Low Interest Rates and Government Debt
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1. Why are real interest rates so low? (And thus, when and how will that change?)
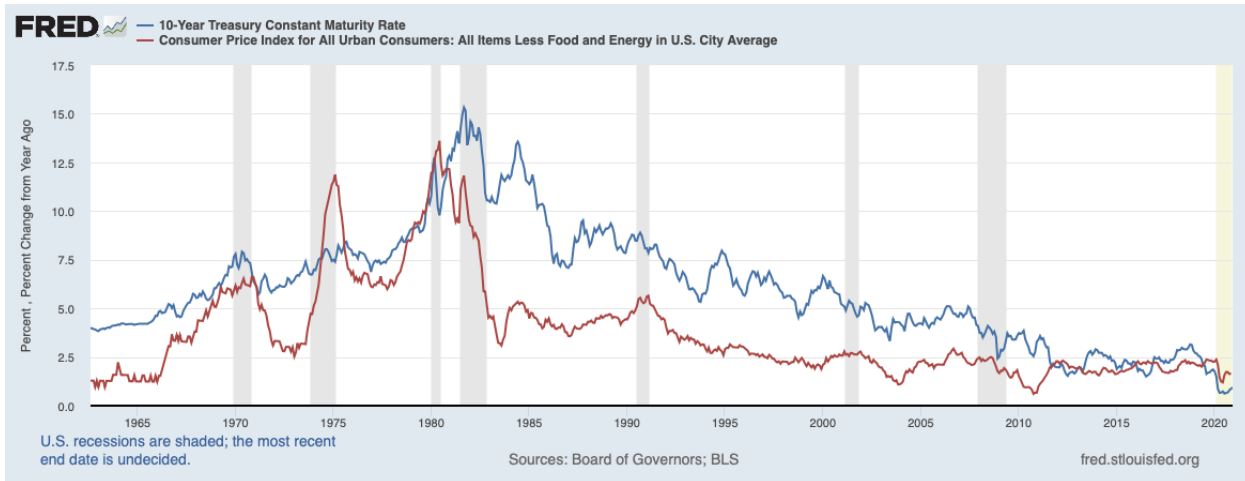

Figure 1. 10 year US treasury rate and core CPI.

As Figure 1 shows, real and nominal interest rates have been on a steady downward trend since 1980. The size, steadiness and durability of that trend mean that we must look for large basic economic forces. "Savings gluts," foreign exchange reserves, quantitative easing, lower bounds, forward guidance bond market frictions and so forth may be important icing on the cake, but they are not the cake. They cannot account for such a long-lasting steady trend.

The most basic economics states that the real interest rate equals people's rate of impatience, plus growth times a coefficient usually thought to be between one and two[1]. The interest rate is also equal to the marginal product of capital. In equations

$$r = \delta + \gamma g = \theta f'(k).$$

Figure 2 presents the growth of potential GDP, as one easy way to look at long run growth trends. Potential GDP grew 4.5% in the 1960s, 3% in the 1970s, had a spurt in the late 1990s, and then settled down to less than 2% now. This slowdown in long-term growth is the great and unheralded economic disaster of our time. But that's for another day.

The most natural explanation for the decline in real interest rates, then, is that growth has declined. A coefficient γ greater than one brings interest rates down faster than growth rates, opening the question that the interest rate r might even be below the growth rate g.

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[1] A more precise statement is $r = \delta + \gamma(g - n) - \gamma(\gamma - 1)\sigma^2/2$ where n is population growth, g is consumption growth, and σ^2 is the volatility of consumption growth.
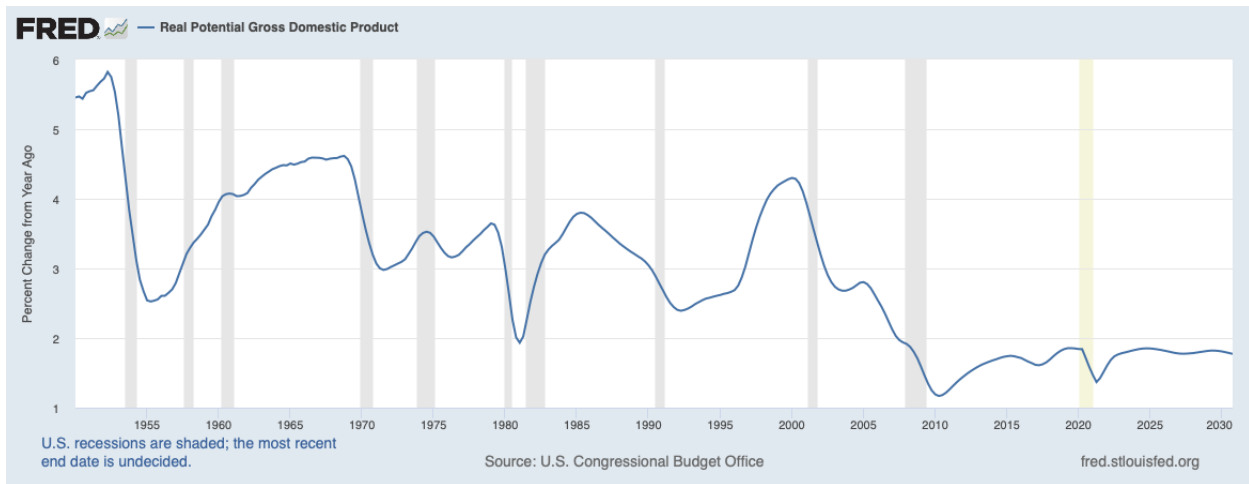
Figure 2. Potential GDP growth.

Basic supply and demand suggests that lower growth, driven by a lower marginal product of capital, or "supply" is the cause. People often allude to extra savings, or demographics, changing "demand." That force would be captured by a decline in δ, an increase in patience. That would lower interest rates without changing growth, or would raise growth without changing interest rates. Changing growth g and constant δ produces what we see.

Why did the marginal product of capital decline, and what would change this event? There are three common stories: First, as we move to services and away from capital-intensive goods, we just need less capital. I'm not persuaded. We need different capital, and a lot of the world looks like it could use capital. Second, we are simply running out of ideas, growth is over, θ is lower. I'm still a techno-optimist. Third, ever-growing marginal tax rates, protections, and regulations are hamstringing the innovation and ruthless competition that it takes to get new ideas into practice. That's my favorite explanation.

But this is beside the point today. The point: here is a plausible cake, a usually overlooked basic economic force that accounts for the four-decade steady decline in interest rates.

Looking again at Figure 1, we cannot have a successful understanding of lower interest rates without saying something about what changed in 1980. Well, obviously, inflation changed. Here is a second basic economic force:

$$E(R_i) = R^f + \beta_i \lambda.$$

In the recessions of the 1970s, inflation went up (stagflation) and bond prices went down (yields went up). Government bonds lost real and nominal value. Government bonds were a risky, positive-beta security. In the recessions since 1980, and especially recently, inflation went down, bond prices went up, and the dollar went up, while private securities collapsed in value. There was a "flight to quality," and government bonds were quality. Government bonds became a negative beta security, a hedge against recessions and financial crises. That insurance value drives average bond returns even below the "risk free rate." With an equity premium of 5% or more, it doesn't take much negative beta to seriously drive down a return.

Underlying this transformation, inflation expectations have become "anchored." But by what? Better speeches by central bankers promising what they might do in the future? Everyone

admits this "anchoring" is poorly understood. We must admit it is tenuous, and the pattern of the 1970s could return.

Most discussions are much more fun, involving more interesting economics and lots of frictions. I think these are at best icing on the cake.
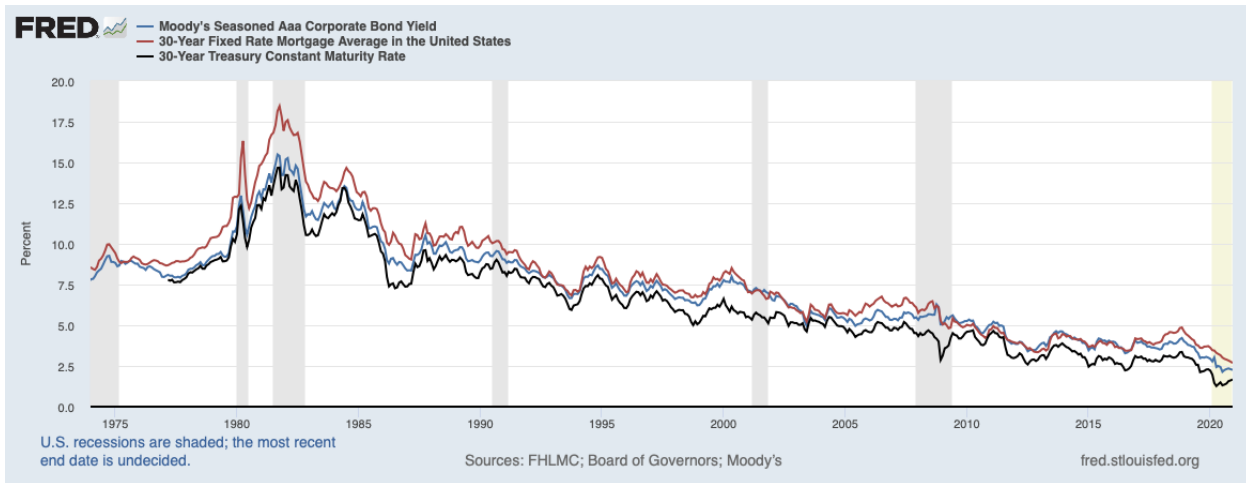

Figure 3. 30 year treasury (black), Moody's AAA (blue), and 30 year mortgage rates (red).

Perhaps US Treasury debt is special, due to its liquidity and use in financial transactions. Figure 3 presents the 30-year Treasury against the Moody's AAA and 30-year mortgage rates, which are quite illiquid. There might be a percent of spread here, some of which is credit spread. It isn't obviously getting bigger over time. Spreads in shorter-term maturities are similar. Widening liquidity spreads do not account for the huge trend seen in Figure 1.
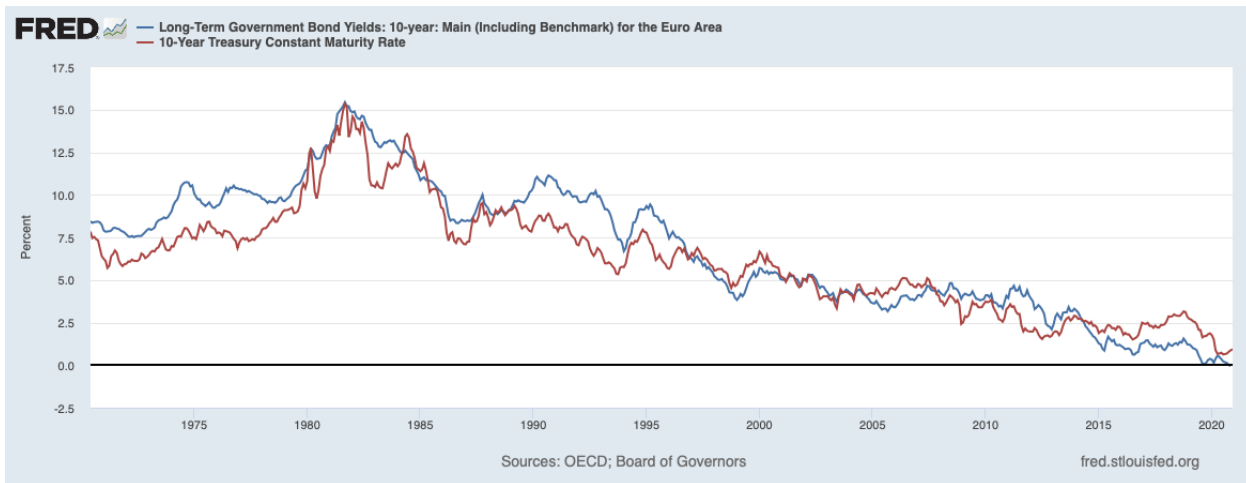

Figure 4. US and Euro 10 year government bonds.

Perhaps the dollar is special, the "reserve currency" that gets "exorbitant privilege." That may be true in quantities but it does not show up in prices. As shown in Figure 4, Euro bond yields

are now 1% lower than US Treasury yields, and have drifted down more. Inflation is a bit lower but not that much lower, so European real rates are lower. Japanese rates show the same patter. Sadly, European and Japanese growth rates are even lower than the US.

2. Low rates, r<g, and government finances

What do these low rates mean for government finances? The debt/GDP ratio B/Y grows at the difference between interest rate and growth rate, less any real primary surpluses.

$$\frac{d}{dt}\left(\frac{B}{Y}\right) = (r-g)\frac{B}{Y} - \frac{s}{Y}$$

This equation, and the possibility that r<g, leads to some tantalizing possibilities.

First, if r<g, then the government can run a steady primary deficit, s less than zero, forever, and the debt/GDP ratio will not change.

Second, if r<g, the government can run a big one-time fiscal expansion, borrowing a lot of money, and then simply grow out of it without running any surpluses. With s=0, the debt/GDP ratio will revert all on its own at rate r-g. In that sense the fiscal expansion does not have to be repaid with later surpluses!

The latter is not a money machine, meaning nobody ever has to work or pay taxes again. It only works as far as the opportunity scales, if borrowing a ton of money and spending it does not drive up r or drive down g. The marginal r is higher than the average r. At some point we all recognize that more borrowing must drive up r, by a variety of mechanisms. But that point may be far above today's debt.

And we still have to pay taxes! Zero surplus means zero surplus, not deficits forever. After the one-time expansion, future spending is fully paid with future taxes.

These are tantalizing possibilities and technically very interesting. If you have not done so, you should immediately read Olivier Blanchard's brilliant AEA presidential address[2] which analyzes these issues. Written just before the US embarked on a $5 Trillion borrowing binge, with immense fiscal plans on the table, I believe Blanchard's fiscal policy address will be as influential in our age as Milton Friedman's 1968 monetary policy address[3] was in his. And if you read all the way to the end, you will see in Blanchards' writing a suggestion of how it could all go wrong, which I give greater weight to here.

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[2] Blanchard, Olivier. 2019. "Public Debt and Low Interest Rates." *American Economic Review*, 109 (4): 1197-1229.

[3] Friedman, Milton. 1968. "The Role of Monetary Policy." *American Economic Review,* 58 (1): 1-17.

However, though the r<g possibility is tantalizing and technically fun, I argue that it is irrelevant to the fiscal issues facing the US and the world today.

Total Deficits, Primary Deficits, and Net Interest
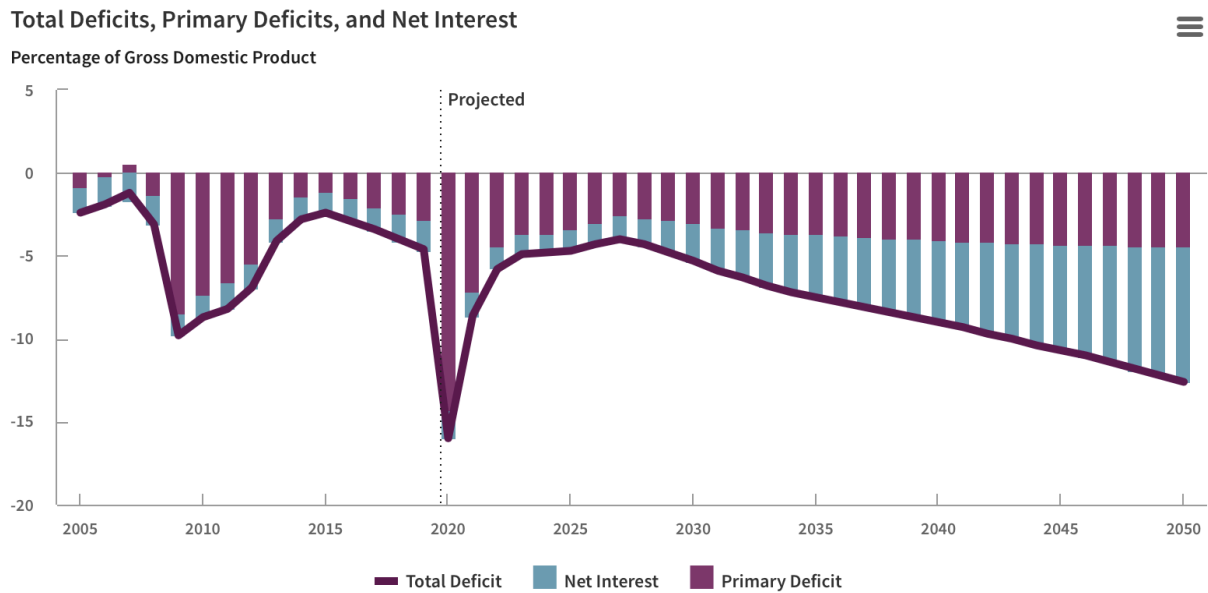**Percentage of Gross Domestic Product**

Figure 5. Deficits. Source: CBO 2020 Long-Run Budget Outlook

Figure 5 presents projected deficits, and Figure 6 presents debt-to-GDP ratios, from the latest CBO long-term budget outlook.
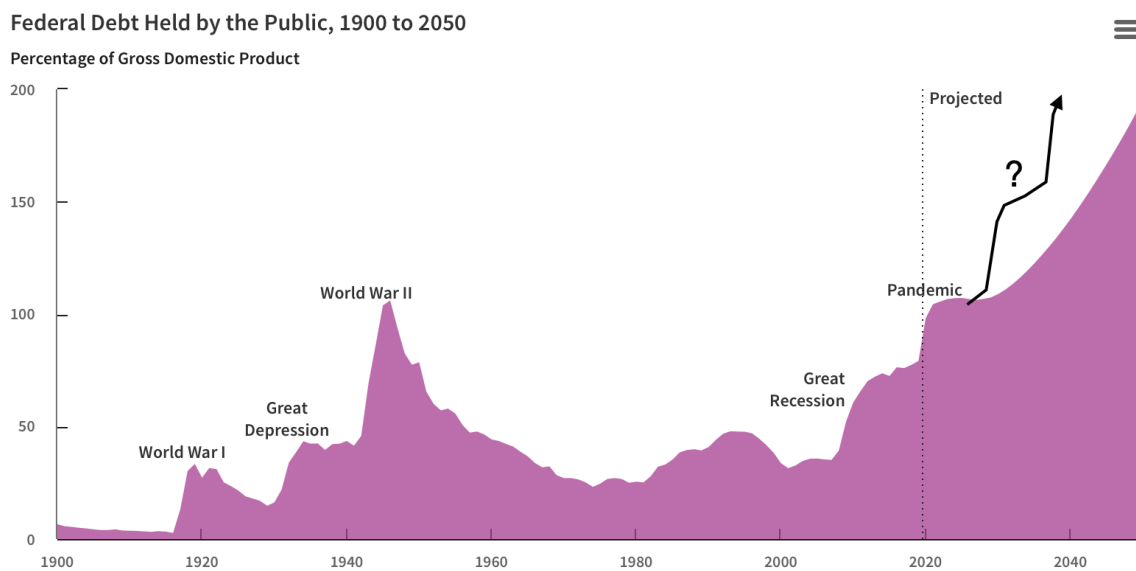
Federal Debt Held by the Public, 1900 to 2050
Percentage of Gross Domestic Product

Figure 6. Debt-to-GDP ratio. CBO 2020 Long-Run Budget Outlook, and author annotation.

An r-g equal to 1% means that, at 100% debt/GDP, the US can run 1% deficit to GDP forever. That's nice. But the US has been running 5% deficit to GDP in good times, 10% in bad times, and 20% in this crisis. The forecast is 5% forever, which then grows to 10% and more as unfunded entitlements kick in. And this forecast is *before* one adds big new spending programs — green energy, universal basic income, medicare for all, infrastructure, and so on — and *does not count* the 25% that each decades' unexpected crisis seems to engender.

The chance to have 1% debt to GDP deficit forever is simply couch change compared to these numbers. R greater or less than g by one percentage point is truly irrelevant to the fiscal challenge at hand.

Figure 6 presents the CBO debt forecast. Again, this forecast is *before* the contemplated "one time" expansion to spend on worthy causes, and *does not* include 25% in the next crises. There will be more crises, you know. I indicated a line that suggests a path extrapolating from the last two crises.

This is not the backdrop — steady debt/GDP, zero primary surplus or deficit — on which one contemplates a one-time expansion which we grow out of with continued zero primary surpluses.

R<g of 1% or so does not justify exponentially growing debt/GDP! That is the fiscal challenge today.

Years	0	10	25	50	100	110	138
B/Y	200	181	156	121	74		50
B/Y	150	135	116	91	55	50	

Table 1. Debt to GDP paths with r-g = -1%.

Growing out of debt also takes an awfully long time. Table 1 calculates the path of debt if the US borrows up to 150% debt/GDP and 200% debt/GDP, and then "grows out" of the debt with zero surpluses. As you can see it takes over 100 years to get back to normal values, 50% debt/GDP ratio.

If you want to bring debt down faster, what do you do? Run surpluses! In that sense, though the technical issues right around r just above and r just below g — transversality conditions, limits, and so forth — are fascinating, that question does not make any difference to our fiscal issues. At r-g of negative one basis point the opportunity to grow out of debt in 1000 years is simply of no practical importance.

And r-g of negative one percent is of almost no practical importance to current fiscal questions. Deficits of 5, 10 and occasionally 20% of GDP will have to be repaid by subsequent surpluses,

sooner or later, more or less painfully. An extra 1% of fiscal space is nice, but does not fundamentally change our fiscal challenges.

3. The iceberg ahead.

So how will r rise, and what does that mean for government finances?

My first mechanism, that interest rates are low because growth is low, turns around if we return to robust, innovation-driven supply side growth. That's the only kind that lasts 20 or 50 years. Forget stimulus. That growth needs the techno-optimists to be right, and the growth-is-over crows to be wrong. That growth needs the regulation-and-protection-is-strangling-growth crowd to be right, and our governments to finally get around to structural reform. If as g grows r grows more, reversing the path we came down, that fact will put some strain on government finances. But that strain will be easy to accommodate in an economy growing 4% or more. We should have such problems. And higher growth need not mean higher government bond returns, through a variety of mechanisms.

My second mechanism, negative beta, disappears when inflation expectations become a bit unglued, or nominal bonds to stop being safe havens in recessions. That is a more tenuous phenomenon. It could change quickly, as it did in 1972 an again in 1980. I think of this possibility as an element of the larger danger.

The larger danger is a doom loop, or sovereign debt crisis, a lot more r with a lot less g, all of a sudden.

Suppose we have run our "one time" final expansion and are at 200% debt to GDP ratio. The next big crisis hits — a war, pandemic, financial mess, or all three. The US wants to borrow another 20% of GDP, and roll over the outstanding debt. Markets get worried and demand, say, 5% rates. That means 10% of GDP more primary deficit, or 10% of GDP more borrowing, 30% of GDP, plus the roll-over. Markets get more worried, and demand 10% rates, so we must borrow 40% of GDP, plus the roll-over. When this spirals out of control, you have a debt crisis. It must lead to sharp inflation, or default. And there is no Germany to bail us out, no Mario Draghi to "do what it takes."

Default is not impossible, just because the US and eurozone print our own currencies. Imagine my scenario and add policy chaos. The US is just getting going on political chaos. Bond markets are demanding 5% or 10%. Are the US Congress and Administration, really going to put interest payments to the Chinese central bank, "the rich," and "Wall Street" ahead of writing checks to needy Americans? Don't bet on it. It won't be a simple default. It will be a complex restructuring, as it always is. T bills may get forcibly rolled over to low-coupon long term debt for example.

But this would be a financial and economic catastrophe. "Riskless" US debt and the US ability to bail out any financial institution in trouble are at the heart of our current financial system. And discussions of such a haircut would lead to an immense run and inflation, provoking the event.

How should we avoid this? Well, again, there is nothing like unleashing faster productivity-led growth to solve all wounds. But growth is blocked as it has always been by politically important constituencies who make money from the old way of doing things. And no political movement in the US or Europe has any interest in growth-oriented structural reform at the moment.

At a minimum, our politicians should could again start spending as if they have to pay back borrowed money. They do. We do.

It would help enormously if our Treasuries funded their governments with long-term debt, ideally perpetuities. Long-term financing makes my doom loop debt crisis much less likely, and will give our political systems some space for well-structured fiscal reforms when the end comes.

And finally, don't count on r one percent less than g to bail us out. It needs zero surpluses, which represent an immense fiscal contraction already, and it needs markets to be patient for centuries, through all the upheavals to come.

Why are long term rates low? It's a good question. My simple graphs and equations are just a suggestion. Real understanding needs real models and quantitative evaluation. It is striking to me that so few are exploring this sort of basic economics before jumping on sexy frictions. Perhaps journals are more interested in the latter. And only real understanding will let us know how long it will last.

The low interest rate trend has been going on for a long time. But we should not count on trends without solid economic foundations. Remember Irving Fisher, who said in 1929, "Stocks are at a permanently higher plateau." Unless we really understand why, "r is on a permanently low trend" has a similar ring to it.