

## **Valse Hot? The Recovery and the Risks Ahead**

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### **The Recession and the Recovery**

What causes business cycles? After reviewing the extensive academic literature that addresses this question and conducting further statistical investigation of his own, Cochrane (1994) concludes, provocatively: we may never know. Ramey's (2016) more recent survey strikes a more optimistic tone, yet still admits our knowledge is far from complete.

The recession that began in March 2020, however, presents no mystery. Both over time and in the cross section, the economic data track very closely patterns of disruption from the pandemic. Figures 1-3 illustrate.

Real GDP, measured at a seasonally adjusted annual rate in the top panel of figure 1, declined by nearly \$2 trillion between the fourth quarter of 2019 and the second quarter of 2020. Two percent annual growth over the past five quarters would have added, under more normal circumstances, another \$500 billion. Through the first quarter of 2021, real GDP has recouped \$1.8 trillion of the total, \$2.5 trillion shortfall, thereby closing about 3/4 of the gap.

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The unemployment rate, shown in the top panel of figure 2, rose from 3.5 percent in January 2020 to 14.8 percent in April 2020, but has since declined to 5.8 percent. By this measure, too, the recovery so far amounts to about 3/4 of the initial loss.

Labor force participation (middle panel of figure 2), however, fell from 63.4 percent in January 2020 to 60.2 percent in April 2020. Its recovery to 61.6 percent closes less than half the initial loss. The employment-population ratio (bottom panel of figure 2) looks a little better. It fell from 61.1 percent in January 2020 to 51.3 percent in April; its recovery to 58.0 percent makes up for about 2/3 of the initial loss. It is clear, nevertheless, that some combination of logistical constraints in sectors most affected by the pandemic, childcare obligations stemming from delayed school re-openings, and incentive effects from supplemental unemployment insurance benefits have slowed the recovery in labor relative to product markets.

Finally, patterns of consumer spending shown in figure 3 reveal that while purchases of nondurable and durable goods are now 7.6 and 23.3 percent *higher* in inflation-adjusted terms than they were in 2019Q4, expenditures on services remain 5.7 lower. These remarkable data highlight, again, the remaining difficulties in overcoming the logistical constraints associated with the pandemic. They highlight, as well, how different the most recent recession is from any of its historical predecessors that Cochrane (1994), Ramey (2016), and many others have tried so hard to explain. During the typical recession, spending on durables falls most sharply, while nondurables and services remain more stable. Since 2020, those typical patterns have been reversed completely.

And perhaps most significantly, real disposable personal income (bottom panel of figure 1) fell by only the slightest amount between January and March 2020 and has since, thanks to several rounds of federal relief payments, often run significantly higher. One could argue that

the monetary and fiscal policy responses to the pandemic were inefficient or overdone. But, as Ireland (2020) and Selgin (2021) emphasize, initial fears that the pandemic would trigger a second Great Depression have simply not been realized. And unlike the bailouts following the financial crisis of 2008-9, which as Lucas (2019) documents, benefited most directly the unsecured creditors of large financial institutions, pandemic relief appears to have quickly reached large numbers of ordinary American households.

So we see that policymakers have, to some extent at least, learned from past mistakes. There does seem to be a thing called progress. For that, we should be grateful.

Here is a prediction. When the dust settles and sober histories of our time can finally be written, our own combination of federalist politics and free-market capitalism will again appear to have offered the most successful response to crisis, just as in better times they provide the most stable backdrop for expanding prosperity and human achievement. Socialism, communism, and other forms of authoritarianism offer nothing but misery, wherever and whenever they are tried. The “universal and homogeneous state” will be exposed – if it hasn’t been already – as a massive fraud and failure. For a review, see Meltzer (2012, 2016) and Granville (2021).

But enough of this philosophy! I suppose you want to know what comes next or, at least, to hear more about what the Federal Reserve is up to now.

### **The Risks Ahead**

Just as the economy was in its first stages of recovery last fall, the Federal Open Market Committee (FOMC 2020) issued an amended Statement on Longer-Run Goals and Monetary Policy Strategy. As Powell (2020) explains, the release of the amended Statement was delayed by the pandemic; the changes in it follow, instead, from the Federal Reserve’s 2019 strategic

review and were motivated by experience during and after the Great Recession of 2008-9. Three innovations stand out.

First and most important, the Committee replaced its previous flexible inflation targeting strategy with a new flexible average inflation targeting (AIT) strategy. Perceiving that the long-run natural interest rate has declined, the Committee expects the zero lower bound (ZLB) on its policy rates to impose a constraint more frequently in the years to come. Federal Reserve officials past and present – see Bernanke (2020) for instance – emphasize that forward interest rate guidance and large-scale asset purchases (quantitative easing or QE) can substitute quite effectively for interest rate reductions after the ZLB is reached. Even so, Committee members remain concerned that their inability to provide sufficient monetary stimulus will cause inflation to fall systematically below their 2 percent target during recessions. If the Committee continues to aim for 2 percent inflation during economic expansions, inflation on average over the entire business cycle will also fall below 2 percent.

The new AIT strategy adjusts by aiming for inflation higher than 2 percent during expansions. This offsets inflation lower than 2 percent during recessions and produces 2 percent inflation when averaged over the business cycle. The new strategy, therefore, shares a key feature of price-level targeting schemes by making up for past shortfalls of inflation from target with subsequent, transitory overshoots.

A fully-articulated price-level targeting strategy, however, would also make clear that past overshoots must be followed by periods of below-target inflation. Whether by design, oversight, or simply from a desire to be concise, the 2020 Statement contains an asymmetry, indicating only that “following periods when inflation has been running persistently below 2 percent, appropriate monetary policy will likely aim to achieve inflation moderately above 2

percent for some time.” It’s easy to understand the rationale for AIT in general, but more difficult to know what to make of how it’s been described.

A second asymmetry appears – this time more clearly and explicitly – in the new Statement’s discussion of employment. Where the earlier Statement (FOMC 2019) describes a monetary policy response to “deviations of employment from the Committee’s assessments of its maximum level,” the 2020 revision replaces “deviations” with “shortfalls” instead. Powell (2020, p.10) traces the rationale for this change to a perceived flattening of the Phillips curve, which implies that “a robust job market can be sustained without causing an outbreak of inflation.”

The Committee’s most recent policy documents illustrate both of these changes in action. The Press Release following the April 2021 meeting (FOMC 28 April 2021) notes that the “Committee decided to keep the target range for the federal funds rate at 0 to 1/4 percent and expects it will be appropriate to maintain this target range until labor market conditions have reached levels consistent with the Committee’s assessments of maximum employment and inflation has risen to 2 percent and is on track to moderately exceed 2 percent for some time.” Meanwhile, the Summary of Economic Projections released in March (FOMC 17 March 2021) show a median expected longer-run unemployment rate of 4.0 percent. Although there may be an important – though, again, unstated – distinction between an “expectation” and a “promise,” these two statements taken together suggest a commitment to hold policy rates at the ZLB until unemployment falls below 4 percent and inflation rises persistently (though moderately) above 2 percent.

The third and final change in strategy is most subtle and, therefore, most difficult to interpret. Powell (2020) gives no explanation for it. The 2019 Statement notes that while

inflation and employment stabilization objectives are “generally complementary,” it goes on to explain that “under circumstances in which the Committee judges that the objectives are not complementary, it follows a balanced approach in promoting them.” The 2020 Statement drops reference to the “balanced approach,” indicating only that the Committee “takes into account the employment shortfalls and inflation deviations and the potentially different time horizons over which employment and inflation are projected to return to levels judged consistent with its mandate.”

Overall, these changes in strategy respond positively to the problems that the FOMC encountered in satisfactorily achieving both sides of its dual mandate during the years of slow recovery and low inflation that followed the 2008-9 recession. But they appear vague – perhaps even deliberately vague – along some dimensions, leaving key questions unanswered. Will the FOMC aim for lower inflation if inflation unexpected runs too far above 2 percent during a recovery that runs “too hot?” And if the FOMC no longer takes a “balanced approach” in responding to conflicting objectives, exactly what kind of “unbalanced approach” will the Committee use instead? With its revised 2020 Statement, the FOMC may have taken a step backwards in communicating clearly its objectives and plans for achieving them.

More importantly, the FOMC is making policy decisions *now*, with reference to its new strategy, in the aftermath of another recession that differs quite fundamentally from the one in 2008-9 that motivated its strategic review. The lessons – summarized by Powell (2020) – that the Committee has drawn from its experience during and after the Great Recession are useful ones. But it’s still not clear that they ought to be applied under present circumstances.

In particular, the three changes noted above – targeting average inflation instead of inflation itself, responding to employment shortfalls instead of deviations, and abandoning a

“balanced” approach to policy tradeoffs – all seem to inject a strong inflationary bias into monetary policy *unless* it really turns out that the Fed will continue to struggle mainly against severe *deflationary* pressures from elsewhere. How likely is that, especially in light of the large federal deficits emphasized by Bordo and Levy (2021) and the political pressures discussed by Hess (2021)?

An even greater danger, described by Hetzel (2021*a*, 2021*b*), is that these elements of the new strategic framework will open the door for a return to the “go-stop” policies of the 1970s. The risk is that now, as back then, the FOMC will ignore low and falling rates of unemployment that might usefully signal that the economy is strong enough to withstand pre-emptive rate increases. That is, it will use low and falling rates of unemployment as a target, not as an indicator. During this “go” phase, overly accommodative monetary policy will cause the economy to “run hot.” Only when inflation rises too far above target will the FOMC move to raise policy rates. By then, however, it will be too late: bringing inflation back down will require a “stop” phase of deliberately tight monetary policy that risks pushing the economy back into recession.

Another way to see these risks is to ask a series of rhetorical questions. When, throughout all of US monetary history, has the Fed succeeded in fine-tuning outcomes to the extent that it hopes to today? What did Milton Friedman (1953) really mean when he warned us about the “effects” of “full-employment policy on economic stability?” Are we so much smarter today that we can safely ignore his advice?

We may not like the obvious answers to these questions. But fortunately, there is an easy way out. By setting a multi-year target path for the level of nominal GDP, and referring consistently to that target path even as it continues to make its usual, meeting-by-meeting

decisions, the FOMC could retain the desirable features of its new AIT framework while also guarding against the build-up of excessive inflationary pressures and the return of go-stop. Let's see how!

### **Fortifying the Fed's New Framework**

Sumner (2017, 2021), Beckworth (2019), and Ireland (2020) explain why nominal GDP stands out as an ideal intermediate target for monetary policy. Always, but especially under present circumstances. And for a number of reasons.

First, because nominal GDP – the total dollar volume of both spending and income, economywide – is a nominal variable. Its movements, therefore, reflect accurately the stance of monetary policy in the recent past. If nominal GDP falls below target, monetary policy has been insufficiently accommodative. If nominal GDP rises about target, monetary policy has become too expansionary.

Focusing on a multi-year target path for the *level* of nominal GDP then becomes a more effectively way of achieving the same goals as the Fed's new flexible average inflation targeting strategy. Just like AIT, it guards against the cumulation of shortfalls that might occur if, because of the constraints imposed by the ZLB, monetary policy cannot deliver sufficient accommodation during a recession.

But figure 4 illustrates how consistent reference to a target path of the level of nominal GDP works much better than AIT as implemented and described in the FOMC's recent policy statement (FOMC 28 April 2021). The top panel shows the actual path of nominal GDP in blue, against a target path in red that calls for 4 percent annual growth starting from a base in the fourth quarter of 2019. The 4 percent growth path for nominal GDP is chosen to be consistent

with average inflation at or slightly above 2 percent, given the Committee's (FOMC 17 March 2021) median projection of 1.8 percent long-run growth in real GDP. The base in 2019, quarter 4 is intended to emphasize what presumably has been and continues to be the FOMC's most basic objective since then: to prevent logistical disruptions associated with the pandemic from being amplified by monetary policy that is insufficiently accommodative because traditional interest rate policy has again been constrained by the ZLB. Both of these choices – for the growth rate and the base – are meant to be illustrative, however, and could be modified without undermining at all the effectiveness of the general strategy.

The bottom panel of figure 4 accomplishes exactly what the FOMC Press Release (28 April 2021) intends to achieve: it provides a clear and unambiguous rationale for the FOMC's policy decisions to maintain a target range for the federal funds rate at 0 to 1/4 percent and to continue purchasing at least \$80 billion of Treasury securities and \$40 billion of federal agency mortgage-backed securities per month. Look: the reason is simple! It is because nominal GDP – a nominal variable – fell 12.75 percent below its target path by the second quarter of 2020 and remains 3.5 percent below target today.

At the same time, however, the two panels of figure 4 also accomplish what the Press Release fails to achieve, by providing clear and explicit guidance as to the circumstances under which the FOMC will have to begin the process of tapering its asset purchases and raising its policy rates. That will have to happen as, in the top panel, the blue line for nominal GDP approaches and crosses the red line for the target.

The dashed green line in the bottom panel indicates that this goal will be met as early as the fourth quarter of 2021 *if* nominal GDP growth continues at the same 11 percent annual rate

recorded for the first quarter 2021. It will happen sooner if nominal GDP growth continues to accelerate, and later if nominal GDP growth falters again.

With reference to a nominal GDP level target, therefore, the FOMC will find it easier to describe itself as responding, systematically and appropriately, to unpredictable changes in the speed of recovery, driven by factors entirely outside of its control. The FOMC's commitment to this contingency plan will be credible because the plan is so simple and because it calls for what are, so obviously, the appropriate policy responses. Even if – especially if – the FOMC continues to operate without reference to a specific monetary policy rule like Taylor's (1993), a target path for nominal GDP plays a valuable role by placing what Sumner (2017) aptly refers to as “guardrails” on its meeting-by-meeting decisions. The target makes clear that the Fed will act to prevent sustained deflation *and* inflation.

The most recent projections (FOMC 17 March 2021) show that few Committee members expect to increase the federal funds rate off the zero lower bound before 2023. It is not clear how or even whether these projections can be reconciled with those for real GDP growth (6.5 percent for 2021, 3.3 percent of 2022), unemployment (4.5 percent for 2021, 3.9 percent for 2022), headline price inflation (2.4 percent for 2021, 2.0 percent for 2022), and core price inflation (2.2 percent for 2021, 2.0 percent for 2022) without implying that the FOMC has stumbled back into a go-stop pattern. And confusion will grow if those projections for growth and inflation are revised upward, as they have been several times already and might again be if the recovery continues to accelerate, while those for the funds rate remain fixed.

Figure 4 improves. It makes clear that keeping interest rates at zero *will* be appropriate *if* the recovery is interrupted again this summer or fall. But rates will have to rise much sooner than 2023 if, instead, robust nominal GDP growth continues. In the latter case, will the FOMC's

current policy – which might be called one of “strategic ambiguity” – trigger unwanted volatility in financial markets? And how will the politics play out, especially as the midterm elections approach? Please just drop the coyness routine, and lay the strategy out more fully!

Second, as the product of real GDP and the aggregate nominal price level, nominal GDP rolls both sides of the Fed’s dual mandate up neatly into one coherent objective. And it does this without reference to the Phillips curve. A nominal GDP level target, therefore, provides a useful cross-check when a stable statistical Phillips curve allows the Fed to use unemployment as a leading indicator of inflation, and an even better substitute when the Phillips curve breaks down.

Again, the specific and peculiar features of the more recent recession and recovery contribute to the *strengths* of the approach. Regardless of whether or not continued health concerns, school closings, and extended unemployment benefits keep millions of potential workers home, a focus on nominal GDP can provide useful information as to whether monetary policy is too loose, too tight, or right on track.

Third, and closely related, reference to nominal GDP growth as the equally weighted sum of real GDP growth and price deflation brings “balance” back into monetary policymaking in a clear and easy-to-understand way. As Hess (2021) and Hetzel (2021a) both emphasize, stochastically alternating lexicographic preference, at first for unemployment and then for inflation, drove the Fed’s go-stop policies throughout the 1970s. A consistent focus on nominal GDP, by contrast, works to restore the key features of more successful policies used during the Great Moderation. Like the Taylor (1993) rule, it generates stability in economic growth *and* inflation, instead of accepting volatility in an attempt to achieve overly ambitious goals for the other.

Fourth and finally, the equation of exchange  $PY=MV$  reveals that nominal GDP also corresponds to a measure of money that is automatically shift-adjusted for changes in velocity. Tobin (1983) and McCallum (1985) popularized this view among academics. Hetzel (2021, p.337) pulls a quote from Alan Greenspan to show how the same insight was used to restore and maintain price stability in the 1980s and 1990s. In the FOMC meeting transcript (17 November 1992, p.45), Greenspan explains:

As I read it, there is no debate within this Committee to abandon our view that a non-inflationary environment is best for this country over the longer term. Everything else, once we've said that, becomes technical questions. I would say that on the basis of the studies, we have seen that to drive nominal GDP, let's assume at 4-1/2 percent, in our old philosophy we would have said that [requires] a 4-1/2 percent growth in M2. In today's analysis, we would say it's significantly less than that. I'm basically arguing that we are really in a sense using ... a nominal GDP goal of which the money supply relationships are mechanisms to achieve that.

As Hendrickson (2012) argues in greater detail, Greenspan's focus on nominal GDP formed an essential component of the successful monetary policy strategy used during the Great Moderation. And underpinning this strategy of nominal GDP targeting is a quantity-theoretic tradition in monetary economics that has often served the Fed well, especially in times of transition or unusual volatility.

In the simplest of terms, what the quantity theory tells us is this. We may never know for sure what causes business cycles. But we *do* know what does *not* necessarily cause inflation: low unemployment. We know this because *high* unemployment accompanied high inflation during the 1970s, and low unemployment accompanied *low* inflation following the Great Recession. Growth in the money supply, by itself, does not necessary cause inflation either, if money demand is shifting too. By correcting for demand shifts, nominal GDP provides a more accurate reading of how monetary policy is affecting the economy.

Following up on this insight, figure 5 plots data on M2 growth and M2 velocity from 1960 through the present, to view the present against the backdrop revealed by longer historical perspective. The pictures are as striking as any from Peggy Guggenheim's townhouse!

Over the past four quarters, M2 has grown by more than 20 percent. We have never in our lifetimes seen such a thing – even during the Great Inflation of 1970s. So far, these extra dollars have been willingly held rather than spent, as reflected in the sharp decline in velocity. But what comes next?

If the Fed continues to purchase bonds at a rate of \$120 billion per month, while holding interest rates at zero, monetary policy will become increasingly accommodative as the economy continues to recover. From a contemporary monetarist perspective like Hetzel's (2021a, 2021b), this will occur as the economy's natural rate of interest moves higher, reflecting stronger consumer and business confidence, ebbing demand for precautionary savings, and increased propensity to spend. If the Fed "does nothing" – more accurately, if it prevents market rates of interest from tracking the rising natural rate – velocity will stabilize or, more likely, reverse course and begin to rise. Continuing rapid M2 growth *will* then translate into faster nominal GDP growth and, from there, into an overshoot of the FOMC's 2 percent inflation target.

Will this overshoot be successfully contained? Or will it form the start of an unwanted go-stop pattern? By comparing nominal GDP to the level target, the Fed can more reliably shape expectations and control the balance of risks. And by doing the same, we as observers can more accurately gauge the risks ahead.

## References

- Beckworth, David. “Facts, Fears, and Functionality of NGDP Level Targeting: A Guide to a Popular Framework for Monetary Policy.” Special Study. Arlington, VA: George Mason University, Mercatus Center, October 2019. Available at <https://www.mercatus.org/system/files/beckworth-ngdp-targeting-mercatus-special-study-v2.pdf>
- Bernanke, Ben S. “The New Tools of Monetary Policy.” *American Economic Review* 110 (April 2020): 943-983.
- Bordo, Michael D. and Mickey D. Levy. “Do Enlarged Fiscal Deficits Cause Inflation? The Historical Record.” *Economic Affairs* 41 (February 2021): 59-83.
- Cochrane, John H. “Shocks.” *Carnegie-Rochester Conference Series on Public Policy* 41 (December 1994): 295-364.
- Federal Open Market Committee. Meeting Transcript. 17 November 1992. Available at <https://www.federalreserve.gov/monetarypolicy/files/FOMC19921117meeting.pdf>
- Federal Open Market Committee. “Statement on Longer-Run Goals and Monetary Policy Strategy.” Amended 29 January 2019. Available at [https://www.federalreserve.gov/monetarypolicy/files/FOMC\\_LongerRunGoals\\_201901.pdf](https://www.federalreserve.gov/monetarypolicy/files/FOMC_LongerRunGoals_201901.pdf)
- Federal Open Market Committee. “Statement on Longer-Run Goals and Monetary Policy Strategy.” Amended 27 August 2020. Available at [https://www.federalreserve.gov/monetarypolicy/files/FOMC\\_LongerRunGoals\\_202008.pdf](https://www.federalreserve.gov/monetarypolicy/files/FOMC_LongerRunGoals_202008.pdf)

Federal Open Market Committee. Summary of Economic Projections. 17 March 2021. Available at <https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20210317.pdf>

Federal Open Market Committee. Press Release. 28 April 2021. Available at

<https://www.federalreserve.gov/monetarypolicy/files/monetary20210428a1.pdf>

Friedman, Milton. “The Effects of a Full-Employment Policy on Economic Stability: A Formal Analysis.” In *Essays in Positive Economics*. Chicago: University of Chicago Press, 1953.

Granville, Brigitte. *What Ails France?* Montreal: McGill-Queen’s University Press, 2021.

Hendrickson, Joshua R. “An Overhaul of Federal Reserve Doctrine: Nominal Income and the Great Moderation.” *Journal of Macroeconomics* 34 (June 2012): 304-317.

Hess, Gregory D. “The Anguish and Progress of Central Banking.” Position Paper. Shadow Open Market Committee, April 2021. Available at <https://www.shadowfed.org/wp-content/uploads/2021/04/Hess-SOMC-April2021.pdf>

Hetzel, Robert. “Assessing the Powell Policy Review.” *Economic Affairs* 41 (February 2021a): 51-58.

Hetzel, Robert. *The Evolution of Monetary Policy from the Founding of the Fed Through 2020: A Narrative and Intellectual History*. Manuscript, 2021b.

Ireland, Peter N. “The Time is Right for Nominal GDP Level Targeting.” Position Paper. Shadow Open Market Committee, June 2020. Available at <http://irelandp.com/papers/somc202006.pdf>

Lucas, Deborah. “The Financial Crisis Bailouts: What They Cost Taxpayers and Who Reaped the Direct Benefits.” Position Paper. Shadow Open Market Committee, April 2019. Available at <https://www.shadowfed.org/wp-content/uploads/2018/10/LucasSOMC-October2018.pdf>

- McCallum, Bennett T. “On Consequences and Criticisms of Monetary Targeting.” *Journal of Money, Credit, and Banking* 17 (November 1985, Part 2): 570-597.
- Meltzer, Allan H. *Why Capitalism?* New York: Oxford University Press, 2012.
- Meltzer, Allan H. “A Paper Dragon (With Teeth).” *The New Criterion* 34 (June 2016): 8-12.
- Powell, Jerome H. “New Economic Challenges and the Fed’s Monetary Policy Review.” Speech delivered at “Navigating the Decade Ahead: Implications for Monetary Policy,” an Economic Policy Symposium. Jackson Hole, WY: 27 August 2020. Available at <https://www.kansascityfed.org/documents/7832/JH2020-Powell.pdf>
- Ramey, V.A. “Macroeconomic Shocks and Their Propagation.” In John B. Taylor and Harald Uhlig, Eds. *Handbook of Macroeconomics*, Volume 2A. Amsterdam: Elsevier, 2016, 71-162.
- Selgin, George. “The Fiscal and Monetary Response to COVID-19: What the Great Depression Has – and Hasn’t – Taught Us.” *Economic Affairs* 41 (February 2021): 3-20.
- Sumner, Scott. “Monetary Policy Rules in Light of the Great Recession.” 54 (December 2017): 90-99.
- Sumner, Scott. *The Money Illusion: Market Monetarism, the Great Recession, and the Future of Monetary Policy*. Chicago: University of Chicago Press, 2021.
- Taylor, John B. “Discretion Versus Policy Rules in Practice.” *Carnegie-Rochester Conference Series on Public Policy* 39 (December 1993): 195-214.
- Tobin, James. “Monetary Policy: Rules, Targets, and Shocks.” *Journal of Money, Credit, and Banking* 15 (November 1983): 506-518.

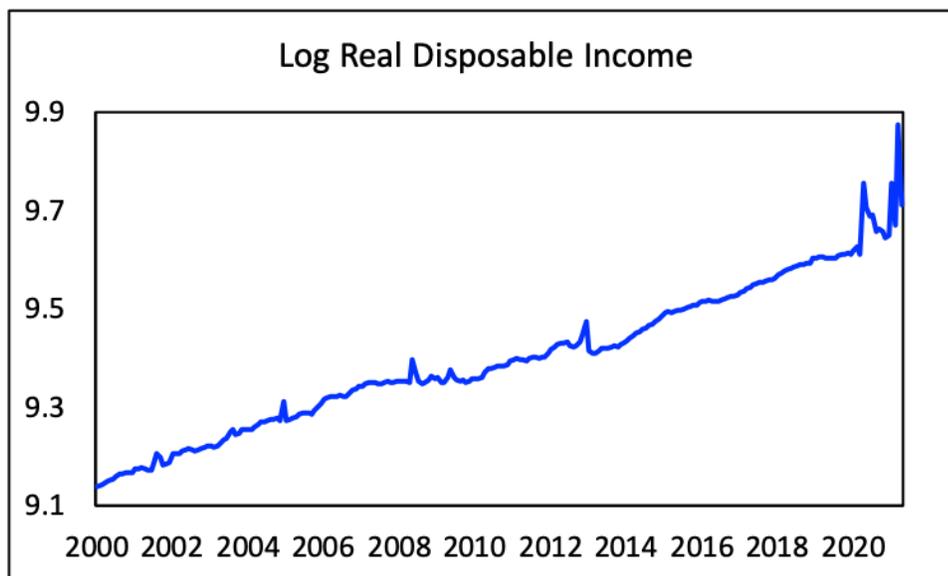
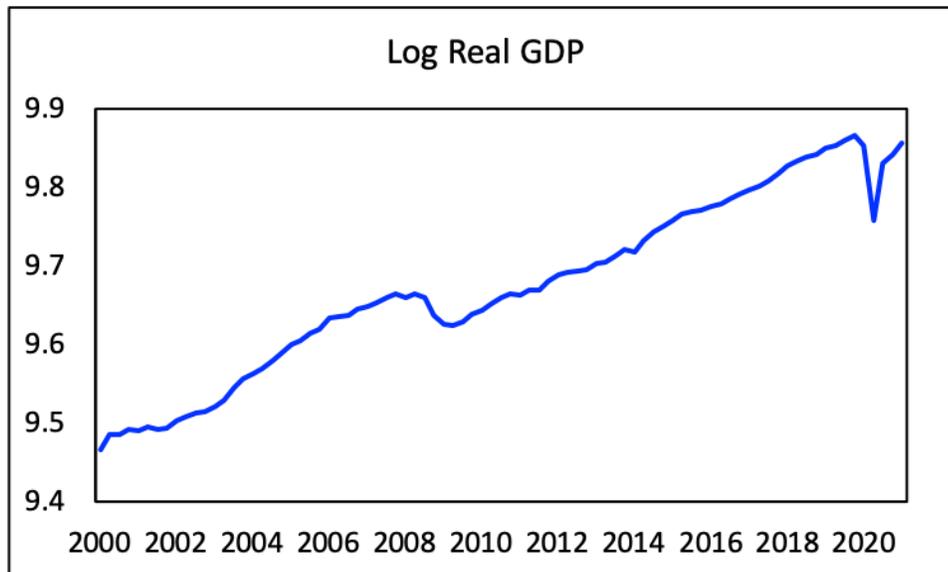


Figure 1. Real Income. GDP data are quarterly, 2000Q1-2020Q1; disposable income data are monthly, 2000:01-2020:04. Source: Federal Reserve Bank of St. Louis' Federal Reserve Economic Data (FRED) database.

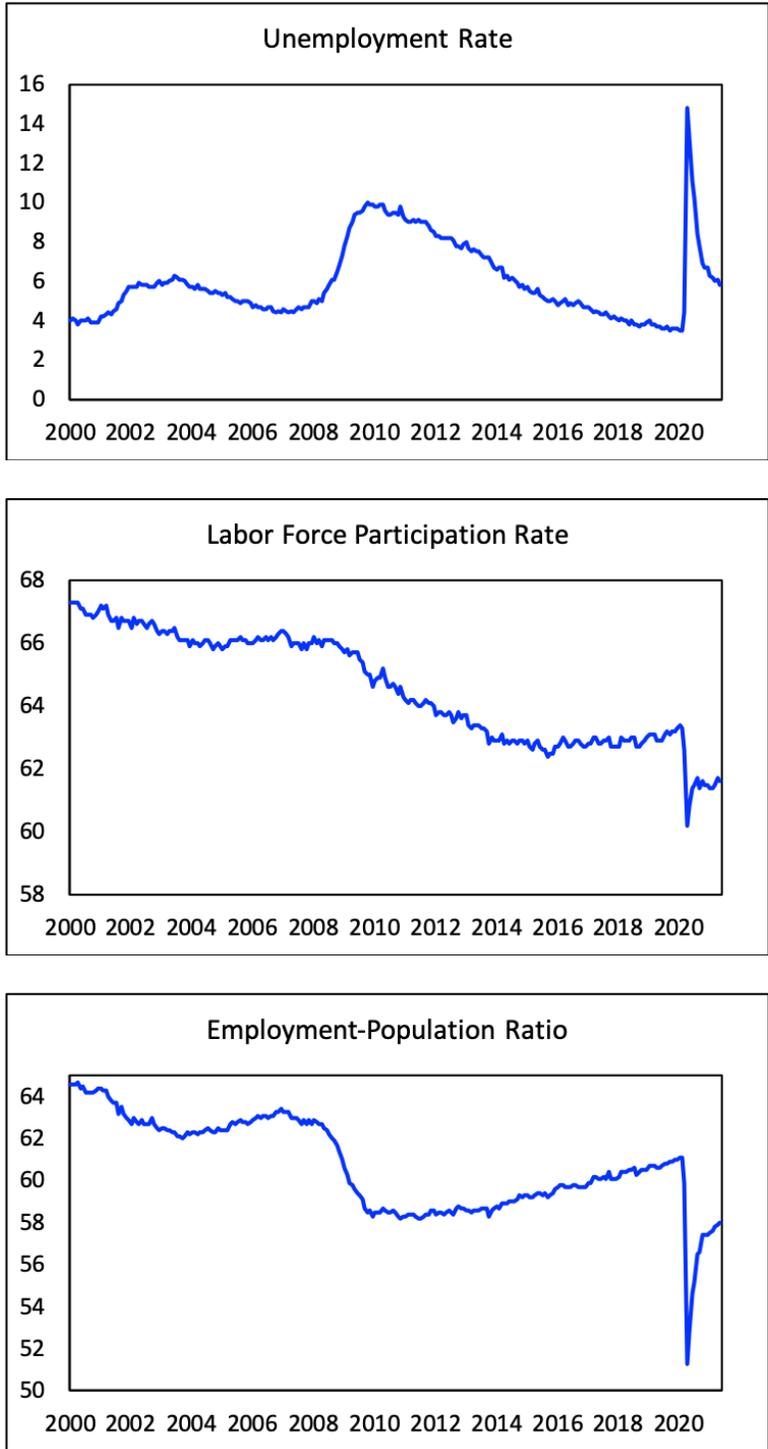


Figure 2. Employment and Unemployment. All data are monthly, 2000:01-2020:05. Source: FRED.

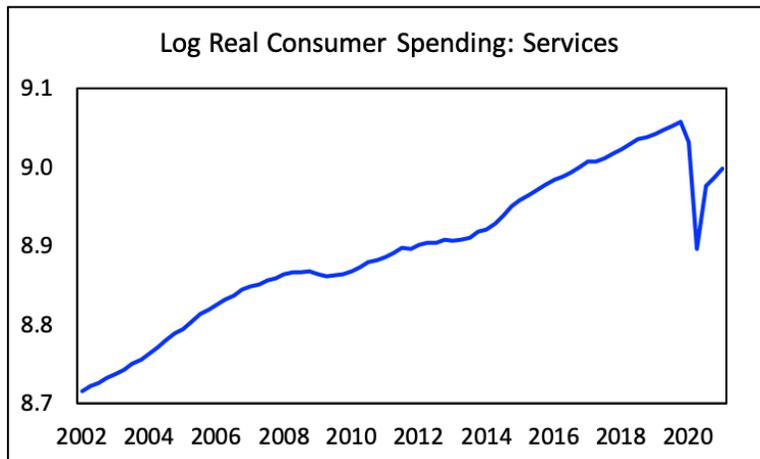
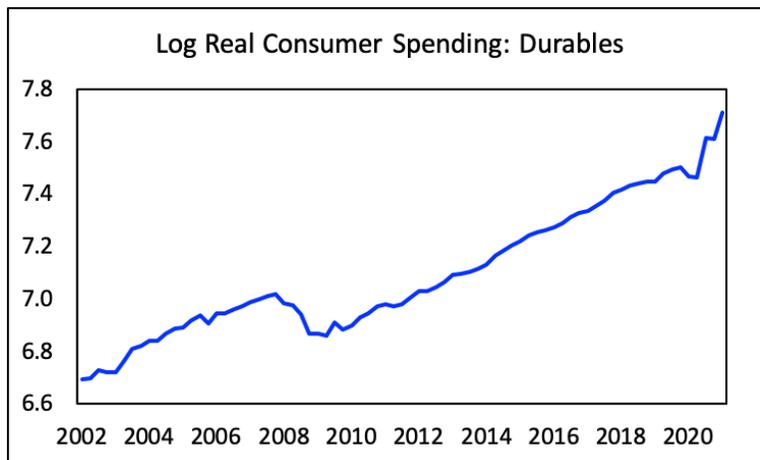
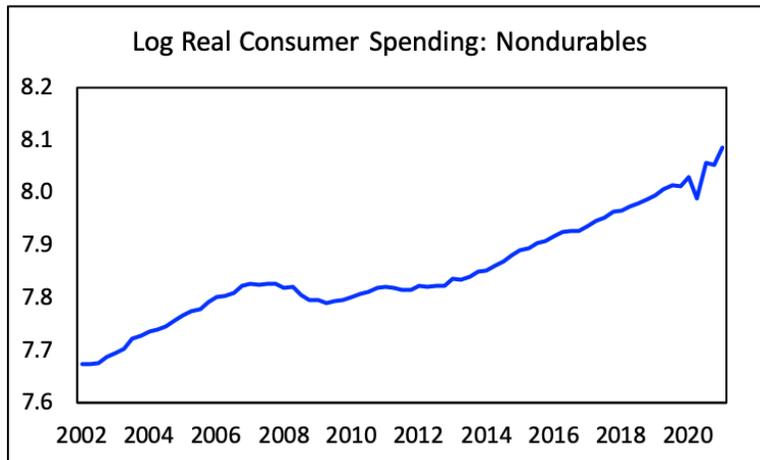


Figure 3. Real Consumer Spending. All data are quarterly, 2002Q1-2020Q1. Source: FRED.

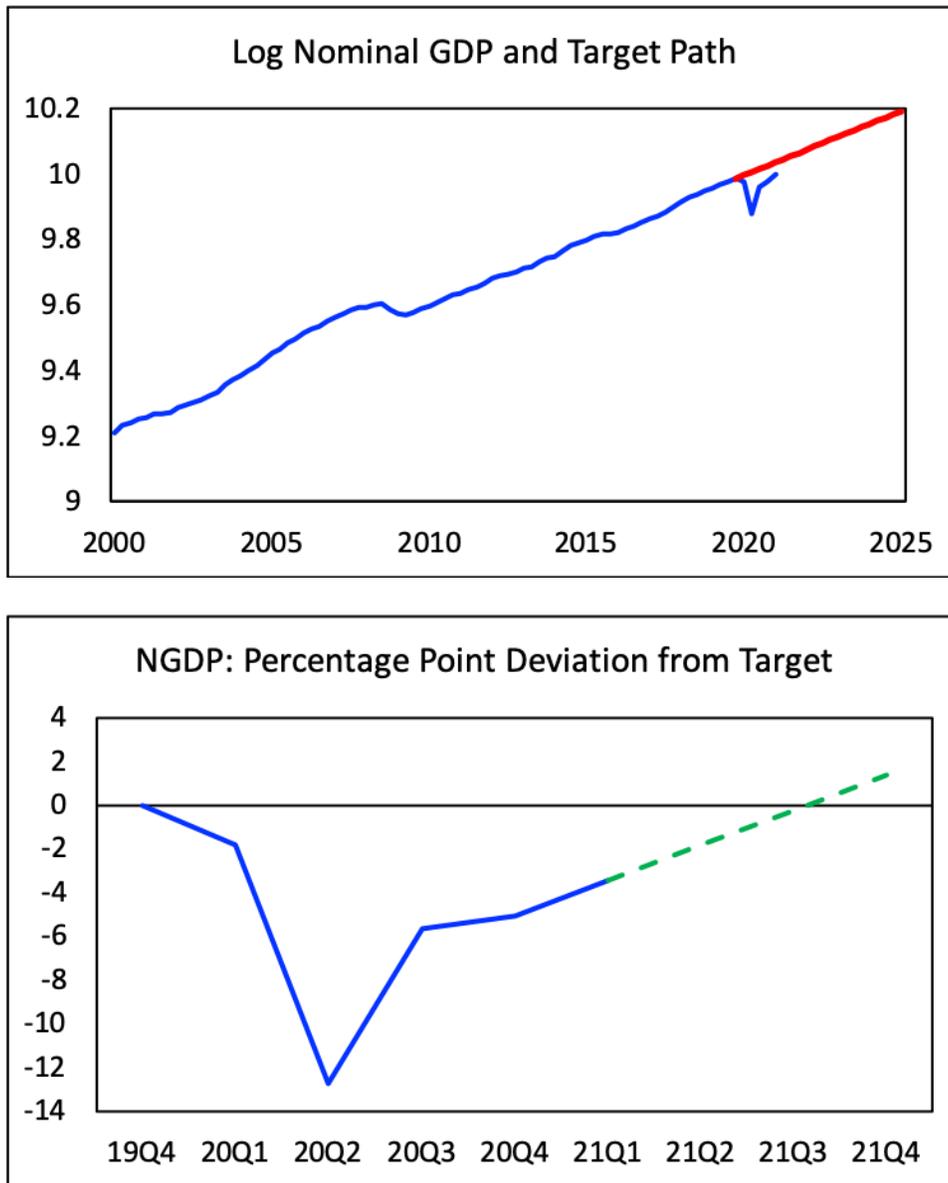


Figure 4. Nominal Income and Target Path. In the top panel, nominal GDP data (blue line) are quarterly, 2000Q1-2020Q1, and the target path (red line) calls for 4 percent annual growth from a base set by the actual level of nominal GDP in 2019Q4. In the bottom panel, the solid blue line shows the percentage-point deviation of nominal GDP from the target path, 2019Q1-2021Q1, and the dashed green line shows how the gap will be closed if nominal GDP continues to grow at an 11 percent annual rate throughout 2021. Data source: FRED.

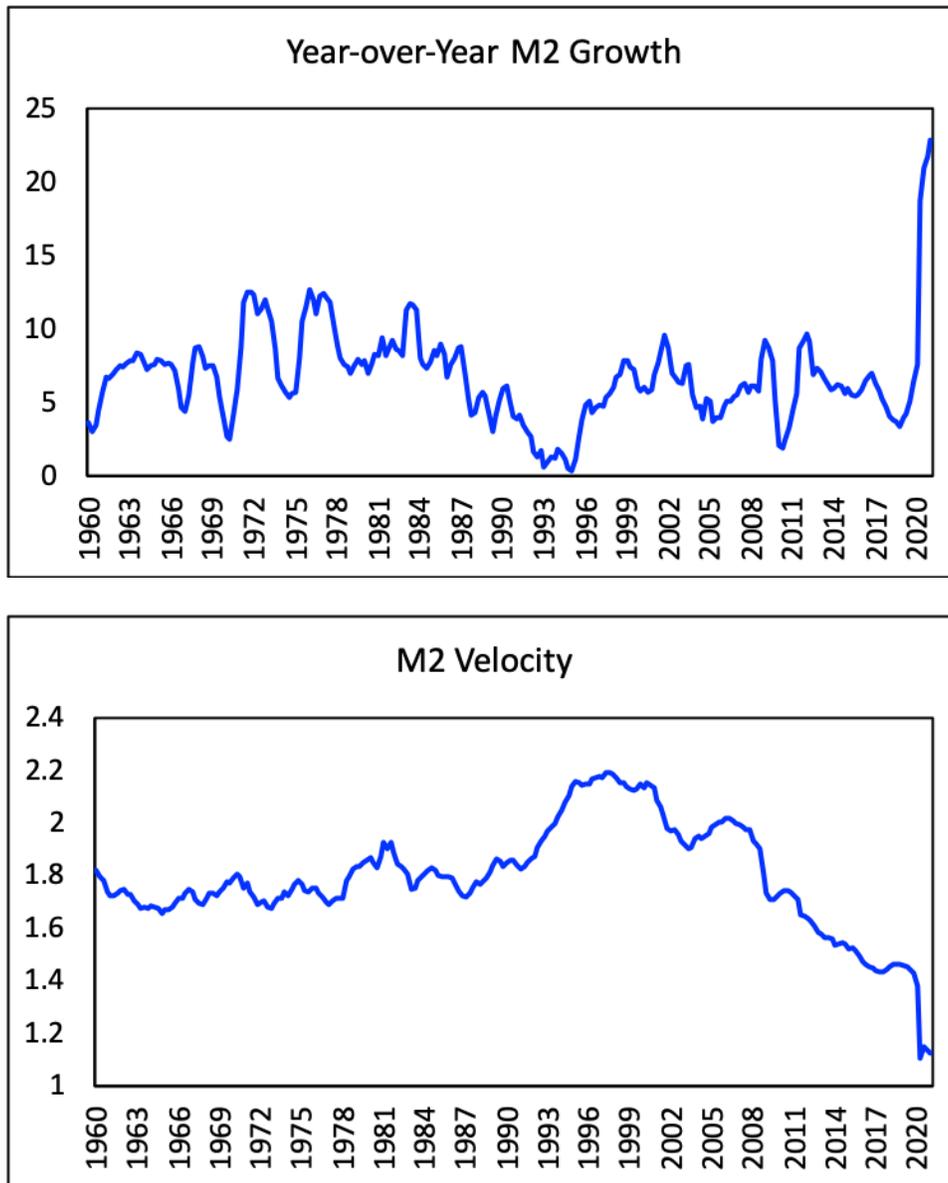


Figure 5. M2 Growth and Velocity. M2 velocity is computed by dividing the M2 money stock by nominal GDP. All data are quarterly, 1960Q1-2020Q1. Source: FRED.