conventional wisdom that, above all, central banks need to keep inflation and inflation expectations in check. Over time, the interpretation of the mandate has been revised to conform better with the inflation-fighting conventional wisdom. To adopt our proposal, the Fed needs to relax some of this inflation-fighting zeal and return to the text of its governing statute.

At present, even though the statute lists three goals of monetary policy (maximum employment, stable prices, and moderate interest

rates), the Fed sees two. As the Federal Reserve of Chicago explains, “Our two goals of price stability and maximum sustainable employment are known collectively as the ‘dual mandate.’”\textsuperscript{276} Moderate long-term interest rates are viewed as an adjunct to the dual mandate (and the Fed seems to see even this “dual” mandate as mostly about inflation).\textsuperscript{277}

We think it is an open and interesting question whether the text of these two mandates leaves room for the Fed to take account of other important goals.\textsuperscript{278} When the two mandates are in tension, as they often are,\textsuperscript{279} how should the Fed go about balancing them? How much price stability should the Fed surrender to pursue “maximum employment”? Arguably, in order to compare these two incommensurable outcomes, the Fed must translate each of them into some common metric, such as social welfare.\textsuperscript{280} When the Fed estimates the social welfare effects of a policy intervention to change the current rate of inflation, an accurate accounting will include all the secondary effects of that policy, as under cost-benefit analysis at other agencies.\textsuperscript{281} If the Fed’s chosen inflation-fighting policy also, say, results in catastrophic global warming, it seems to us that any sensible approach to governance must factor that in. So, too, if the Fed chooses to reduce its purchases of government debt, it seems plausible to us that evaluating whether that policy strikes the optimal balance between the two mandates requires the Fed to account for all the welfare effects of its choice, including any impact on the fiscal system.

At the same time, we can see the argument for treading carefully. When courts review the scope of authority delegated to agencies, they presume Congress does not “hide elephants in mouseholes.”\textsuperscript{282} We’d concede that other creative legal arguments, such as claiming that monetary finance increases employment by reducing inefficient taxa-


\textsuperscript{278} Some Fed economists have asserted recently that fiscal effects “are not factors influencing monetary policy decisions,” because they do not fit into either of the two pieces of the dual mandate. Cavallo et al., note 136, at 1. Our argument here is that the economists are probably wrong about what the law requires.

\textsuperscript{279} Benjamin M. Friedman, Why a Dual Mandate Is Right for Monetary Policy, 11 Int'l Fin. 153, 157 (2008).

\textsuperscript{280} Id., at 156.


tion, are too indirect to justify such an important change to the Fed's practices. Our point about cost-benefit analysis might be an elephant in a mousehole, too. We leave further development of the legal meaning of the mandates for future work.

For now, we also argue that the Fed's pursuit of monetary finance receives statutory justification from the forgotten third prong of its mandate—moderate long-term interest rates. A focus on long-term rates is not traditionally part of central banking, which focuses more on short-term rates. Long-term rates, however, are important for the costs of government debt and thus play an important role in fiscal policy. Moreover, the only way for the Fed to lower long-term rates is to buy a significant quantity of long-term debt—another term for monetary finance.

The legislative history of the “moderate long-term rates” provision supports this interpretation. The original Congressional Resolution on which the Fed’s mandate was based was accompanied by a Committee report that indicates that the “long-term interest rates” provision was not originated as an adjunct to maximum employment and stable prices. Rather, it was viewed as independently important “to encourage lower long-term interest rates and expansion in the monetary and credit aggregates appropriate to facilitating prompt economic recovery... including a policy of increasing the Federal Open Market Account’s holdings of long term U.S. securities and of the debt instruments of Federal agencies.”283 That is, Congress expressly authorizes the Fed to decide how much government debt to hold, in addition to its dual mandate.

Rather than a departure from the Fed’s original mandate, the pursuit of monetary finance would (arguably) constitute a return to the mandate’s words and intent. As a result, the Fed can pursue monetary finance without congressional action. Additional statutory instruction from Congress, however, would further strengthen the case for monetary finance by the Fed.

2. Monetary Finance and the European Central Bank

While the Fed’s objectives date from the 1970’s, the ECB’s founding documents date from the 1990’s. By that point, the conventional wisdom that central banks should prioritize control of inflation was firmly entrenched. The ECB’s mandate reflects this shift. Rather than a dual mandate balancing inflation and employment, the ECB’s “primary ob-

jective” is “to maintain price stability.”

It can only pursue other objectives “[w]ithout prejudice to the objective of price stability.”

This component of the ECB’s mandate appears to preclude the pursuit of monetary finance unless there is no risk of inflation. But even this type of monetary finance is outlawed by other provisions of the ECB’s mandate. Article 123 of the Treaty of Lisbon functionally “prevents the [ECB] from taking actions which would directly finance government spending.” In other words, monetary finance is constitutionally outlawed.

One might ask how the ECB has purchased trillions in eurozone government bonds since 2008 if it is prohibited from providing “monetary finance.” The ECB, however, claims that its bond purchase programs are acceptable because they are motivated by its pursuit of price stability rather than its desire to finance eurozone governments. This argument was affirmed by the European Court of Justice in 2015 and again in 2018. But the German Constitutional Court, which gets to opine on the validity of some ECB programs, ruled in 2020 that the trillions in ECB bond purchases were invalid.

Whatever the legal validity of the ECB existing and future balance sheet expansions, the prohibition on monetary finance, if it is to mean anything, precludes ECB monetary finance from buying government debt with newly created money for the purpose of easing fiscal burdens. If the ECB is to pursue a monetary finance objective, as we urge, the prohibition on monetary financing needs to be repealed or reinterpreted. Repealing the prohibition on monetary finance would also have the salutary effect of bringing to an end the tortured consti-

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tutional jurisprudence on the validity of the existing ECB’s bond purchase programs. While the prohibition on monetary finance may have been a reasonable legal construction pre-2008, it fails to provide clear guidance in the current macroeconomic era, when monetary and fiscal policy are inextricably intertwined.

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We’ve argued that under some economic conditions the power to print money can offer governments something close to a free lunch: financing at lower expected social cost than any alternative. But the free lunch is not an all-you-can-eat buffet. The limited size and availability of monetary finance opportunities counsels careful design of institutions to guide its authorization, to allocate it efficiently over time, and to ensure nonopportunistic responses by political actors.