Secular Demand Stagnation in the 21st Century U.S. Economy

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The concern that an economy could experience persistent, and in some sense unusual, weakness goes back to Keynes's *General Theory* and led Alvin Hansen to coin the term "secular stagnation." In the postwar development of macroeconomics, this perspective was not completely lost, but it became a backwater in the mainstream. This paper argues that it was a mistake to dismiss secular demand stagnation as a potentially important problem in modern developed economies. We argue that the theoretical case for possible secular stagnation remains strong and empirical evidence that it has affected the U.S. economy in the aftermath of the Great Recession is convincing.

After a brief discussion of the definition of secular stagnation, we present a few broad facts supporting the claim that the U.S. economy has experienced stagnant growth in recent years. The headline statistics come from real GDP. We compare peak-to-peak performance of output over the past few decades, adjusted for population, to demonstrate weak growth since 2000, and exceptional stagnation since 2007. We also provide supporting evidence from labor-force participation, capacity utilization, and the evolution of official forecasts of potential output. The basic argument is that the U.S. economy remains well below the trend it followed prior to the 2008-09 crisis.

This conclusion is uncontroversial, the bigger question is why such a shortfall occurred. This paper seeks to address whether recent observed stagnation is due to changing conditions of supply or demand. The theoretical case for looking first to supply to explain secular weakness is conventional. According to mainstream macroeconomics, problems of inadequate demand should be confined to the short run. Stagnation extending well beyond five years, according to this perspective, should arise from slower growth of inputs to production, a deceleration in the rate of technical change, or an unfavorable shift in the institutional structure that affects either inputs or technology. This theoretical framework leads many analysts to declare that, despite the clear evidence of disappointing macroeconomic trends since 2007, the U.S. economy must nonetheless be operating at or near its potential output level by late 2017.

While it is conventional to associate persistent stagnation with the supply side, alternative theoretical perspectives imply that the dynamics of aggregate demand can be a fundamental and independent determinant of the path of the economy "beyond the short run." One widely discussed reason is that monetary policy is the key mechanism that eliminates output gaps created by weak aggregate demand, and in the face of a large shortfall in demand the effectiveness of monetary policy is constrained by the zero lower bound on nominal interest rates. We also survey the results of heterodox Keynesian

macroeconomic models according to which aggregate demand leads growth over horizons extending beyond the typical short run of textbook macroeconomics. These models imply that secular stagnation can arise from persistent weakness in demand.

The primary empirical contribution of this paper is to assess supply and demand factors that could explain slow U.S. economic growth in recent years. The supply-side story relies on a combination of demographic and technological explanations (including some kind of technology shock, retirement of the baby boomers, or skill mismatch problems in labor markets). We show that there is little support for direct supply-side explanations for secular stagnation. Furthermore, low inflation and historically low real interest rates point to stagnant demand rather than supply shocks as the primary explanation. Indeed, we find ample direct evidence of weak demand. The biggest effect comes from a deep drop and slow recovery of household demand following the crisis. We analyze data on the actual cash spending of the household sector generated with methods we developed in Cynamon and Fazzari (2015a) and show the trend of real household demand is more than 10 percent below its pre-crisis trend through 2016, and the recovery of household demand is dramatically behind the path followed in earlier cycles. We connect weakness in household demand with the unsustainable trend of household consumption leading up to the crisis using new evidence from a micro-data study of household finance, the dramatic bursting of the household debt bubble, and rising income inequality. Government spending has also stagnated significantly since 2010. Business investment is approximately normal relative to historical patterns, given the rather slow output growth of the past several years. Net exports jumped up considerably in the crisis, mitigating some of the decline in household demand. But trade improvements have not been large enough to overcome stagnant demand growth from the household and government sectors.

The empirical case for demand-led secular stagnation cannot be settled from a single time series or regression coefficient. Rather the case rests on a historical analysis of multiple categories of evidence. This spectrum of evidence is gathered here and leads, in our view, to a clear conclusion that the U.S. has experiences secular stagnation from sluggish demand growth in the nearly 10 years following the biggest financial crisis since the first years of the Great Depression. The concluding section of the paper considers some of the implications of this finding for understanding current economic data and for developing effective macroeconomic policy.

What is Secular Stagnation?

The term “secular stagnation” often carries a rather specific economic meaning that extends beyond the two words themselves. In recent years the term usually refers to the presence of slack resources due to insufficient demand and the failure of endogenous mechanisms (including rule-based monetary policy) to close a non-trivial output gap in a reasonably short period of time. For our purposes, however, we initially take a step back

from this rather loaded meaning to define the term more literally in terms of its two constituent words, both of which deserve brief discussion.

"Stagnation" implies sluggishness of economic activity, but that definition immediately raises the question of sluggishness relative to what benchmark? It would be typical in macroeconomic modeling to think of the benchmark as some measure of full employment of labor, full utilization of capital, or an estimate of potential output. But while these concepts may have a clear meaning within a model, they are not directly observable empirically. For our purposes, therefore, we define stagnation relative to historical benchmarks. The economy faces stagnation when it does not perform as well as it had in previous periods. In some cases, trends or growth rates define the benchmark, real per capita GDP growth, for example. In other cases, the level of a ratio, labor force participation for example, could signal stagnation.

"Secular" implies persistence. If one takes the term literally, it implies *a lot* of persistence. The closest definition from dictionary.com of secular in the economic context is "going on from age to age; continuing through long ages." The idea of an "age" carries the implication of multiple decades. But in the economic context the meaning seems to relate more to the typical textbook "short run" versus "long run" context. In particular, the "short run" is a time when wages and prices do not fully adjust to their equilibrium values. While there is little clear, practical definition of how long such adjustment should take, the suggestion of years of textbook treatment give the sense that the relevant time horizon for the "short run" runs from a few quarters to a few years.[1] Thus we define secular in this context to mean beyond the textbook short run, which, despite the ambiguities, almost certainly implies that stagnation persisting beyond four or five years is secular.

Note that this definition of secular stagnation is largely atheoretical and, by itself, does not carry any specific policy implications. Stagnation defined in this way may arise from the supply side, the demand side or some combination of both.

The Case for Secular Stagnation in the Post-Crisis U.S. Economy

With this definition of secular stagnation we now make the case that the U.S. economy since the 2008-09 financial crisis and Great Recession has experienced secular stagnation.

To put recent growth into historical context one must account consistently for both cyclical and population effects. It can be misleading to judge an economy's

[1] A prominent example comes from N.G. Mankiw's popular textbook. In its eighth edition, part XII is entitled "Short-Run Economic Fluctuations," but there is almost no discussion of the time horizon for the "short run." There is an implicit suggestion that the short run is similar to the duration of recessions (a few quarters). On page 716, Mankiw writes "in the short run, the price level does affect the economy's output … over a year or two."

performance by looking at how much it grows from a deep trough, or how little it grows over a period that includes a recession. Because we are interested in longer run dynamics, we need to eliminate temporary cyclical effects. We use peak-to-peak comparisons over business cycles. It is not entirely obvious that peak levels of macro variables are completely free of cyclical components. But they represent actual macroeconomic conditions about as good as they actually get. In addition, to obtain consistent historical comparisons, we need to account for changes in population dynamics over the past 40 years, so we compare growth on a per capita basis (using total population aged 16 and over).

Table 1 presents peak-to-peak annualized growth of real GDP per capita over the five most recent U.S. business cycles. (The very brief 1980-81 cycle is combined with the following cycle.) The current cycle is, of course, incomplete.

Table 1
Peak-to-Peak Growth Statistics for Real GDP Per Capita*

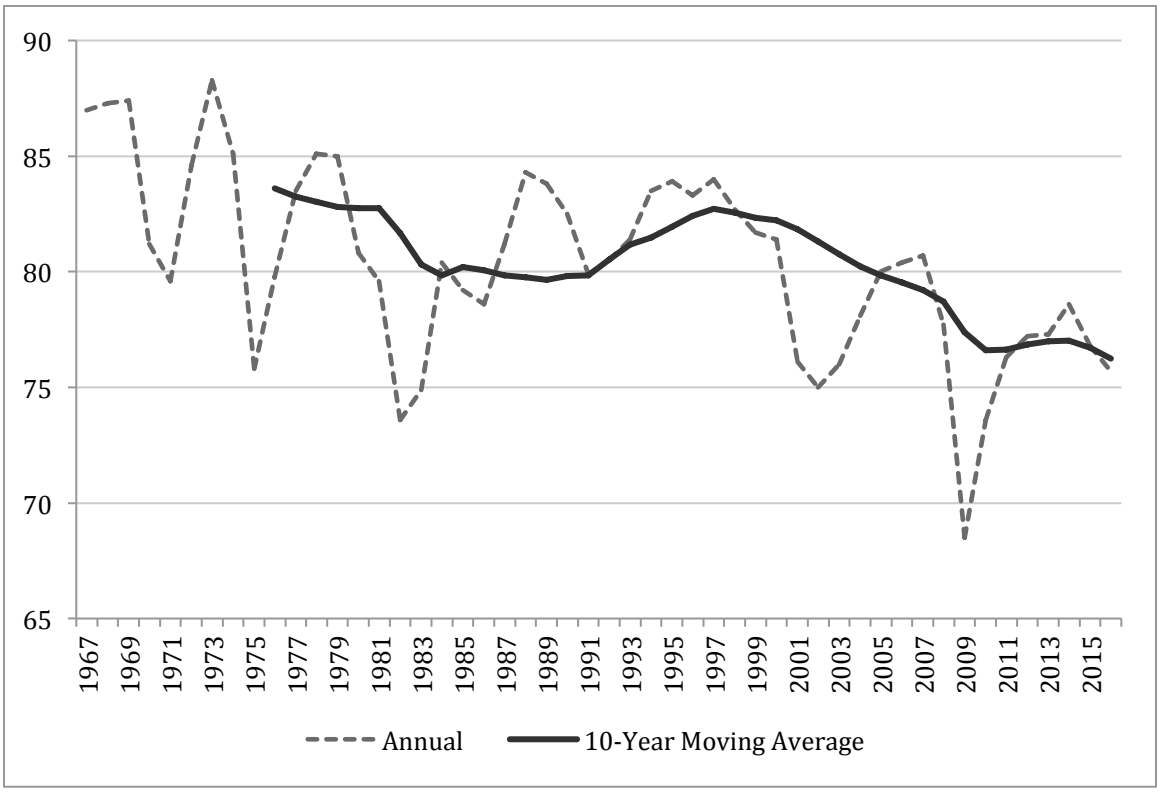
Peak Dates	Total Growth	Annualized Growth per Year
1973:4 to 1979:3	11.9%	1.8%
1979:3 to 1990:2	25.0%	2.1%
1990:2 to 2000:2	24.2%	2.2%
2000:4 to 2007:4	10.9%	1.4%
2007:4 to 2017:2*	**5.8%**	**0.6%**

* Peak yet to be reached for current cycle

The decline in annualized per capita growth in the most recent two cycles is striking. Of course, the current cycle has yet to reach its peak. But even strong growth for several years would keep the current recovery the weakest in more than a half century. For example, even if real per capita growth accelerated to an average of 2.5 percent per year for the *next six years*, the annualized growth figure for the current recovery would remain below the rather poor showing of the early 2000s. According to the definition in the previous section, this is secular stagnation: persistent performance that falls short of historical norms.

The Federal Reserve's industrial capacity utilization measure covers a rather small share of the economy (manufacturing, mining and utilities), but it tells a similar story.

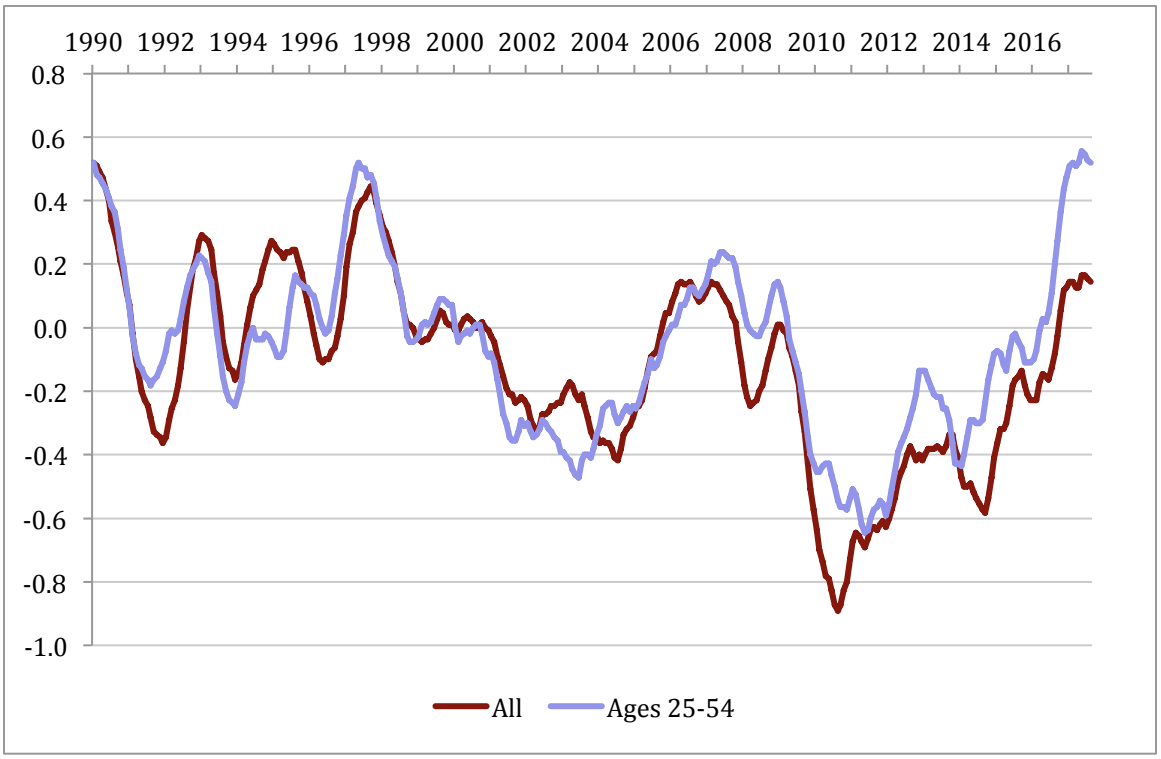
Figure 1
Total Industry Capacity Utilization



The annual data are highly cyclical, but the long-term moving average shows a clear downward trend since the late 1990s.

Current labor market statistics may seem to refute the idea that stagnation continues in the U.S. Most arguments that the economy, by 2017, has returned to more or less full employment refer to the admittedly low headline unemployment rate. It is also well known, however, that labor force participation has dropped significantly. The chart below provides some perspective on participation. The chart graphs the (smoothed) year-over-year change in the overall labor force participation rate as well as the year-over-year change for adults aged 25 to 54, a series that eliminates the effect of the aging baby boom generation. The figure begins with 1990 to exclude the earlier period of rising female labor force participation.

Figure 2
Annual Percentage Point Change in Labor Force Participation Rates

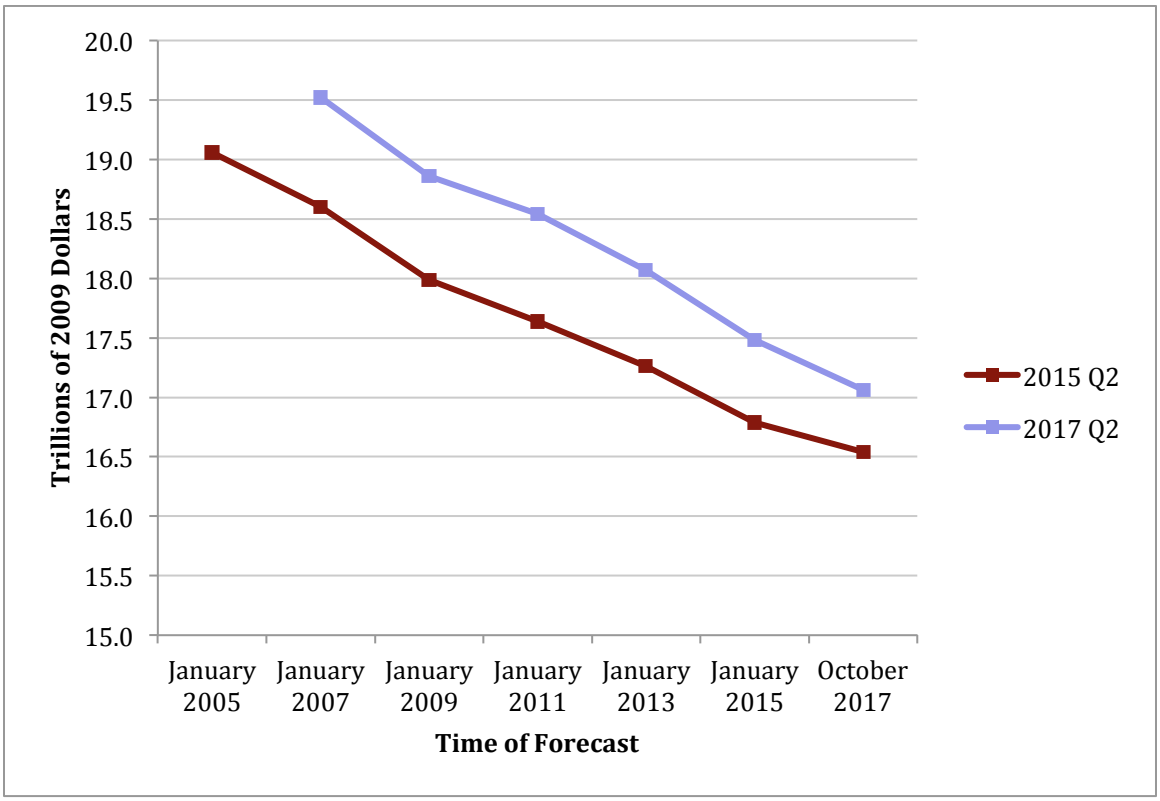


Difference in the monthly participation rate over one year in percentage points. To reduce volatility, a twelve-month moving average is computed after differencing.

It is clear that growth in labor force participation in the past few quarters still has not come close to making up for the declines since 2008, including for the "prime age" group (compare the area in the figure below and above zero for each part of the cycle). In addition, it is also clear from this chart that the brief period of growth in 2006 and 2007 did not make up for losses in participation during the sluggish period from 2000 to 2006. the first years of the century. When the Great Recession hit, labor force participation started from a somewhat low level, making the weakness since crisis more significant.

A particularly interesting indicator of stagnation, noted by Summers (2014) is the evolution of potential output estimates from the Congressional Budget Office (CBO). For fiscal planning purposes, the CBO projects potential output ten years forward. Figure 3 shows the evolution of these forecasts. The lower line shows how the projection for the second quarter of 2015 evolved over 12 years from early 2005 to the most recent estimate from October 2017. The upper line shows the evolution of CBO potential output forecast for the second quarter of 2017 from early 2007 to 2017.

Figure 3
Evolution of CBO Projections of US Potential Output for Two Recent Quarters



Figures in real 2009 dollars. The data were obtained from the St. Louis Federal Reserve ALFRED resource for vintage macroeconomic data. To account for both changes in the base year for the price deflator and changes in the definition of GDP, the values for the fourth quarter of 2004 were adjusted to match the October, 2017 projections and then forecasted growth rates from that point forward were used from each vintage of data to estimate what the forecast would have been using concepts consistent with the October, 2017 estimates.

These figures have stunning implications. The CBO current estimate of potential output in 2017 is 12.6 percent below (about $2.8 trillion in 2017 dollars) the forecast from ten years ago. But presumably the CBO was fully aware of the aging of the labor force when making its past forecasts.[2]

How to Explain Secular Stagnation?

These results show that the US has experienced exceptional stagnation relative to both historical experience and expectations for potential growth established in earlier years. The stagnation extends for (at least) the past ten years, clearly consistent with the

[2] In an interesting and detailed study, Coibion et al. (2017) use different methods to estimate changes in potential output forecasts from 2007 to 2017. They find a striking 20 percent drop in the estimate of potential output over that horizon. In addition, they identify a large 10 percent gap between the most recent estimate of potential output and actual output. These figures imply a huge reduction in the economy's growth path from reasonable projections made prior to the crisis.

definition of secular presented earlier. Something important has happened; the key question is why. In this section, we summarize explanations for secular stagnation through alternative supply-side and demand-side theoretical perspectives.

Secular Stagnation and Supply-Side Theory

Virtually every conventionally educated macroeconomist in the early 21st century has been taught that the explanation for the kind of aggregate stagnation demonstrated in the previous section, that is, stagnation that persists beyond a few years, must come from the supply side. The dominant interpretation of Keynesian macroeconomics is that stagnant aggregate demand is caused by some kind of nominal stickiness in wages or prices; once nominal variables adjust the supply side rules once again. In the "New Keynesian" models of the past couple of decades, active monetary policy replaces nominal adjustment as the key mechanism that offsets nominal rigidities reasonably quickly. How long could it take for wages and prices to adjust? How long could it take for a wise central bank to engineer a monetary offset to the nominal rigidity? Evidence is sketchy, but ten years after a late 2007 peak and approaching nine years since a mid-2009 trough must necessarily seem like enough time has passed to eliminate the supposedly "temporary" effects of even a severe demand "shock."[3]

Through the theoretical lens of this neoclassical synthesis (Keynesian short run and classical long run) the stagnation implied by the evidence presented in the previous section must result from a compromised supply side (see also Storm, 2017, page 4) Explanations include labor skill mismatch, exogenous negative shocks to innovation, higher costs to match savers with borrowers in financial markets, excessively repressive regulation, oppressive current or future taxation, etc. Supply-side enthusiasts in the political sphere sing the well-rehearsed song from the 1980s that all we need do is resurrect Reaganesque tax and regulation policies to cure stagnation.[4] Those in the mainstream who are more realistic and empirically grounded lament, but grudgingly accept, a low-growth economy as far as the eye can see as a new normal, at least until some exogenous event boosts supply-side growth.[5]

The supply-side perspective is logically coherent and deserves empirical attention, which we begin later in this paper. But we note here that these explanations are all *ex post* reasoning. Conventional wisdom did not worry much about supply stagnation in the run up to or even in the immediate aftermath of the Great Recession crisis (the CBO potential output forecasts in figure 3 support this conclusion). When sluggishness first became evident in late 2007 and the first half of 2008, typical expectations were for a mild

[3] An alternative interpretation, of course, is that the zero lower bound on nominal interest rates constrains monetary policy so that persistent stagnation can be explained through by weak demand. We take up this question later in the paper.

[4] For a representative example, see "Finding America's Lost 3% Growth" by Phil Gramm and Michael Solon, *Wall Street Journal,* September 11, 2017, page A17.

[5] Gordon (2015, p. 191), as quoted in Storm (2017) captures this perspective well: "The U.S. is riding on a slow-moving turtle," and "there is little politicians can do about it."

recession at worst, interpreted through the experience of the widely acclaimed Great Moderation.[6] When the economy fell off the cliff in the fall of 2008, panic ensued. But as the "green shoots" of stabilization sprouted in mid 2009, typical forecasts were for growth not just consistent with earlier trends, but substantially *faster* than trend growth that would recover the temporarily lost output of the deep recession. Supply-side explanations for stagnation emerged only *after* it became too empirically salient and too persistent to be dismissed as "short run." The question "Why didn't you see this coming?" is not an entirely fair criticism; much of the progress in science comes from explaining unanticipated phenomena after the fact. The main point here, however, is that the supply-side theoretical lens *requires a supply-side explanation for secular stagnation.*

Demand Side 1: Zero Lower Bound for Nominal Interest Rates

While demand-driven secular stagnation was not much discussed in mainstream macroeconomics until well after the financial crisis and slow growth emerged, the possibility of persistent stagnation due to weak demand was not completely ignored. Along with a new consensus that monetary policy, and not nominal adjustment, was the key mechanism to eliminate demand gaps came the important qualification about the zero lower bound for monetary policy (ZLB). [7] This constraint seemed to be binding for Japan (see Krugman, 1998, for example) and the US actually flirted with the bound in the slow recovery from the 2001 recession (Eggertsson and Woodford, 2003, for example). But ZLB problems did not figure prominently in most practical analysis of the US economy prior to the crisis.

After the crisis things changed dramatically. The ZLB played a starring role in the mainstream resurrection of secular stagnation initiated by Laurence Summers. Paul Krugman referred to the ZLB regularly in his widely read *New York Times* op-ed columns and it was ubiquitous in his blog posts. Academic work followed, represented prominently by DeLong and Summers (2012), Eggertsson and Krugman (2014), and Laubach and Williams (2016). From this perspective, insufficient demand could persistently keep the economy away from potential output if demand were so weak to push the "natural rate of interest" negative, preventing monetary policy from doing its critical job. Considering the magnitude of the demand problems associated with Great Recession, particularly the required deleveraging of the household sector, the post-crisis years fit this narrative.

As Krugman's blog regularly mentioned, these were not "normal" times due to the ZLB. One infers that, from the new-consensus-ZLB perspective, a demand-side

[6] Ben Bernanke was not alone in making this kind of statement "Our estimates are that we are slightly growing at the moment [April, 2008], but we think that there's a chance that for the first half [of 2008] as a whole there might be a slight contraction. … Monetary and fiscal policies are in train that should support a return to growth in the second half of [2008] and [2009]" from testimony to the Joint Economic Committee of the U.S. Congress, April 10, 2008.

[7] Some countries experimented with modestly negative nominal interest rates. Short-term interest rates did become slightly negative in a few countries, but it is unlikely that this policy can lower nominal rates much below zero. See Viñals, et al. (2016) for further discussion.

explanation for secular stagnation is also not "normal," but it can happen. That said, this perspective presupposes, at least implicitly, that the economy will return to "normal" at some point, and will more or less stay there most of the time.

With short-term interest rates well above the ZLB in late 2017 and the expectation that they will continue to rise, this point of view suggests that normal times have returned and therefore demand-side secular stagnation is an interesting phenomenon of the recent past, but not a first-order problem moving forward. That said, many discussions of the ZLB and persistent demand constraints on production invoke the possibility of hysteresis (especially DeLong and Summers, 2012, also invoked in Summers, 2014). From this perspective, even though the ZLB problem may be transient, the extended weakness drags the supply side down through lower business investment, labor skill decay, reduced labor-force participation, weaker incentives for innovation, etc. Thus, even after the ZLB problem passes, the supply-driven potential output path remains below what could have been achieved had aggregate demand growth remained higher.

Demand Side 2: Demand-Led Growth Beyond the Short Run

Outside of mainstream neoclassical synthesis or new consensus macroeconomics, a family of heterodox models propose that the "normal" situation is actually one in which aggregate growth is constrained by demand. These models, at least implicitly, reject the macro stabilizing role of nominal wage and price adjustment. They also reject, again often implicitly, that monetary policy can effectively close demand gaps in a relatively short period of time, although the ineffectiveness of the monetary policy channel is more nuanced and deserves further discussion later in this paper. From the point of view of these models, the primary explanation for secular stagnation is secular sluggishness in demand growth relative to historical norms. We briefly survey three broad categories of these models here.

First, what we label the historical model analyzes demand dynamics in the context of specific events through time. There may be some analytic guidance for the kinds of dynamics to investigate, but actual macro results come from historically specific conditions. An example of this approach is Minsky's financial instability hypothesis in his own work (Minsky, 1986, for example). Minsky discusses some systematic characteristics of financial cycles over time, but he analyzes specific historical tendencies and events to understand demand dynamics and their effect on production and employment.

Second, perhaps the most common analytical approach in heterodox research on demand-led growth are grounded in what have come to be known as Kaleckian growth models. Although there are many variants, in the basic model investment is the primary engine of demand dynamics. This approach follows Keynes in that at least part of investment is autonomous (often associated with the concept of "animal spirits."). Income distribution, especially the functional distribution between profits and wages, also plays a central role in the determination of the path of aggregate demand. Different paths

of demand ultimately result in changes in capacity utilization. Changes in autonomous investment or other demand and distribution parameters affect the steady-state growth rate of demand and also the endogenous equilibrium rate of capacity utilization.[8]

Third is a class often called "super-multiplier" models. In contrast to Kaleckian models, investment in these models is determined by firms that target a desired capital-output ratio, including the choice of a capacity utilization rate. This approach harks back to Harrod's (1939) seminal dynamic Keynesian model. The dynamics of demand are, at a basic level, determined by two factors. First, these models posit a dynamic path of autonomous demand. This is demand that does not depend on the state of the economy, including, but not limited to, cyclically independent government spending. Autonomous demand is important to offset the "knife edge" instability of the original Harrod model, as emphasized in Fazzari et al. (2013). Second, a "super-multiplier" term reflects induced demand that is tied to the state of the economy. It incorporates the long-run propensity to consume (possibly including effects of income distribution), endogenous import demand, and the dynamics of endogenous investment (along the lines of the typical investment accelerator effect).[9]

In all of these models, the dynamic path of demand determines output and, therefore, secular stagnation would arise from factors that cause a persistent reduction in the path of demand over time. In the vast majority of this research, little attention is paid to supply-side constraints. Some authors explicitly invoke a developing economy context in which there is a large supply of domestic labor in subsistence agriculture that can be drawn into the market sector to meet any reasonable path of demand. Others, however, incorporate supply explicitly into models of demand-led growth.[10] In a new working paper, Fazzari et al. (2017) explicitly link a super-multiplier model of demand-led growth with hysteresis effects of the demand path that spill over to both the labor supply and labor productivity growth. The model shows a tendency for supply to adjust to the dynamic path of demand. Thus, if demand growth slows persistently, supply is dragged down as well, reducing potential output. The implication is that demand-side secular stagnation may be consistent with small output gaps, as conventionally measured. These models turn the neoclassical synthesis on its head: demand leads supply generating what Summers (2014, page 71) labels "a kind of inverse Say's Law."[11]

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[8] Hein (2014) and Lavoie (2014) provide an extensive surveys of these models.

[9] See Cesaratto et al. (2003) for an insightful discussion and further references. Lavoie (2014, section 6.5.7) provides a useful summary and additional references.

[10] See, in particular, Dutt (2006), Skott (2010), and other work cited by Lavoie (2014, section 6.6.)

[11] Some empirical work is relevant to assessing these models. Girardi and Pariboni (2016) find support for aspects of the super-multiplier model. In an innovative paper, Girardi et al. (2017) find persistent effects of positive autonomous demand shocks on GDP over many years and 34 OECD countries. They also find evidence that demand shocks have persistent effects on supply variables such as the capital stock and labor force participation, with strong (but not necessarily permanent) effects on labor productivity. Strong hysteresis effects of fiscal policy as proposed in DeLong and Summers (2012) are found empirically by Fatas and Summers (2016).

Why Recent Secular Stagnation: Is it Supply or Demand?

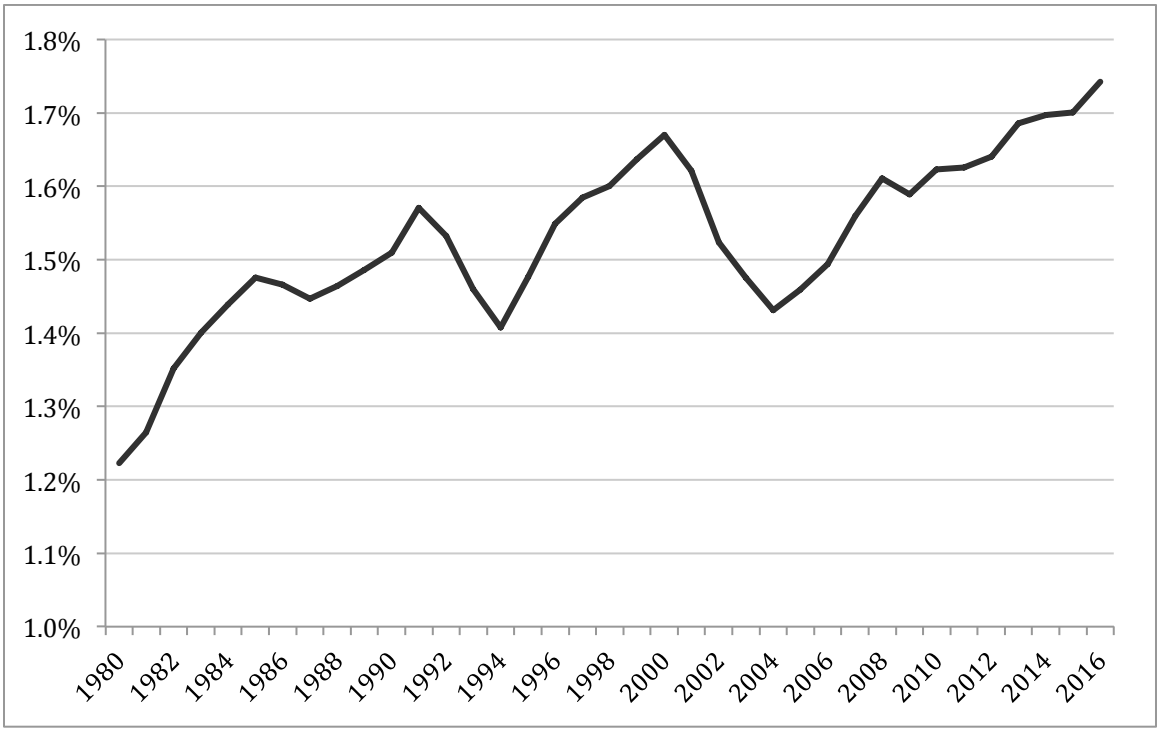
Given that the US economy has experienced significant and persistent stagnation in recent years, to what extent is it explained by supply versus demand? This is a big question that deserves research from a number of perspectives, we provide a start towards an answer in this section.

Supply-Side Channels

Let us first consider direct evidence for the supply-side explanation. An often-mentioned supply-side story for a deceleration in real output growth is the aging of the large baby-boom generation that reduces labor supply growth. No doubt demographic factors are important, but this explanation must confront at least two empirical problems. First, mainstream predictions of the economy's path that were fully informed by demographic reality have been dialed back significantly (see figure 3). Second, why should this demographic effect occur so abruptly around the time of the Great Recession crisis?

A more plausible supply-side story is an unanticipated slowdown in labor productivity growth. Although the data are volatile, there has been a marked decline in the growth rate of real private output per hour in recent years, especially since 2015. As the previous section points out, however, slower growth in labor productivity could be the *result* of a stagnant economy rather than the root cause of stagnation. It is clear from figure 4 that private R&D spending has actually been one of the few bright spots in recent economic performance.

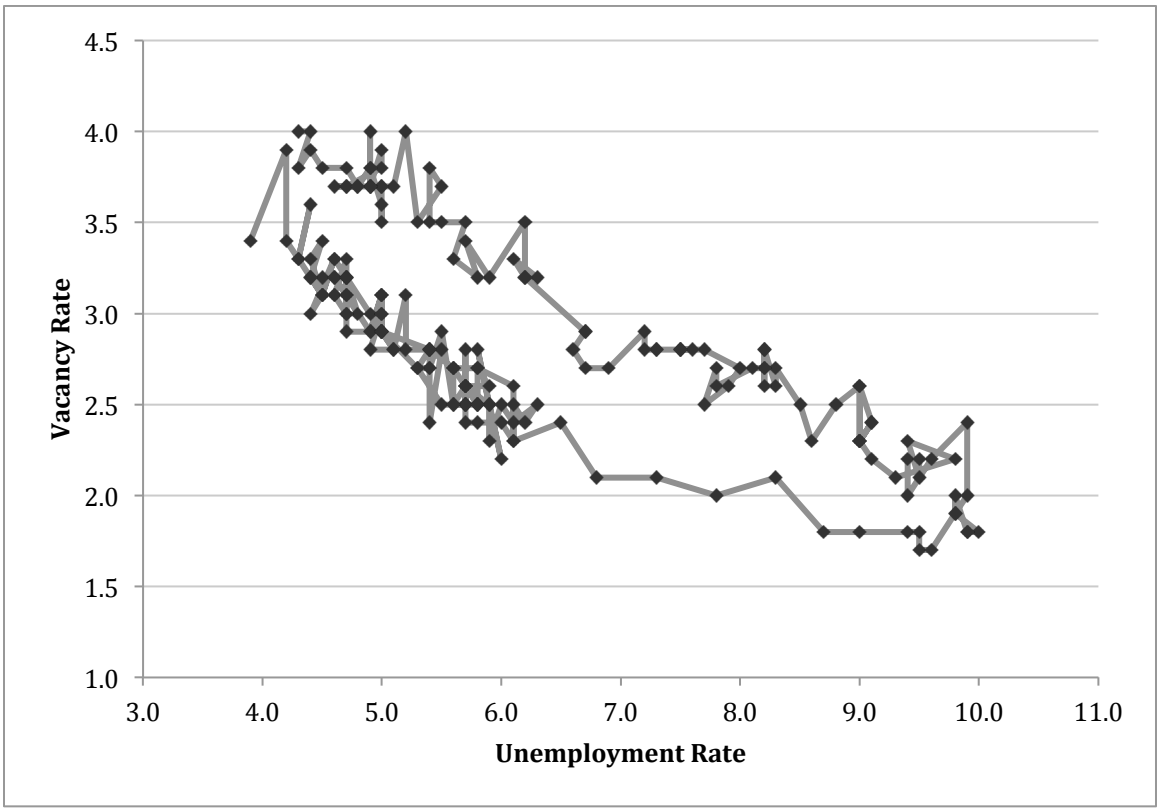
Figure 4
Share of Research & Development (Private) in GDP



In fact, the real weakness in R&D occurred in the aftermath of the bursting of the tech bubble rather than following the Great Recession. There is no evidence of weak innovative activity in the past decade from this widely referenced measure.

Another common supply-side explanation for stagnation is a mismatch between the skills of the labor force and the changing needs of modern business. The correlation between unemployment and job openings (the "Beveridge Curve") does not support this explanation. If mismatch is the problem job openings should go up as the unemployment rate rises, that is, openings and unemployment should be positively correlated. Figure 5 shows that, instead, the unemployment rate and the vacancy rate are very much *negatively* correlated.

Figure 5
The Beveridge Curve (Job Vacancy Rate vs. Unemployment Rate)



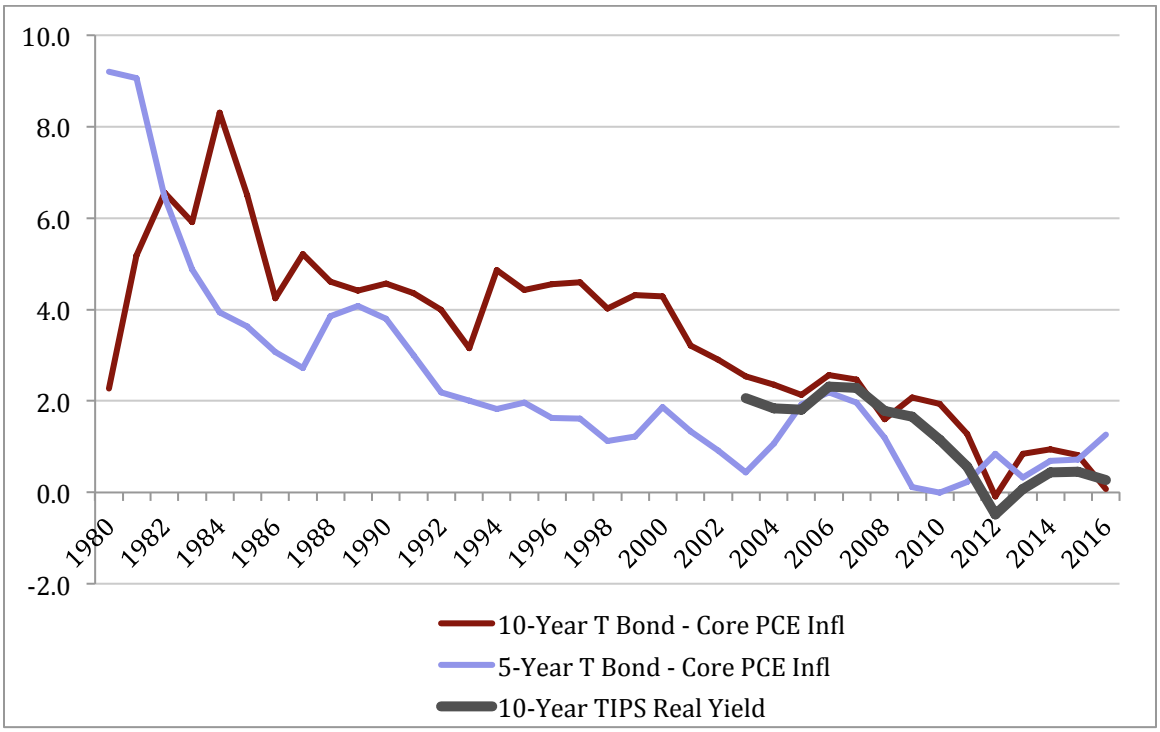
Monthly data beginning in December, 2000

The lower left cluster of points in figure 5 traces the increase and decrease in unemployment during the brief 2001 recession and the subsequent recovery. The vacancy rate declines as the unemployment rate rises and almost exactly traces the same path backwards as the unemployment rate falls in the recovery. Things are somewhat different in the Great Recession and its aftermath. As the unemployment rate rises from 6 percent to 10 percent in 2008 and 2009, the vacancy rate falls further (inconsistent with the mismatch explanation). There is roughly a half point rise in the vacancy rate in early 2010 with unemployment roughly constant. As the unemployment rate declines from the middle of 2010, the vacancy rate rises (again inconsistent with labor market mismatch as the dominant feature). It is interesting that there seems to be a persistent, roughly half point, rise in the vacancy rate from 2010 through 2017, for any rate of unemployment, which might indicate modestly elevated mismatch (although it might also result from employers being more selective about filling vacancies in a weak growth environment). But the overwhelming direction of the evidence is that the unemployment rate and the vacancy rate are negatively correlated inconsistent with the mismatch hypothesis.

Perhaps the simplest way to answer the supply/demand question is to look at key prices. Stagnant supply should raise inflation, other things equal. Of course, this has not happened. Perhaps an even more basic implication of a negative supply shock in a

conventional macroeconomic model is an increase in the real interest rate to choke off excess demand, at least over some horizon.[12] Figure 6 presents three different real interest rate series: the yield on 10-year Treasury bonds less core PCE inflation, the 5-year bond yield less core PCE inflation, and a pure market measure of the real interest rate, the real yield on the 10-year Treasury Inflation Protected Securities (TIPS, which is available since 2003).

Figure 6
Real Interest Rates



There is no indication whatsoever of rising real interest rates in the stagnant era of the past decade. The general downward trend of real interest rates over the past few decades, and the collapse to almost zero in recent years, is consistent with an environment of weak demand.[13] In addition, the fact that *long-term* real interest rates are so low gives every indication that these conditions are expected to persist for years to come.

Evidence of Demand-Led Secular Stagnation

Aside from the decline in labor productivity growth, there is little supporting evidence for supply-side explanations of US secular stagnation. That is not case on the

[12] In the short term, a negative supply shock would likely reduce the demand for capital investment as well as reducing income and saving, leading to ambiguous predictions about real interest rates. But after a number of years, when the capital stock adjusts to equilibrium values, it is likely that a supply shock large enough to explain the kind of economic slowdown documented earlier would lead to higher est rates.
[13] A related explanation for falling interest rates is the "global saving glut," but this explanation has a "weak demand" aspect. High foreign saving in the US implies a large current account deficit that subtracts from domestic demand.

demand side. Much of our recent work has focused on the US household sector. In a pre-crisis article (Cynamon and Fazzari, 2008, updated in Cynamon and Fazzari, 2013a), we raised concerns about the ability of the US economy to maintain trends of consumption and residential construction because they appeared to be financed in part by unsustainable household borrowing.

Figure 7
Household Debt to Disposable Personal Income

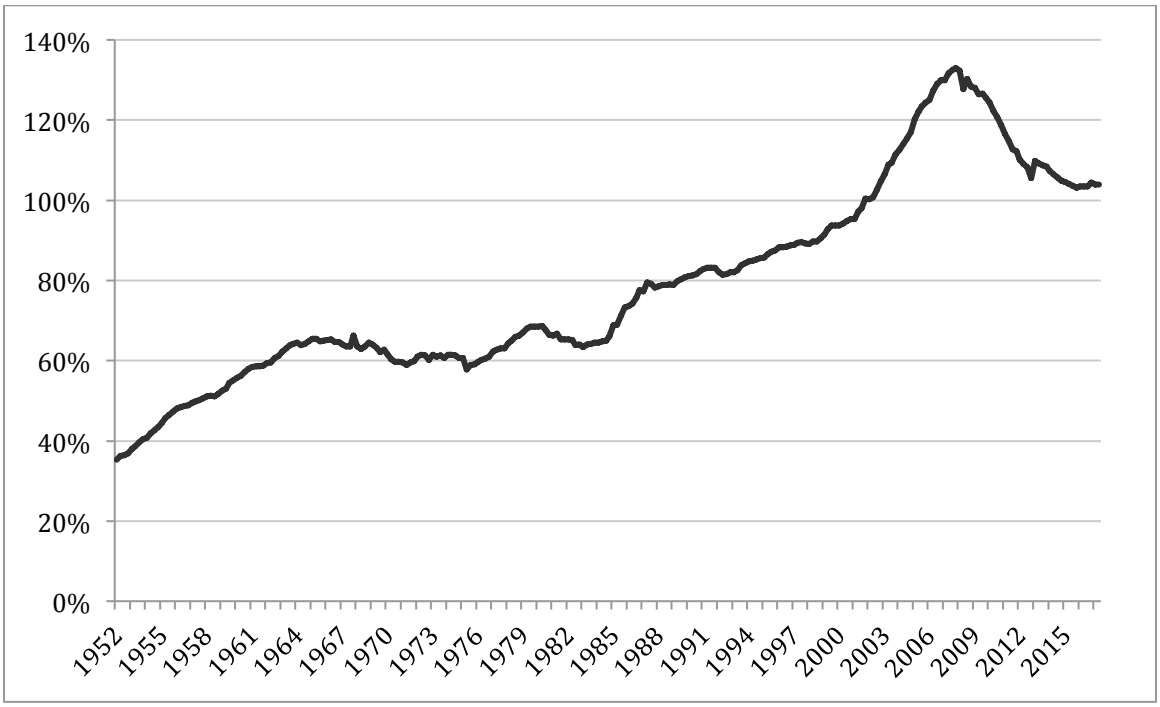


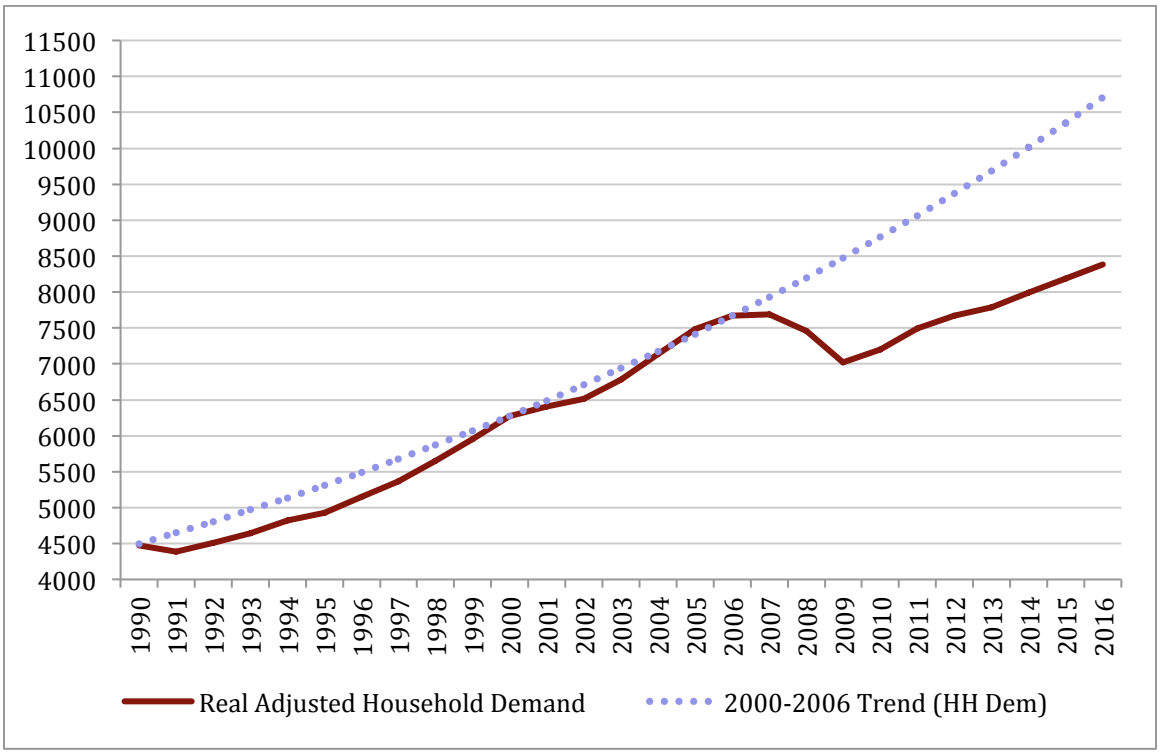
Figure 7 shows that after a period of relative stability from the early 1960s through the early 1980s, the household debt-disposable income ratio began to rise. The increase accelerated in the late 1990s to reach a peak on the eve of the Great Recession more than double early 1960s levels. Deleveraging was rapid in the crisis and its aftermath, although the ratio has stabilized since 2015. Many commentators argue that the rapid growth in household debt prior to the crisis boosted demand growth above sustainable levels, growth that was lost when debt growth collapsed after the crisis.[14]

In Cynamon and Fazzari (2017) we develop a cash flow measure of household demand designed to capture what the household sector actually spends on newly produced goods and service. This measure removes imputed rent on owner-occupied housing, adds in construction of new single-family homes, removes government-financed medical care, and makes many other adjustments to the conventional measure of personal

[14] Mason and Jayadev (2014) present a somewhat different interpretation, arguing that much of the rise in the household debt-income ratio prior to the crisis (and especially prior to the late 1990s) was due to high real interest rates and low inflation rather than high consumption growth. Even with this interpretation, however, the dramatic contraction of debt growth following the crisis likely reduced household demand growth, consistent with evidence we present here.

consumption expenditure. Figure 8 shows the real value of our adjusted household demand series starting in 1990.

Figure 8
Real Adjusted Household Demand (with 2000-2006 Trend)

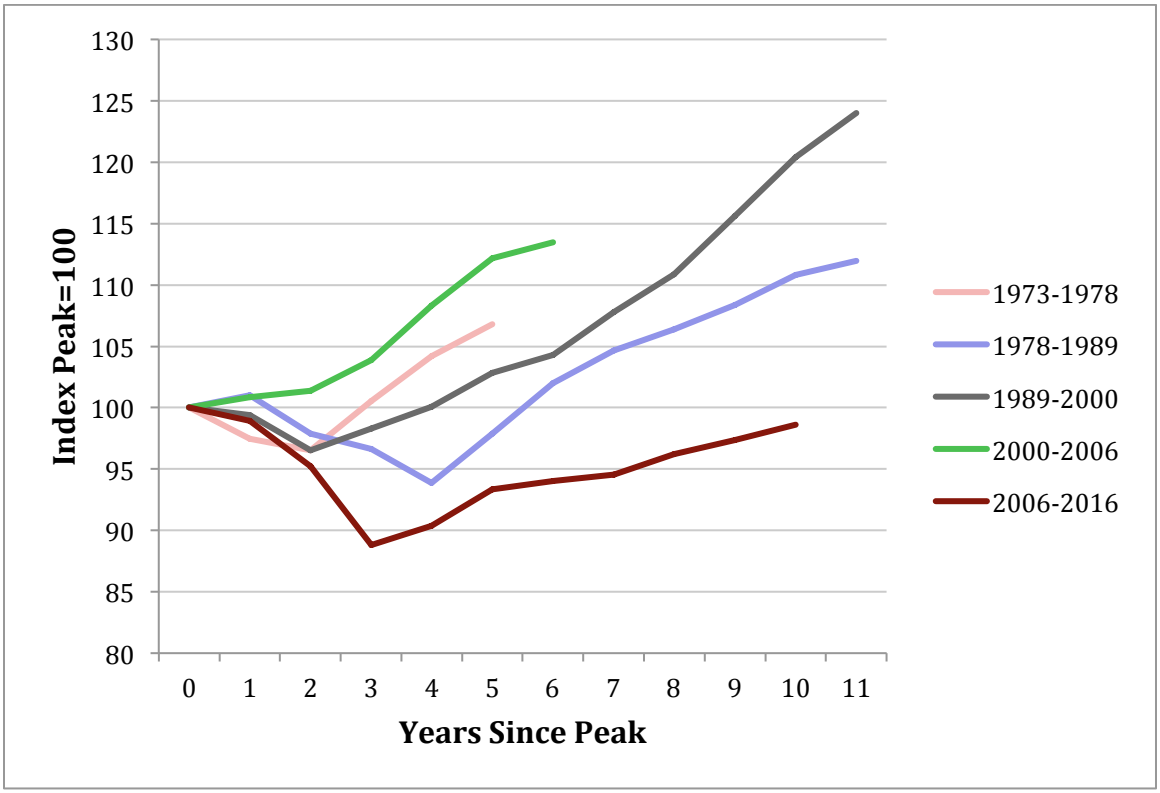


Adjusted household demand measures cash expenditure on newly produced output, including single-family residential construction, by the US household sector estimated with the methods developed in Cynamon and Fazzari (2017) deflated using the personal consumption expenditure chain-weighted price index and updated with annual data through 2016.

The trend line shown in figure 8 plots the simple geometric growth rate of real household demand from the business cycle peak in 2000 to the peak of this series in 2006. Note that this trend also almost exactly replicates the peak-to-peak trend between 1990 and 2000. We do not claim there is anything deeply structural about this trend. Its relevance is that it represents the actual growth in household demand needed to keep the US economy growing fast enough so, at least at cycle peaks, output approximated potential. Note that after both the 1990 and 2001 recessions, household demand sags modestly below the peak-to-peak trend, but then catches up (especially in the boom of the late 1990s). Obviously, the story after 2006 is entirely different. The decline in household demand from 2006 to 2009 is, by far, the largest reduction in the postwar years. More relevant for purposes of this paper, there is no evidence that household demand has regained anything like the trend that was necessary for adequate economic performance prior to the crisis. By 2014, actual demand *was more than 20 percent below the previous trend*. As time goes on, the past trend becomes less and less relevant as a realistic benchmark for where the economy could go. But it is clear that the past 10 years are unusual.

Figure 9 leads to a similar conclusion in a more historical context. The figure plots real household demand profiles indexed to 100 at cycle peaks going back to 1973. The profiles are calculated on a per capita basis to adjust for different rates of population growth over the past four decades.

Figure 9
Real Per Capita Adjusted Demand Profiles for Recent Business Cycles



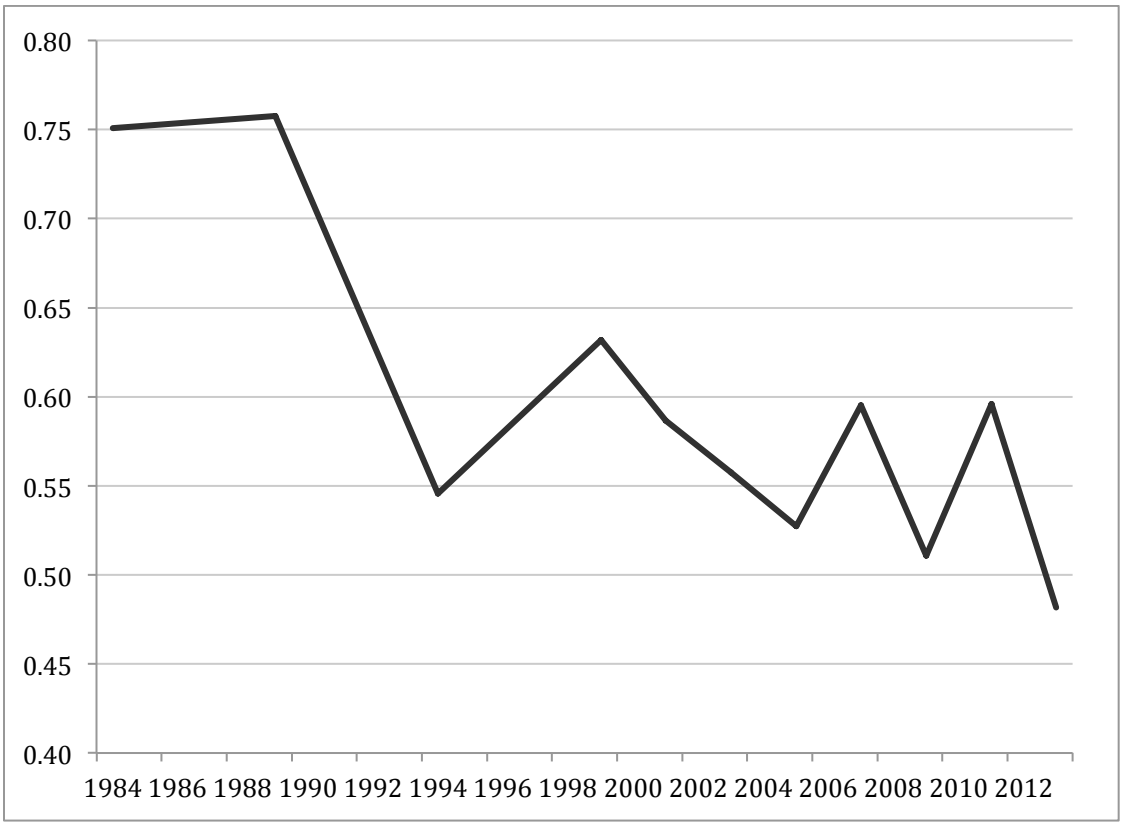
Data based on methods from Cynamon and Fazzari (2017). The population measure used for per capita computations is the civilian non-institutional population aged 16 and above.

Both the historic drop and stagnant recovery of household demand are evident in the figure. For example, compare the profile in the recent cycle at year 6 to the final year 6 value for the 2000-2006 cycle: the recent profile is more than 17 percent behind the recovery through 2006. We interpret these figures as consistent with secular stagnation created in large part by weak household demand growth.

New research we are pursuing provides a different angle on the stagnation of household demand growth. With Daniel Cooper of the Federal Reserve Bank of Boston we are studying the financial sustainability of US households using microeconomic data from the Panel Study of Income Dynamics (PSID). The details of this research are complex, but the concept is simple. We ask if a household's current household financial resources are adequate to allow it to continue to consume at current levels in real terms

through the remainder of the household's expected lifetimes.[15] Figure 10 shows the estimated share of sustainable households according to this definition.

Figure 10
Share of US Households with Sustainable Consumption



Authors' calculations from PSID data. The definition of a sustainable household is discussed in the text.

In the mid 1980s, we estimate that three quarters of American households were consuming at sustainable levels. The sustainable share drops significantly over the next 30 years, reaching a level slightly below 50 percent for our most recent observation in 2013. An important cause of this drop is that, while the definition of sustainability assumes that households will consume at a constant real level going forward, most households in our sample increased their real consumption over time (median annualized real consumption growth was 1.8 percent).

How is this evidence relevant to the question of secular demand stagnation? If households were consuming unsustainably, "beyond their means," for decades something must change. The evidence in figures 8 and 9 shows that aggregate consumption growth

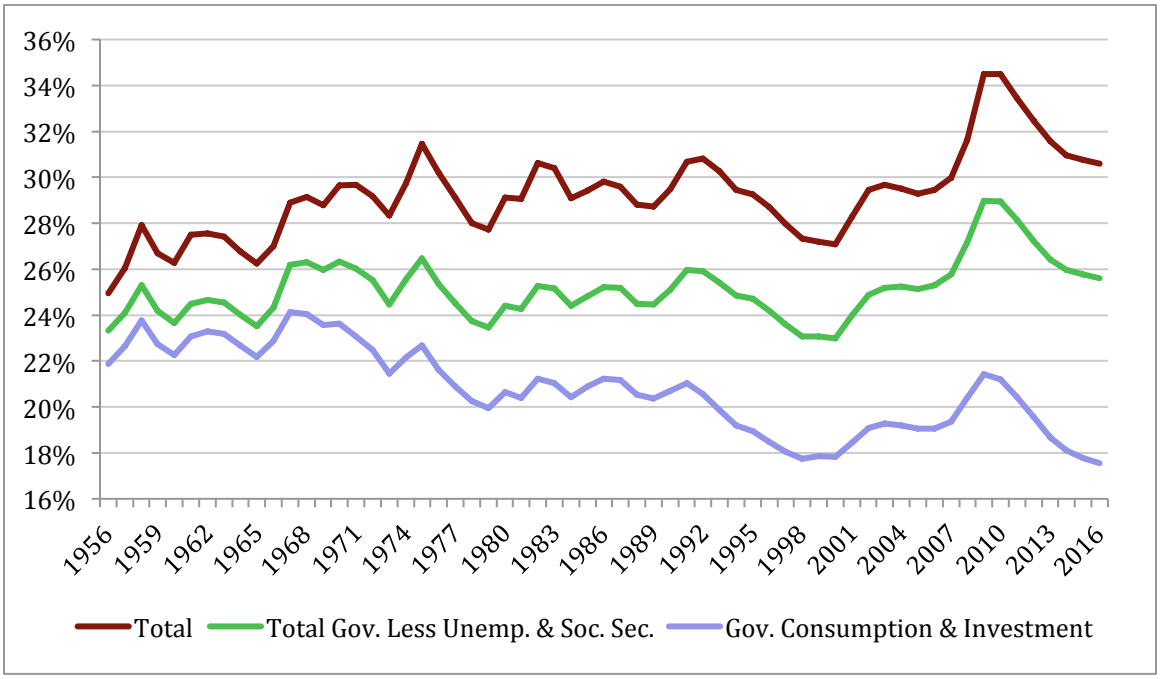
[15] This research is based on consumption measures from the PSID developed in Cooper (2010). We estimate future wage and salary growth by age and education groups. We assume retirement consumption will be 90 percent of working-age consumption in real terms. The calculations include detailed estimates of household Social Security benefits. The data are at low frequency (every five years from 1984 to 1999 and every two years from 1999 through 2013) due to the structure of the PSID surveys Further details are available from the authors.

did indeed drop. In the PSID micro data, there is also a drop in consumption growth in the middle 2000s. The increased share of unsustainable households raises the likelihood of aggregate demand growth stagnation. Also note that even though actual real consumption growth slowed significantly in the PSID sample, the sustainability ratio has not improved. This evidence suggests sluggish consumption growth will continue in coming years.

The exploration of consumption growth in the previous paragraphs links to the theoretical idea discussed earlier about the importance of "autonomous" demand, that is, demand that is not induced by the overall state of the economy. Most of consumption would not be autonomous in this sense, especially over the long run, because consumption must ultimately be financed by income (or the draw down of wealth accumulated from past income flows). But, especially if consumption is debt financed, part of it may be effectively autonomous, possibly for years. The combined evidence above suggests that there was autonomous consumption growth for perhaps as much as two decades prior to the Great Recession. Much, perhaps most, of this growth may have ultimately been unsustainable, but it likely provided an important part of the economy's demand engine for an extended period. The problem is that with the end of the consumer borrowing bubble and post-crisis deleveraging, this autonomous consumption growth has ended, contributing in a significant way to demand-driven secular stagnation.

If autonomous consumption growth slowed (or reversed) after the crisis, has another component of autonomous consumption come to the rescue? An obvious candidate is government spending, through both direct government purchases of final output and transfer payments that finance demand. Again, basic data offers insights. Figure 11 shows three measures of the share of government in the economy. If the share is growing, the variable is raising overall demand growth while a declining share contributes to demand stagnation. The data include federal, state, and local expenditure.

Figure 11
Measures of Government Spending as a Share of GDP



The strongest positive trend in figure 11 is the share of total government. This series is on a positive trend through the 1960s and was roughly stable in the 1970s and 1980s (although the composition of this spending changed somewhat). Total government spending was slowing demand growth (negative trend in figure 11) in the 1990s before rising in the early 2000s and hitting record highs with the "Obama stimulus" in 2009 and 2010. Government, for several years, replaced some of the demand lost from the household sector. But the falling government share since 2010 indicates that government is slowing overall demand growth, and therefore magnifying the post-crisis stagnation of demand.

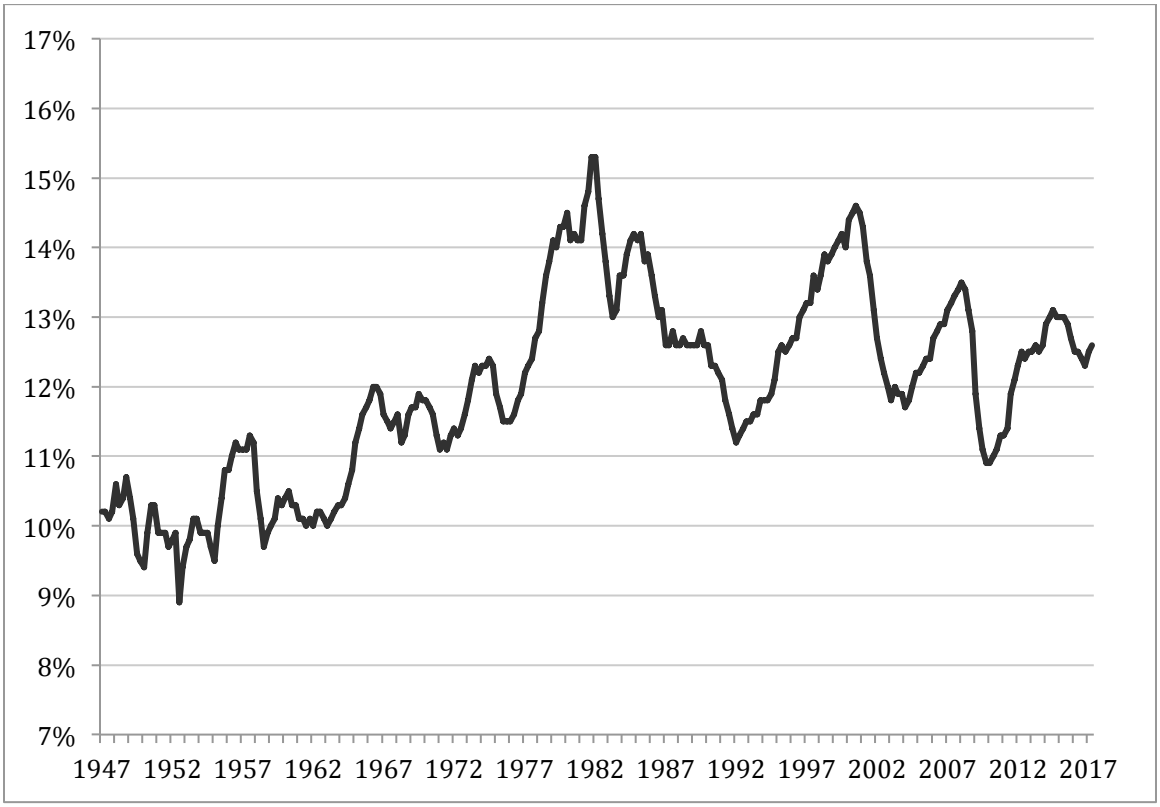
The middle line in figure 11 is designed to focus more precisely on the autonomous and independent part of government spending and its effect on demand. This measure excludes unemployment compensation which is clearly related to the state of the economy. The bigger effect comes from removing Social Security. Undoubtedly, Social Security has been rising as a share of the economy and it is critical in supporting demand for many, probably most, of its recipients. But spending financed with Social Security payments is part of the household demand data we present in earlier figures. Therefore, including it as part of government spending would be double counting to some extent. Another way to appreciate this point is to recognize that if we count rising Social Security as part of government demand stimulus we should exclude household demand financed by Social Security payments from private household demand, which would make the earlier problems identified with stagnant household spending even worse. With this alternative measure (the middle line in figure 11), the trend in the share of

government spending appears approximately flat over decades. Note that this measure still includes large and quickly rising transfers for government-financed medical care, but those expenditures are largely offset by declines in other areas. The positive bump in the Great Recession is still significant, but so is the rapid decline since 2010.

The bottom line in figure 11 excludes all transfer payments and measures the direct effect of government purchases on final demand. This measure is on a clear downward trend since the late 1960s, with the exception of the first decade of the 21st century. (This series combines a modestly positive to flat trend for state and local spending with an even more steeply negative trend for the federal government share.) Direct government demand, perhaps the most obvious autonomous part of demand, is contributing to secular stagnation.

Business investment is clearly not autonomous; it is highly procyclical. Figure 12 plots the share of business investment in GDP.

Figure 12
Nonresidential Business Fixed Investment as a Share of GDP

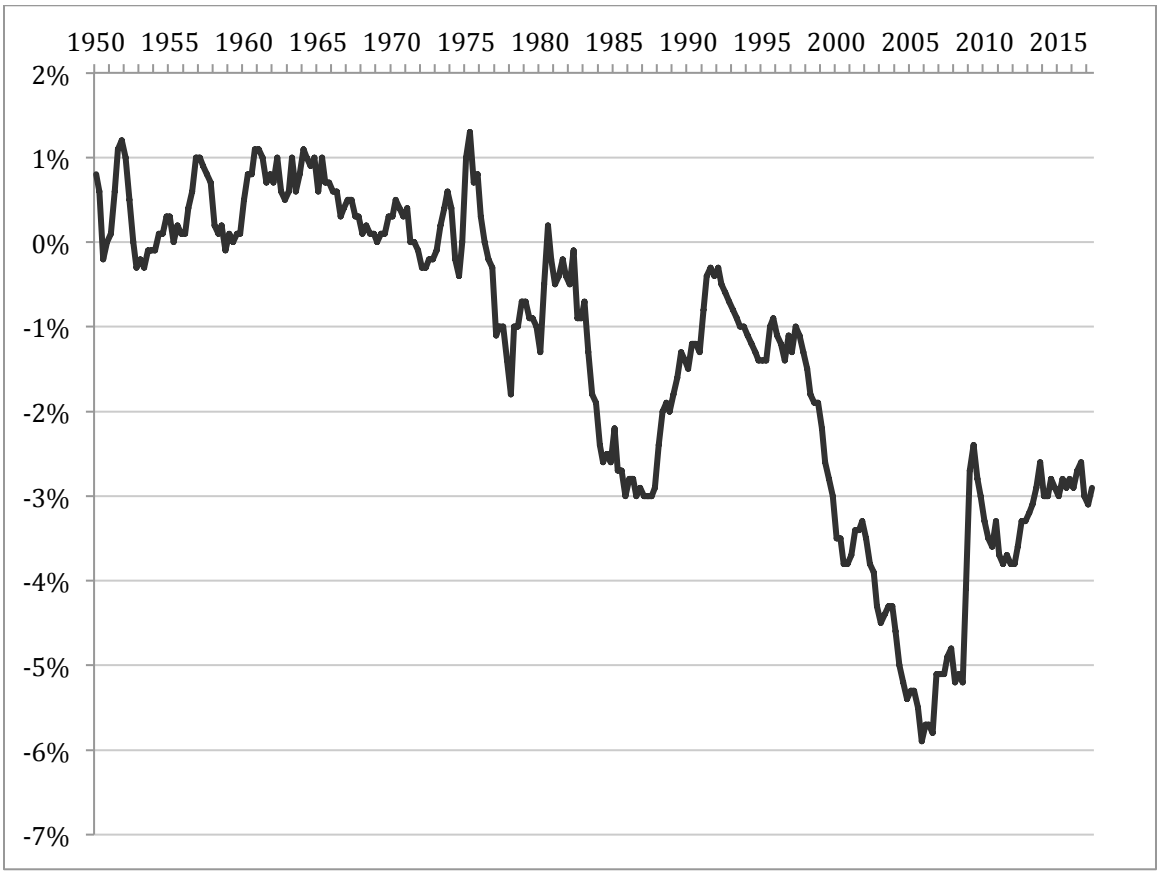


From 1950 to 1980, demand growth was partially investment led; the rising share of investment implies that capital accumulation accelerated demand growth. Since 1980, although there is some evidence of declining peaks, the investment share has been approximately without trend. Cyclical fluctuations dominate. Business investment plummeted in the Great Recession, as one would expect in the most severe downturn in

decades. By 2012, however, the *share* of business investment had largely recovered to average levels. To the extent that GDP growth is stagnating, investment is following suit, but just in proportion to output. Investment seems to be neither a long-term source of acceleration or deceleration in recent decades.[16]

Both for completeness and because international trade has become an especially politically charged issue over the last few years, we show the share of net exports in GDP in figure 13.

Figure 13
Net Exports as a Share of GDP



From the late 1970s until the Great Recession, and especially after 1990, net exports have been a drag on demand, contributing to stagnation. The jump in the crisis years mitigated the negative effects of other components of demand. We interpret this change largely in

[16] The data in figure 12 also shed light on a typical supply-side explanation for stagnation: the argument that high taxes and regulation have reduced business investment. The recent growth rate of investment may be somewhat weak, like the growth rate of GDP. But the investment share data imply that investment is not particularly weak *given the state of the economy*. Also note that the data in figure 12 present the share of nominal business investment in nominal GDP. Because the relative price of capital goods has declined, the current share of real investment in real GDP is somewhat higher relative to past cycles than the nominal share in figure 12, and the share peaks for the past several decades in the real share are almost equal. This real share of investment is likely more relevant to the supply-side argument.

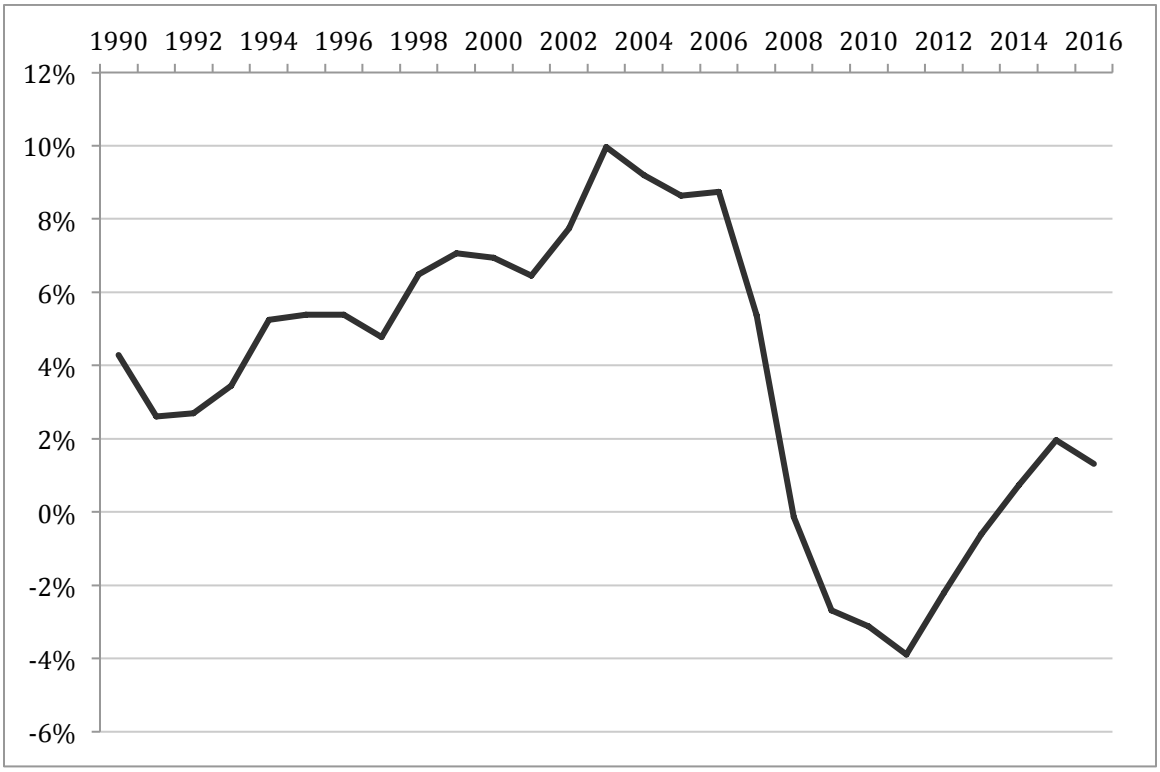
the context of our household demand analysis. The consumption boom led to induced import demand, explaining much of the decline in net export prior to 2008. When household demand slowed dramatically, net exports improved partially offseting the loss of household spending (also see van Treeck, 2013). But note that the favorable change in net exports of two to three percent of GDP is dwarfed by the overall shortfall in household demand (greater than 12 percent of GDP as measured by the difference between actual demand and trend demand in figure 8).

The bottom line of this section is that there is little evidence for supply-driven stagnation. But once one recognizes theoretically that persistent stagnation "beyond the short run" can come from the demand side, there is a strong case that sluggish demand growth is the primary culprit. Slow, even negative, growth of government-financed demand is part of the story, but the bigger issue is stagnation in household demand.

Finance, Rising Inequality, and the Dynamics of Household Demand

Following the conclusion from the previous section, the natural question to ask is *why* household demand growth has stagnated, failing to converge back to its pre-crisis trend despite a recovery that now exceeds eight years. Part of the answer to this question was discussed in the previous section: the unsustainable bubble of household borrowing finally burst. Figure 14 looks at the underlying data in a somewhat different way, showing the real growth rate in household sector liabilities since 1990.

Figure 14
Real Growth in Household Debt



Obviously, household debt grew for a decade much faster than the real economy. The collapse was striking and even well in to the recovery, real debt growth remains far below pre-crisis figures.

What explains these striking dynamics? An important part of the answer surely comes from a boom and then bust in access to household credit. Deregulation in household credit markets, tax reform (particularly the 1986 reform that gave birth to widespread HELOCs), technology that enabled credit scoring, and the lending euphoria emerging from the credit boom coupled with the rise in home prices undoubtedly led lenders to aggressively market credit to American households. But why did people actually borrow so much? Again, there are a variety of explanations in the literature. We focus here on one that we consider especially salient: rising income inequality.

Some research argues that rising inequality directly encouraged more borrowing. We present our take on these behavioral issues in Cynamon and Fazzari (2015a) focusing on how households develop norms of behavior in a context of uncertainty about future income, asset returns, life expectancy, etc. Van Treeck (2013) surveys an extensive research literature on rising inequality and its macroeconomic implications for consumption spending. Some of this work argues that rising inequality directly leads to higher spending through the "relative income" and "expenditure cascade" effects. Of course, higher spending plus income stagnation across much of the income distribution leads to higher debt. From this perspective, rising inequality fueled the debt bubble that

kept household demand strong prior to the crisis. Consistent with Minsky's financial instability theory, this rising household financial fragility set the stage for the Great Recession collapse in household lending (figure 14) and subsequent stagnant demand, as documented above.

We find this explanation interesting and there is some direct empirical support for the expenditure cascade model (see the survey in van Treeck, 2013, section 4). Without arguing for a specific behavioral mechanism, we propose in Cynamon and Fazzari (2015a) that inequality is related to the dynamics of household finance and spending leading up to the Great Recession. Our data show that the accumulation of debt is largely concentrated in the bottom 95 percent of the income distribution and when the crisis hit the bottom 95 percent reduced their consumption-income ratio. This reduction is fundamentally inconsistent with the consumption-smoothing predictions of the mainstream life-cycle model of consumption but is entirely consistent with an environment in which the bottom 95 percent were borrowing unsustainably and then had to cut back on spending when debt growth was severely curtailed. In contrast, the top 5 percent engaged in massive consumption smoothing, raising their consumption-income ratio dramatically in the crisis years.[17]

Beyond the question of whether the household debt bubble was caused in significant part by rising inequality, there is a straightforward way in which rising inequality contributes to demand-side stagnation. For decades, economists have proposed that the propensity to consume out of income drops at higher levels of income. This effect is partly behavioral, since more affluent households have more discretionary income (especially relative to current consumption norms) that is more easily allocated to saving and wealth accumulation for retirement, bequest, or as a marker of social success or the accumulation of economic power. But just as important is the fact that higher income people pay higher tax rates on average so that a bigger slice of each pre-tax dollar is taken out of income of the affluent before it is allocated between consumption and saving.

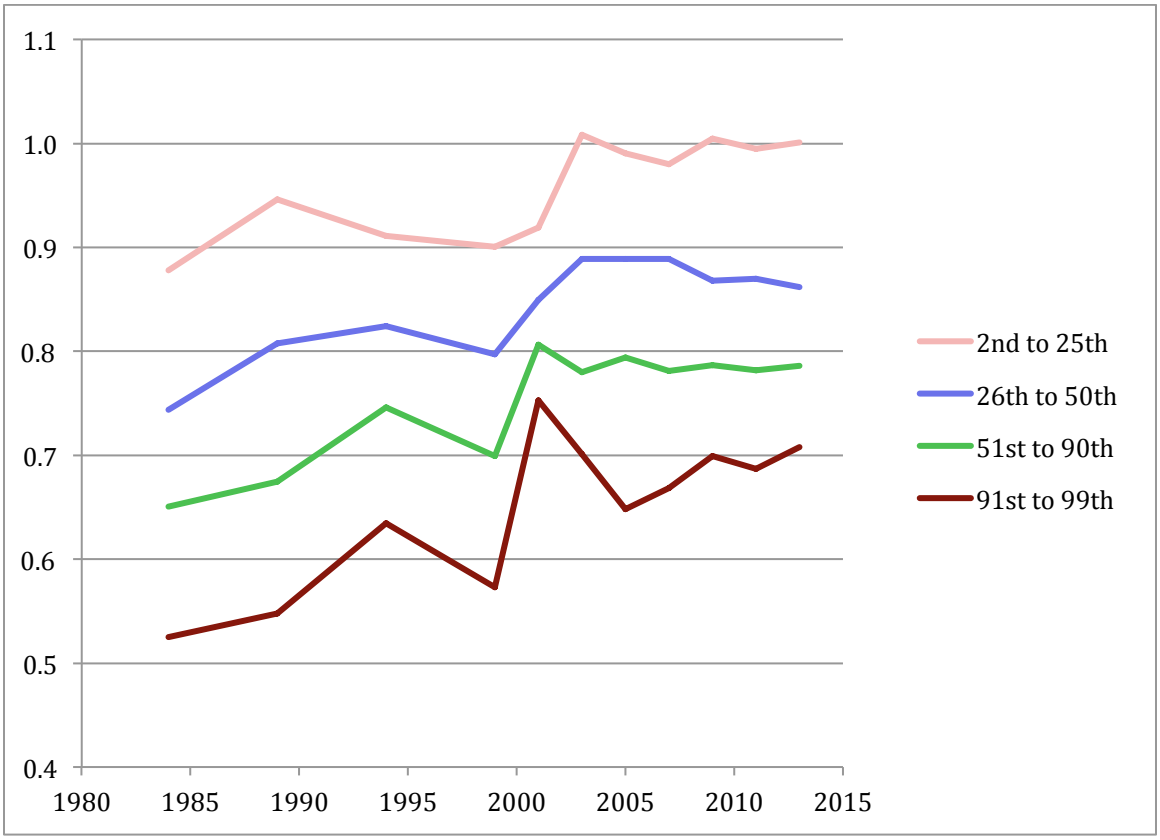
Direct evidence of the effect of income on the propensity to consume is hard to come by in the US largely because of lack of high-quality microeconomic data on expenditure.[18] Dynan, et al. (2004) analyze the issue extensively and find lower propensities to consume for households higher in the income distribution. On average, we find similar results in Cynamon and Fazzari (2015a) for the bottom 95 percent versus the

[17] The fact that we find differences between the bottom 95 percent and the top 5 percent in Cynamon and Fazzari (2015a) should not be interpreted as evidence that household financial instability was concentrated, in general, among lower-income households. In our new work based on the PSID and reported in figure 10 we find that the decline in financial sustainability takes place across the entire income distribution and that debt-income ratios rise more in the middle class and upper middle class than at the bottom of the distribution. (Note that due to limitations of the PSID sampling frame we cannot make inferences about the very top part of the income distribution.)

[18] Although the Federal Reserve's Consumer Expenditure Survey is often cited for these purposed there are severe measurement problems with this data source. See van Treeck (2013, section 3) for further information and references.

top 5 percent. Our PSID data sample provides detailed evidence on consumption propensities across time and income groups. Figure 15 plots the median ratio of household consumption to pre-tax income for four income groups from the first observation in our data (1984) through the end of the sample (2013).

Figure 15
Median Ratio of Estimated Consumption to Pre-Tax Family Income



Authors calculations based on PSID data. The income percentile groups are determined by average family income in 2009 dollars for each household across all PSID waves in which the household has observations. The bottom and top one percent are excluded due to volatility and small sample sizes in these groups.

The groups in figure 15 are determined from the income distribution of our PSID analysis sample. Median income conforms approximately with national statistics. The PSID sample gets sparse at the top of the income distribution and it contains very few observations for the truly rich. Therefore the highest income group shown in figure 15 corresponds to the upper middle class.[19] The propensity to consume for the top few percentiles of the entire income distribution, the group that has experienced the greatest increase in its income share, is likely to be lower, perhaps substantially lower, than the bottom line shown in the figure.

[19] Median pre-tax family income in the top group in figure 15 is about $200,000 in the last several waves of the sample which is about the lower limit of the top 5 percent of the national income distribution according to CPS data.

This evidence implies that rising inequality lowers the average propensity to consume for the economy as a whole. In Cynamon and Fazzari (2015b) we calibrate a demand-led growth model and show that the model can predict a decline in the economy's growth path of 10 percent or more as the result the actual shift in income distribution that occurred in the US from 1984 to 2009. This finding implies that rising inequality can indeed explain significant stagnation in demand growth.

This argument must face a timing problem. Income inequality has been rising for close to four decades. Secular stagnation, however, is a persistent but relatively recent phenomenon, most evident in the years since the Great Recession. Through the lens of the demand-led growth models summarized earlier, particularly the super-multiplier model, it is important to distinguish between the dynamics of autonomous demand and changes in the multiplier that translate autonomous demand into total output. The most obvious effect of changing income distribution is on the multiplier through the propensity to consume, as in Cynamon and Fazzari (2015b). From this perspective, the rising share of high-income households would lead to a slow, persistent decline in the multiplier starting in the mid 1980s, other things equal. But this multiplier is applied to the dynamic path of autonomous demand. A number of authors identify credit-induced household demand, including residential investment, as a key component of autonomous demand (see Cesaratto et al., 2003, and Girardi and Pariboni, 2017, for example). While one could reasonably argue that some credit-induced household spending is induced by the state of the business cycle, the evidence presented above is consistent with a large and rapidly growing share of autonomous and debt-financed spending from the US household sector beginning no later than the mid 1980s and continuing, even accelerating, until just before the Great Recession. Quantification of these effects is outside the scope of this paper, but our basic interpretation, consistent with our earlier work and the analysis in other research, is that this multi-decade trend of debt-financed autonomous consumption, to a first approximation, offset and postponed the demand drag created by rising inequality. In addition, the rapid growth of government-financed demand from the late 1990s through 2010 delayed the inequality effect (figure 11).

This dynamic changed with the financial crisis and Great Recession. The debt-financed household demand bubble burst, exposing underlying demand weakness, much of which can be reasonably attributed to rising inequality. This interpretation is consistent with the inability for household demand to regain its pre-crisis trend (figures 8 and 9). Along with the significant post-2010 reduction in government-financed demand, we have the recipe for secular stagnation.

Reflections on the Role of the ZLB

As discussed earlier, much of the recent analysis of US secular stagnation focuses on the binding ZLB constraint that prevents monetary policy from "fixing" problems of weak demand. On the one hand, at any point in time, this point seems both rather simple

and obvious. If low aggregate demand is responsible for secular stagnation and aggregate demand depends inversely on the real interest rate, there would seem to be some sufficiently low real interest rate at any point in time that would eliminate the cause of stagnation. If the ZLB prevents the central bank from hitting this "natural" real rate, then the ZLB seems critical to the entire issue. That said, we are somewhat skeptical that the problems described here can be fully addressed in a practical way by lower interest rates, even if there are ways around the ZLB constraint. This skepticism revolves around two questions: (1) Does a practical natural rate really exist that can be effectively targeted? (2) What are the dynamic implications of using the interest rate as the primary means to assure adequate demand growth?

The answer to the question about the practical relevance of the natural real rate of interest turns on interest elasticities of several components of demand. Personal consumption is nearly 70 percent of aggregate demand in the US and there is little evidence that it is sensitive to interest rates.[20] Second, while business investment is usually viewed as more interest elastic than consumption, evidence in favor of an elasticity of substitution between labor and capital of unity (as implied by the typical Cobb-Douglas technology assumption of calibrated models) has been seriously questioned empirically.[21] Furthermore, the link between business investment and interest rates faces what Fazzari (1999) calls the problem of "multiplied elasticities." The effect of lower interest rates on aggregate demand through business investment is limited by the elasticity of the user cost of capital to the real interest rate (likely averaging less than 0.25 due to depreciation dominating the user cost), the elasticity of substitution between capital and labor (averaging about 0.5 across many studies), and the share of business investment in aggregate demand (recently about 13 percent).

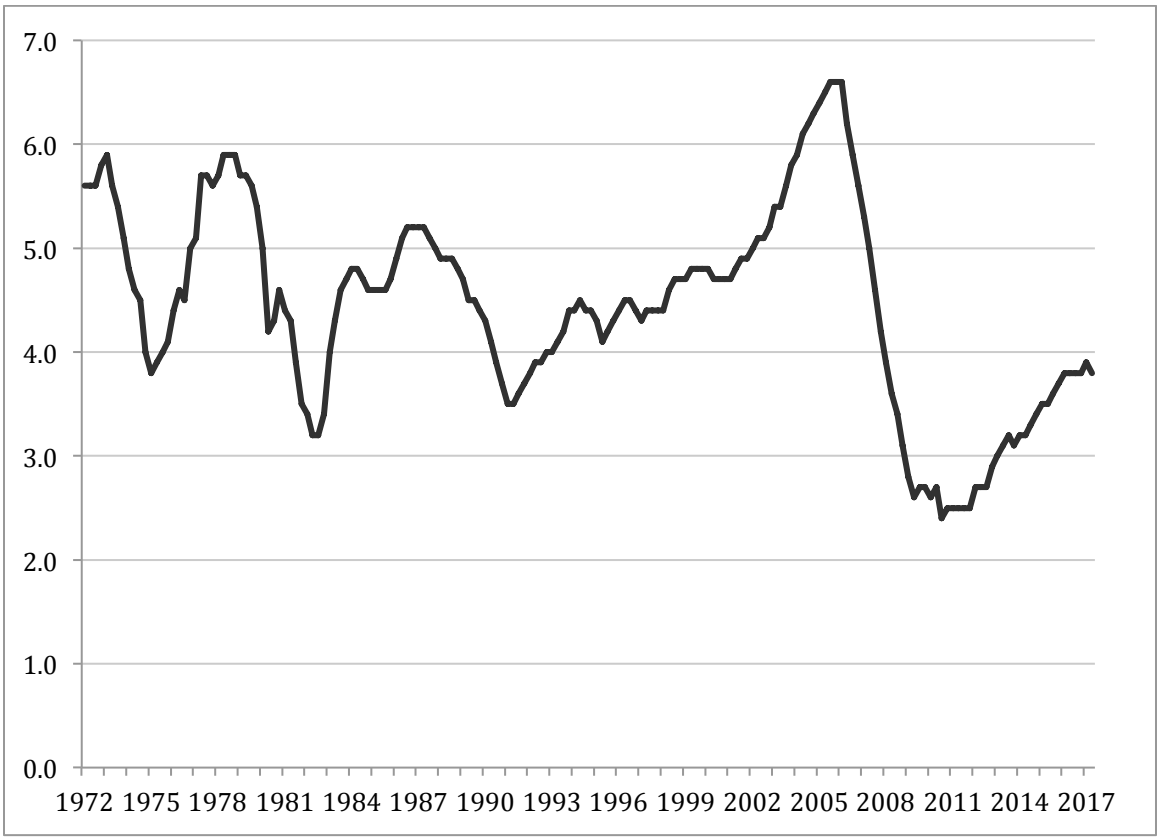
If neither saving nor investment is very sensitive to interest rates, a simple loanable funds theory of the natural rate of interest implies that the natural rate will be so volatile that it is of little practical relevance for monetary policy. (Think of a loanable funds diagram with very steep supply and demand curves. Small shifts in either curve will generate big changes in the equilibrium interest rate.) In particular, weak investment and low consumption (higher desired saving at full employment income levels) will cause the natural rate to plummet to very negative values. Tracking a volatile and often very negative natural rate is not a feasible operational goal for monetary policy.

This view seems inconsistent with the perception that monetary policy was effective at stabilizing the economy during the "Great Moderation" period. We agree that interest rate cuts by the Federal Reserve did help prevent the emergence of secular stagnation prior to 2008, but we argue that this short-term stabilization did not operate through conventional intertemporal substitution channels for either consumption or business investment. Rather, falling interest rates stimulated the economy primarily

[20] The consumption Euler equation that typically provides the foundation for the "IS" relationship in New Keynesian DSGE models *imposes* intertemporal interest elasticity of consumption.
[21] See Chirinko, et al. (2011) and references given there.

though the housing market. Figure 16 shows the share of residential construction in GDP since 1972. The recession bars show that every recovery from the 1974-75 recession through the 2001 recession was led by a housing boom that began almost exactly at the trough of the recession. (In the 2001 recession, there was hardly a pause in the pre-recession trend of residential construction, but the trend accelerated after the trough.) We attribute these booms in large part to interest rate cuts engineered by monetary policy.

Figure 16
Share of Residential Construction in GDP



In addition, parts of personal consumption were financed by "mortgage equity withdrawal," including draw downs on home equity lines of credit and cash-out refinancing. Through these channels, monetary policy was likely effective at stimulating demand for an extended period of time but with the *dynamic consequence* of persistent increases in household financial fragility, fragility that would ultimately trigger the Great Recession crisis.[22] In this respect, the difference between the aftermath of the 2008-09 recession and earlier cycles evident in figure 16 is important. Although the decline in residential construction was catastrophic, the recovery was neither swift nor particularly strong. It took about three years from the trough of the crisis for any recovery at all to begin. And even by mid 2017, this measure of residential construction is just beginning to

[22] This kind of dynamic process is an example of the general phenomenon described by Minsky's (1986) "financial instability hypothesis."

reach what would have been trough-of-recession levels for earlier cycles in the past four decades.

The point is that to the extent that monetary policy stabilized demand since the 1980s or even earlier, it did so by encouraging what ultimately became dynamically unsustainable borrowing that eventually led to severe financial instability and, ultimately, secular stagnation.

We do not deny that monetary policy can be a useful tool to address stagnant demand growth. But we question whether a demand-led secular stagnation of the magnitude analyzed here could be eliminated by any practical decline in the real interest rate, or, by extension, alternative monetary policies like quantitative easing. Also, to the extent that monetary policy is effective at any point in time, it likely creates some risk of creating asset-price bubbles or borrowing that create unsustainable dynamics. If this is the case, the problem of secular demand stagnation is deeply rooted in the structural characteristics of demand generation; it is more than a ZLB problem.[23]

Conclusion: Demand-Led Growth Implies Demand Leads Supply

The evidence presented here makes the case for demand-led secular stagnation in the US economy since the Great Recession. No single chart or empirical test "proves" the case, but the evidence taken together leads in our view to a clear conclusion. This interpretation has begun to enter mainstream thinking, but it remains a minority view. The Federal Reserve is raising interest rates and claiming the economy is close to "full employment." As of the second quarter of 2017, figures from the U.S. government now put the official "output gap" between real potential output and real GDP at less than 0.2 percent, rather a remarkable figure considering the general anxiety about jobs, wages, and overall economic performance in the country in the first year of the Trump administration.

While some of the rather optimistic assessment of current US data may be due to conceptual mis-measurement (for example, "hidden" unemployment in weak labor force participation, see Dantas and Wray, 2017), we believe that the bigger effect is the result of hysteresis, that is, *demand leading supply*, the reverse of the mainstream neoclassical synthesis. A weak economy reduces labor force participation and immigration (see Setterfield, 2003). As discussed previously, the recent business investment share in a stagnant economy implies a low absolute level of investment. This means that new technology spreads more slowly through production and may limit learning by doing growth in labor productivity. Palley (1996, page 124) writes "[t]echnical progress is

[23] This point is supported by some empirical studies. In Girardi et al. (2017), the persistent effects of autonomous demand expansions are evident in the data going back to 1960. In Fazzari et al. (2015) we estimate that large fiscal multipliers associated with economic slack in the US economy prevailed in about 60 percent of the observations from the middle 1960s. Clearly the ZLB was not binding during most of the time covered in these studies.

therefore both 'revealed' and 'realized' through investment, so that investment serves simultaneously as the means of (1) expanding the capital stock, (2) feeding technical innovations into the production process, and (3) uncovering further possibilities for innovation." As DeLong and Summers (2012) point out, low rates of employment lead to "decay" in workers skills, also reducing productivity growth. Dutt (2006, page 325) links labor productivity growth with the state of the economy, summarizing the argument with "the old adage that necessity is the mother of invention. … The speed of technological change is essentially determined by pressures and bottlenecks in the economy." Storm (2017) provides an insightful, empirically based analysis of how weak demand growth lowers total factor productivity growth. The US economy has had little "pressure" in the past decade. In Fazzari et al. (2017) we present a demand-led growth model in which changes in the level and growth of the demand path endogenously cause supply to adjust to the demand-driven path.[24] Again, weak demand growth pulls supply growth down as well.

These dynamic macroeconomic channels deserve more attention in research. They also have important policy implications. Most obviously, policy must attend to the dynamics of demand growth beyond the short run. We should not accept that either endogenous economic adjustments or enlightened monetary policy will take care of the demand side. So-called "structural" concerns may be more important for demand than supply in many historical circumstances, including the circumstances faced by the U.S. economy as the second decade of the 21st century draws to a close. Given our skepticism about the effectiveness of monetary policy to tune demand growth, a more activist and expansionary fiscal policy must be on the table. The kind of collapse in government spending evident in figure 12 for the past seven years is far from benign. When that decline occurred at the same time as a historic drop in household demand the relevant question may be less why do we have secular stagnation, but instead why isn't stagnation even worse?[25]

There are certainly reasons why the U.S. could benefit from fiscal expansion, most obviously a need for new and renewed public infrastructure. But government spending needs to pass a cost-benefit test and our rough assessment is that we will not achieve a "high pressure" economy with fiscal stimulus alone; we need more private demand. Investment will take care of itself if the demand growth path accelerates. More attention must be paid to household demand, which the data presented here show is the most important source of stagnation. Tax policy needs to target demand; the well worn

[24] In this model, faster demand growth stimulates faster supply growth, but within limits. Reasonable parameter values for the link between the state of the economy and the growth of both labor supply and labor productivity do not allow the economy to grow arbitrarily fast, which would be unreasonable. But a rough calibration of the model in Fazzari et al. (2017) implies that it is entirely plausible for changes in demand growth from something like one percent to three percent to be accommodated by endogenous adjustments of supply. And declines in secular demand growth will always drag supply down with it.

[25] DeLong and Summers (2012) make a compelling case that fiscal stimulus when demand leads supply need not increase, and may very well significantly reduce, government debt relative to the size of the economy. Also see Cynamon and Fazzari (2013b).

supply-side arguments for tax cuts on business and high incomes, including the major tax reform debated as this paper is written, are hugely inefficient in the context of demand-led stagnation.

Finally, rising inequality of income is a prime suspect in secular stagnation. When the top sliver of earners captures most of the growth, the economy's central function to recycle income back into demand is deeply compromised. Not only must policy address inequality, but we must look more deeply at shifting social norms that affect wage setting and think creatively about how to manage the real challenges globalization poses for lower and middle classes in developed economies. Understanding these issues is difficult; designing effective policy to address inequality in pre-tax incomes may be even harder. But without restoring income growth broadly across the distribution, we fear that secular stagnation will become the new normal.

Kregel (2016) quotes Franklin Roosevelt's May 22, 1932 Oglethorpe University commencement address:

> [T]he country needs and, unless I mistake its temper, the country demands bold, persistent experimentation. It is common sense to take a method and try it: If it fails, admit it frankly and try another. But above all, try something. The millions who are in want will not standby silently forever while the things to satisfy their needs are within easy reach. We need enthusiasm, imagination and the ability to face facts, even unpleasant ones, bravely. We need to correct by drastic means, if necessary, the faults in our economic system from which we now suffer.

This sentiment is particularly poignant in the aftermath of Donald Trump's stunning electoral victory. An important part of the American electorate seemed to behave according to this perspective: we must "try something," and that "something" needs to be different from the status quo. Trump undoubtedly offered "something," but despite the campaign rhetoric it does not appear that "bold, persistent experimentation" with truly new approaches is in the cards. Policy seems more likely to magnify, rather than "correct … the faults in our economic system from which we now suffer." It is our hope that a focus on the key economic role identified here for demand dynamics as the cause of secular stagnation, even though such thinking is new to the mainstream macroeconomics of the past 70 years, will provide a path to bold and effective policy ideas.

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