

An Overview of the Macroeconomics of AI in the U.S.

Overview

- Is AI-related spending the only thing between the U.S. economy and recession?
 - Not really – but it's true that the overall economy is weak and AI-related spending is strong
 - If this AI-related spending is also fragile, its quick evaporation could be a genuine threat to growth in short-term
 - Most policy issues related to this are very standard Keynesian recession response
- Do we need to worry about an AI-driven financial crisis? (I don't think so – yet)
- What about longer-run effects, like job-displacement or rising profit share? (Again, no evidence yet this is a big deal – and even very bullish forecasts of AI effects don't seem that worrisome)
- Policy thoughts (mostly standard Keynesian recession-response)

Between 2019q4 and 2024q4, GDP growth averaged 2.4%. From 2024q4 to 2025q4 this slowed, but just slightly to 2.2%. The last quarter of 2025 saw a sharp slowdown to a 1.4% annualized growth rate. Some of this was due to the government cuts of DOGE and the shutdown, but there was private sector weakening as well.

When the first six months of 2025 saw weak GDP growth this inspired talk that the only reason the US didn't enter a recession then was spending associated with the race by major firms to "win" AI dominance. I'm going to try to unpack what this might mean and assess how true it is in the current moment.

The punchline is that I don't think that's true as of now, but, it is true that spending on AI is strong and other components of GDP are weak, so, it could become true in the future? And it is true that AI-driven spending is probably pretty fragile and subject to some big downward shocks over next year. Also, I think the wealth effect of stock market valuations are a bigger deal so far than the capital expenditures on AI in terms of how much support to spending (or *aggregate demand* in the jargon of economists) and the former is even a more fragile base of growth for the next couple of years than the latter.

Then I'll touch on one other potential short-run issue – whether or not there is evidence that the financing structure of the AI capex boom is fragile and could amplify any downward effects on spending. So far, I don't see a lot of evidence of financial fragility – at least not any that is macro-relevant.

Finally, I'll say a couple of words about the issues related to AI's potential effects on labor market outcomes through job displacement. I guess I'll just say it – I see little evidence either in data so far or even in pretty bullish forecasts of how disruptive AI will be that these are huge issues of concern going forward that need super-tailored or different policy responses.

I'll end with some obvious policy thoughts.

AI-Related Spending and Near-Term Growth (or, Hydraulic Effects Related to AI)

- 2 big effects of AI-related spending and growth
 - Consumption spending from stock market “wealth effect” – AI firms leading a stock market surge (bubble?) that is generating more consumption spending
 - Macroeconomic investment (building plants and structures, buying equipment and people to do R&D) related to AI firms' race to make the market-leading AI firm
- Right now, wealth effect likely the bigger one?
 - But, combined, AI-related spending might be adding 0.5% roughly to GDP growth? Not nothing but not the whole story explaining non-recession
- Financial fragility from AI capex another worry?

So, what could people mean by saying that AI (and implicitly spending associated with AI) is keeping the US economy out of recession? I think two things.

First, the rising stock market valuations driven by hopes that AI investments will spur future profits is buoying consumption spending through *wealth effects* – as stock market wealth rises people spend down some of those wealth increases and consumption spending is higher.

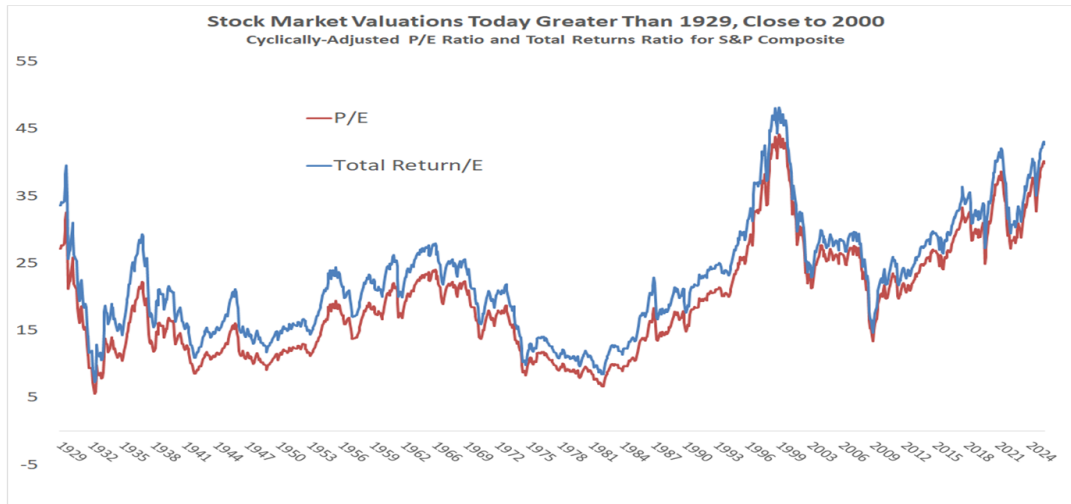
Second, there is a lot of investment in plants, equipment, structures and intellectual property that is associated with the AI boom – lots of firms are hoping to be in the first-wave of companies whose AI products are adopted, this race for first means they're investing a lot today in data centers, servers, racks, and research. This wave of AI related-spending that we'll call “capex” is spurring spending and demand for components, construction materials and labor, and people.

I'll assess the likely strength of these two effects in a minute.

Some people have thrown another factor into the mix that could amplify the economic effects of any downward shock to AI spending – fragile financing structures that could cause collateral damage as they are unwound. These are a lot harder to assess but I'll say a couple of things about this.

First, the hydraulic spending effects associated with AI-spending – wealth effects from stock market valuations and capex effects from the AI buildout.

Stock Market Today Does Look Like a Bubble



The stock market today looks bubbly. The clearest indicator of whether or not the stock market looks to be a bubble is the price/earnings ratio. In the end, you decide to own a stock because you expect it to throw off income in the future – either dividends or a capital gain. At any point in time, that income stream that can accrue to shareholders is limited by a firm’s *earnings* – the denominator of the price/earnings ratio. When you’re comparing across stocks, you want to buy the \$1 of earnings that is the cheapest to purchase – so the price of a stock is in the numerator.

The p/e ratio for the entire stock market basically tells us how expensive it has become to buy \$1 of earnings generally for investors. It has become extraordinarily expensive – essentially the most expensive in history outside of the 2000/2001 stock market – which saw a very large decline in subsequent years as the internet bubble popped. We’re already seeing a higher p/e ratio than what prevailed in 1929, the other huge stock market bubble in history.

Is it possible that today’s high p/e ratio isn’t a bubble? It’s possible. We’re not really just buying *current* earnings with a stock purchase, we’re thinking about *future* earnings. Maybe AI investments will cause such a profit boom in the coming years that the expensiveness of today’s stocks will be justified? But that’s really the only “out” for those thinking this is not a bubble – we need to see very, very large profits in coming years.

Numbers on stock market effect

- Households have about \$40 trillion in corporate equity wealth
- Say p/e ratio falls from today's 40 to more-reasonable 30. Say it all happens through declines in stock prices
 - HH wealth would then be down \$10 trillion. Stock market wealth effects are estimated at around 2% (much smaller than wealth effect from housing wealth), so, this is about \$200 billion reduction in consumer spending
- This is very roughly 0.65% of GDP growth
 - Real number might be less? Could take >1 year to see price declines? AI-related stocks "only" about 50-60% of stock growth since 2022....

How much does this very high p/e ratio matter in terms of spurring extra spending in the US economy? Say that it returns to something slightly higher than its long-run, 1989-2019 average (slightly higher to reflect today's lower interest rates than the 1989-2019 average). That's a reduction of about a quarter (going from 40 to 30). HHs have about \$40 trillion in wealth in corporate equities, so, if all this reduction in the p/e ratio happened through lower stock prices rather than some pick-up in earnings, this would imply roughly a \$10 trillion reduction in HH wealth. Adjusted for the size of the economy, this is about half of the wealth hit we saw when the housing bubble popped in 2006-2009 and then the stock market followed.

2 other reasons why this one is less scary besides just being smaller than those 2008 shocks.

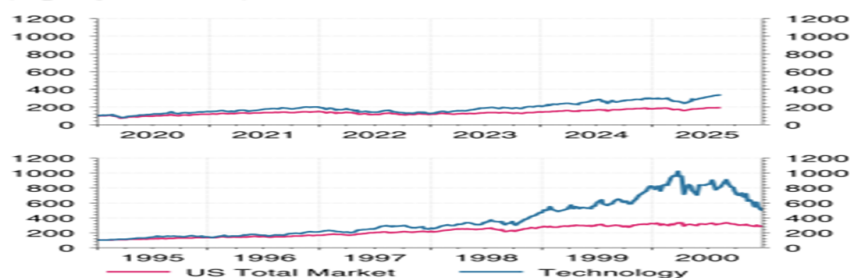
First, the standard estimate of how much a \$1 rise or fall in stock market wealth affects consumption is around \$0.02. For housing wealth the number is at least twice as big and maybe three times as big. Half of the wealth hit in the 2008 crisis was housing wealth with much-larger spending effect. Second, I don't think (I'll talk more on this in a second) that we've seen the extremely fragile financing structures of the AI boom that we did for the housing bubble).

So, based off a \$10 trillion reduction in wealth, this implies a reduction in consumption spending of around \$200 billion, or 0.65% of GDP if the entire p/e correction happens through a fall in stock prices. If all this happened in a year, it would not be a small deal but still likely wouldn't push an otherwise-healthy economy into recession. But, it's a heavy drag on growth and the economy might not be otherwise-healthy.

Note on bubble/wealth effects

Today's overall p/e a bit lower than 2000, and today's contribution from technology firms smaller than in late 1990s?

Figure 3 Current tech rally vs. dot-com bubble (equity indices)



Source: LSEG.

Note: In each panel, indices are rebased at 100 on the first date displayed in the chart.

One favorable thing worth noting is that the overperformance of technology stocks in the past few years is relatively less pronounced than the overperformance of technology stocks in the 2000 bubble.

AI Capex Big Yet Still Seem Overstated

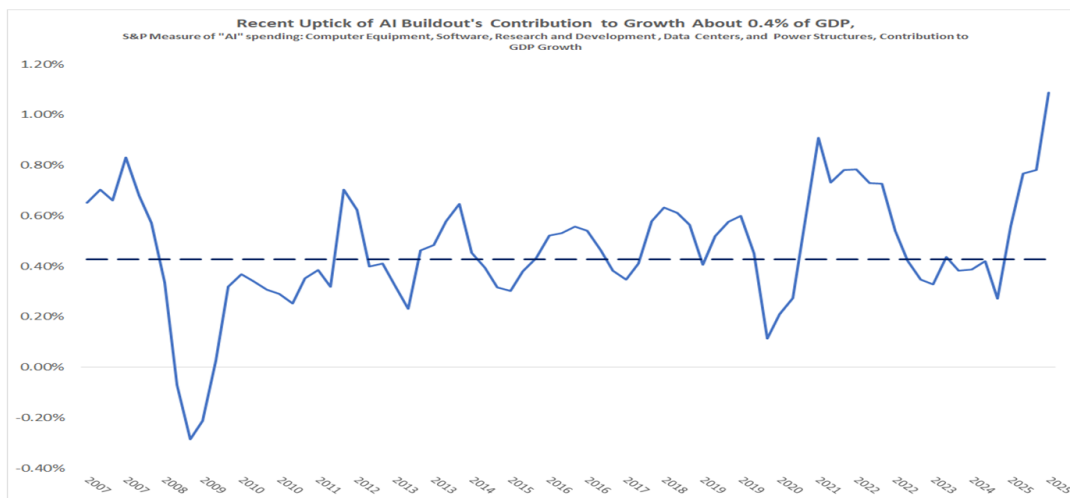
- “Meta plans \$600 billion US spend as AI data centers expand”
- These are *plans* over some *multi-year* period
- Also, some of the capex in these AI “plans” is either the same as or is just substituting for other IT-related investments.
- Is there evidence that AI is driving a big uptick in overall corporate spending?
- Real data that can so far be plausibly linked to AI capex spending shows something like a 0.4% contribution to GDP growth

Yet, again, this capex contribution pales when compared to other historical periods of rapid tech adoption – like the late 1990s

How about AI capex? It's definitely up noticeably very recently (first 2 quarters of 2025) but on this one I think the hype has gotten ahead of impact. Lots of articles throw around numbers like “one

firm is spending \$800 billion on AI”. That would be huge money, even in macro terms. Almost always those stories are highly misleading – it’s more like a company announced plans to spend that much over some 5- to 10-year period.

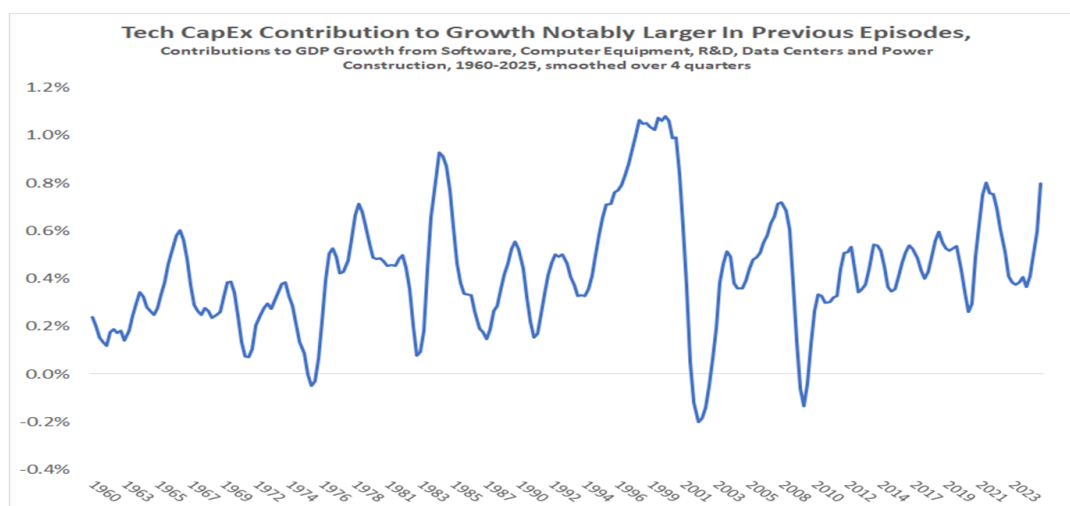
AI Capex Contribution to Growth Rising Very Recently



To get a sense of actual spending that can be tracked in high-quality data and plausibly attributed to the AI capex buildout, we use a classification used by Standard and Poors about what components of GDP one might expect to see pushed up by AI spending – they identify these sectors as: “data center and power construction, information processing equipment, software, and research and development”.

If you do that, and look from 2007, you do see a very recent pick-up in the contribution of this kind of investment to GDP growth. Basically from 2007-2019 this kind of spending contributed 0.4% of GDP growth in an average year, but for the first half of 2025 it contributed 0.76%. That 0.35% “excess” contribution is not nothing, but not huge? One note for why it’s not huge – all these components together only constitute about 7.7% of total GDP. So, even if they grew at 10%, this would only imply a contribution to growth of less than 1%. You see this dynamic especially in data centers – they’ve grown at about a 40% clip over the past year, but they still are only 0.1% of GDP, so, they contributed just 0.04% to growth. And, of course, it’s only the excess contribution over some loosely defined “normal” amount that I think you can really say is the AI driver of growth?

Today's Tech Spending Tame in Historical Frame

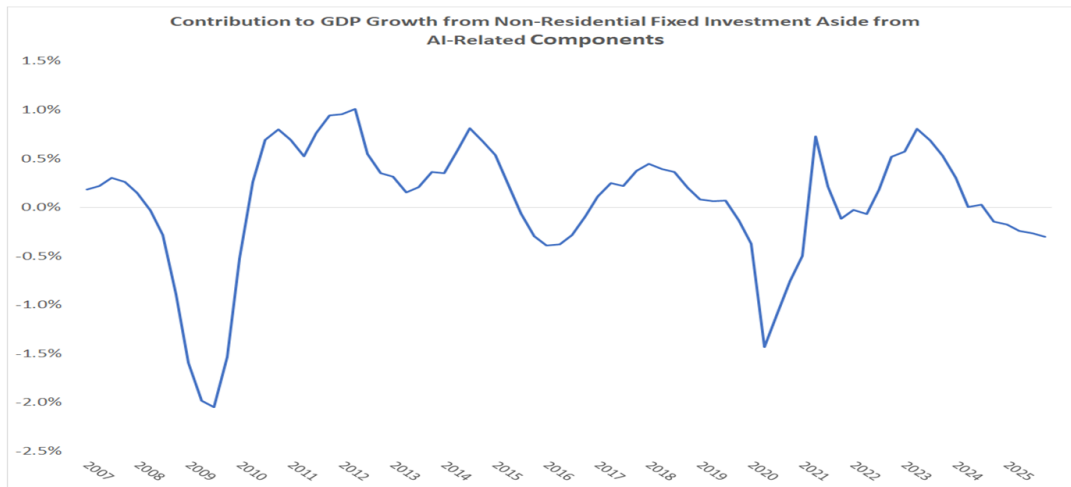


I should note another comparison to the dotcom buildout of the late 1990s - so far this wave of tech investment kind of pales in the face of that. This chart also smooths this spending over 4 quarters – it's only the first 6 months of 2025 that saw a big pickup.

A very important note as well is that not all of this “excess” capex translates into U.S. GDP – lots of computer equipment is imported and imports are subtracted out of this kind of investment when you're accounting for contributions to growth. Could easily be a third or more of the equipment is being imported by value?

Finally, it's worth noting the pretty pronounced weakness in business investment outside of the AI-related sectors. Non-residential fixed investment outside of these categories is now into negative territory. Given the highly unfavorable environment for new investment over the past year with radical policy uncertainty surrounding tariffs, the scale of deportations, the independence of the Fed's policymaking decisions and upward pressure on interest rates with the passage of the OBBA this weakness is hardly shocking. But, shocking or not, it does demonstrate that concerns that the macroeconomy has become very dependent on AI spending have some real basis.

Side-Note: Non-AI Related Investment Is Quite Weak – Could be AI Crowd-Out or Casualty of Overall Policy Uncertainty?



Summing up hydraulic effects

- Aggressive estimates (0.65% contribution from wealth effect and 0.35% from capex) sum to about 1% of GDP growth contributions
- Our long-run sustainable pace of GDP growth is likely under 2%, so, a 1% shock is halfway to recession, and, growth of 1% would see unemployment rate start to rise
- Further, AI-related spending might well be a fragile base for growth – it is not hard to imagine both wealth effects and capex drying up really fast if firms start being disappointed about potential future returns
- So, AI-related spending effects alone would definitely make me start reaching at least for the “what to do in case of recession” playbook
- Luckily (so far anyway) I don’t see the financial fragility issue in play yet – investments seem mostly financed out of profits

But, still, if we take the “excess” wealth effect and the “excess” investment in AI-related categories and round them up aggressively, you can get within shouting distance 1% of GDP growth over the past year. This could be close to the threshold for pushing the economy into outright recession if there was a quick evaporation of these effects.

And, that's the real danger - I think there could be a relatively quick evaporation. Both the wealth effect and the capex boost could be pretty fragile bases for growth going forward. Lots of the racing firms are going to fall behind and once people decide their stock isn't the one that will generate huge future profits they will pull out and their prices will stop growing or even collapse. And, if the ability of AI generally to generate profits starts to get doubted in coming years, this will also lead to a price collapse.

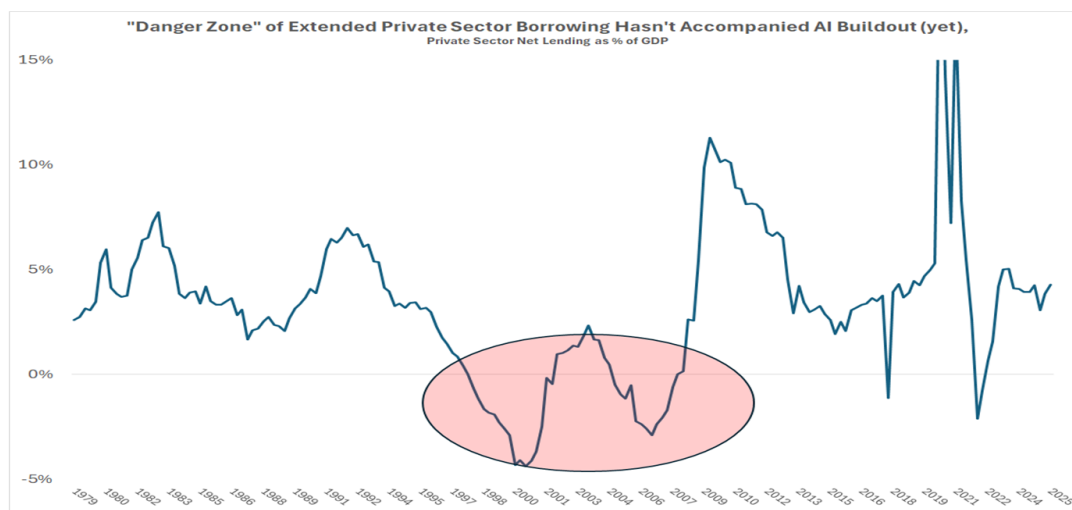
One key issue here – AI could be a huge productivity boost and yet fail to generate profits! That would be an amazingly good outcome from typical peoples' perspective in the long-run, but we should note that doubting that AI-related stock valuations are reasonable doesn't necessarily mean you think AI is worthless – it just means you're doubting it's going to be historically *profitable*.

Besides these two hydraulic Keynesian effects of AI spending – consumption spending out of stock market wealth and capex, people have also raised the issue of fragile financing structures that could amplify the downward shock of any AI-spending pullback. You've heard some comparisons out there to the 2008 Great Financial Crisis. What made the potential financial amplification effects of that crisis so bad was that the housing bubble was supported by huge increases in debt that were in turn collateralized against precisely the thing that cratered in value (home prices). This meant that the house price crash was amplified throughout the financial sector and led to cascading crises throughout financial institutions.

I will say a couple of things to that, mostly, I think reassuring in some sense.

First, there is some comfort to be taken in the fact that the 2001 stock market crash did not generate these kind of amplification effects that threatened the financial sector. That's because the financing of firms in that episode was mostly through straight equity – firms issued stock and people bought it. When firms failed (think pets.com), all that happened was that equity-holders lost wealth. There were no cascades within the financial sector that amplified bad outcomes. This is in contrast to the 2008 crash, when the financing of new home constructions was done by huge amounts of leverage – and opaque leverage at that. As home prices began falling, debts went unpaid, and one company's failure to pay their debts lead to another firm who held that debt to fall, and this fall meant more debts were unpaid and so on.

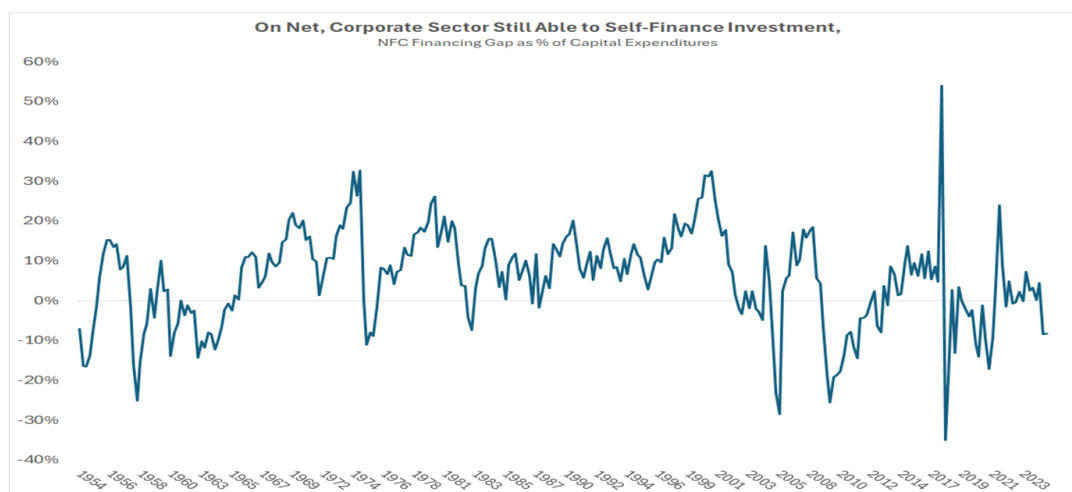
So Far, Little Evidence Of Fragile Financing Structures?



Second, so far the AI buildout seems to be – at least in macro data – mostly happening through free cash flow (profits). If you look at net lending in the private sector, there has been no sharp dive into negative territory the way there was with both the stock market and housing booms.

[The stock market bubble saw net borrowing *among firms* – they really did a lot of investment to wire the economy for the internet and couldn't finance it internally out of profits. That gap is what is being shown here – it turns out they filled that gap with equity rather than debt – equity is also a liability. Housing market saw the net borrowing show up in the *household* sector - households' mortgage debt is intermediated by finance but stays on the balance sheets of households]

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Further, if you look at the financing gap – or the difference between current capital outlays and cash flow normalized by the outlays– you see this is right around zero. When this number is positive and large, this means firms need to find external finance because they can't finance capital investment out of current profits – this external finance can be either equity or debt. So far, it has not spiked very positive and firms can do most of the financing they need with current profits.

I've read the reports that financing is getting a little dodgier in the AI sector with more debt and more opaque relationships. And, the financial sector is great at hiding risks from the kind of macro data I'm looking at. But for now, I don't see a ton of financial amplifiers that would make our earlier estimates of wealth effects on consumption and reductions in capex explode much bigger.

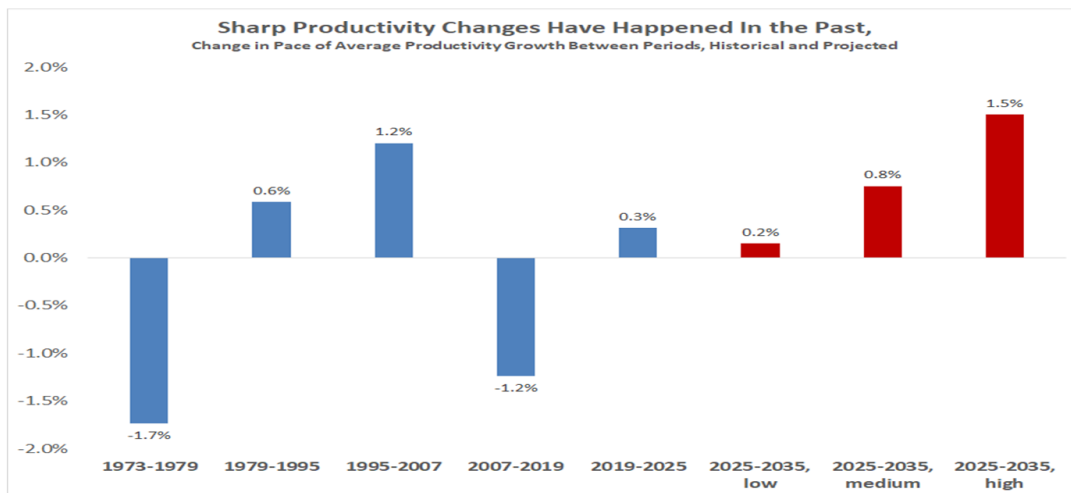
Finally, in the end the problems associated with the financial crisis of 2008 and early 2009 were not the things that led to the long depression of GDP and the labor market in the 2010s. We resolved the financial crisis pretty quickly. I'll say a bit more in the policy section about lessons learned, but, what made the housing bubble burst so destructive in the 2010s was the ensuing policy failures – most notably the embrace of fiscal austerity – it was the failure to address the real economy's demand shortfall with the policy medicine it needed, not a story about the financial sector.

Will AI Make Jobs Redundant and Raise Profit Share?

- Forecasted effects – even on higher end – are not showing historically unprecedented labor market disruption coming our way
- Effects on young college grads employment thru 2024 not really evident
- Effects on profit share also not evident

A couple of last thoughts that are actually mostly the same thought: what will be AI's effects on job-displacement and productivity.

AI's Forecasted Productivity (and Job-Displacing) Effects Are Not Historically Unprecedented



When people express concern about AI and job-displacement, it really has to show up as an increase in measured productivity – where productivity is output generated in an average hour of work. If firms can reduce their workforces and still make the same amount (or more) stuff, this is the displacement people are presumably concerned with and it *must show up as an increase in measured productivity*.

Even if there is a productivity acceleration associated with AI investment, this doesn't have to lead to job displacement, however. The productivity boom will raise incomes by definition – if the income gains are spent this would boost demand for labor somewhere outside the sectors that did the productivity-enhancing investment. There is really good research showing that productivity growth within any sector does tend to reduce job-growth in the sector, but, it *generates* job growth in other sectors. So, as productivity rises in manufacturing, job-growth in that sector is sharply reduced, but this makes goods produced in this sector much cheaper and frees up money to be spent in other sectors, creating jobs there.

If the income gains from productivity growth are not being spent and generating demand for labor elsewhere, that's a problem calling for a straightforward Keynesian solution – use the tools of monetary and fiscal policy to boost spending and ensure the spending happens.

So, productivity growth is the necessary but not sufficient condition to be really concerned about a genuine wave of job-loss spurred by AI.

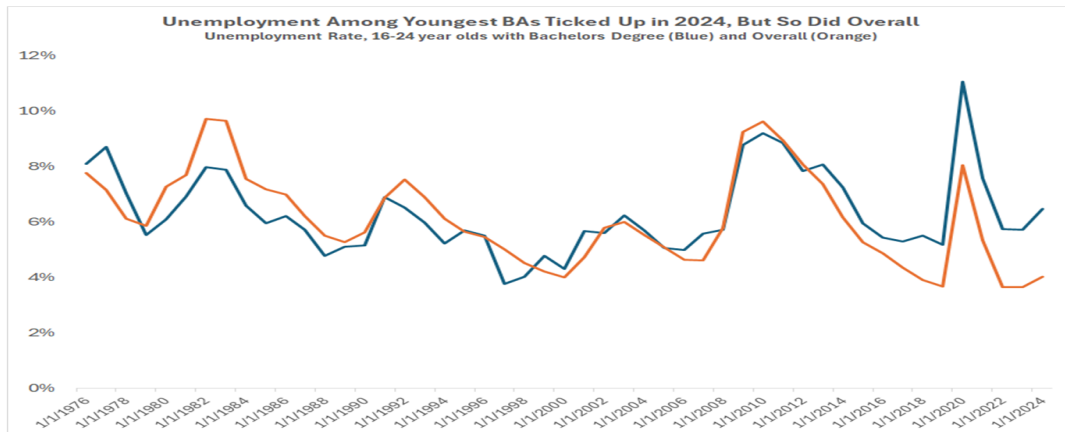
Lots of the talk around AI and job displacement is really hyperbolic. It is useful to take a look at what some forecasts of AI-induced productivity growth would mean for the economy over the next 10 years and see how out of bounds this experience might be relative to historical experience. If it's not that out of bounds, there should be some comfort there?

Basically, I took a modest and a stretch estimate of how much AI investments will boost productivity growth over the next decade. The modest one comes from Daron Acemoglu, and, he thinks AI will boost productivity growth by about 0.15% per year for the next decade. The stretch one comes from Goldman Sachs, who thinks the number is closer to 1.5% per year. I will note I'm really putting my thumb on the scale here, since GS thinks about a third of that 1.5% will come at the direct expense of other technology's contribution to growth, so, they only think measured productivity growth will rise by closer to 1% per year.

But, either way, say they're right and there even is not this "crowd out" effect on other technology. Is an acceleration of productivity growth of 1.5% unprecedented in US economic life? Not really, we've had positive and negative swings about this large between various growth cycles in the past. In the 70s productivity growth slowed incredibly sharply (about 1.7% per year) relative to the previous decades and productivity growth slowed sharply again between 2007 and 2019, whereas in the mid/late 90s productivity growth *accelerated* by right around that 1.5%.

So, we're not really going into the unknown here even in the very bullish forecasts? And, just a refresher – the 70s were really meh in terms of economic performance for typical workers while 2007-2019 was just awful, while the late 1990s and early 2000s were really quite good. All else equal, *productivity accelerations have been good for US workers* even as the overall policy regime allowed far too much productivity growth to escape out of their paychecks. But, the problem wasn't the productivity acceleration, it was the surrounding policy regime.

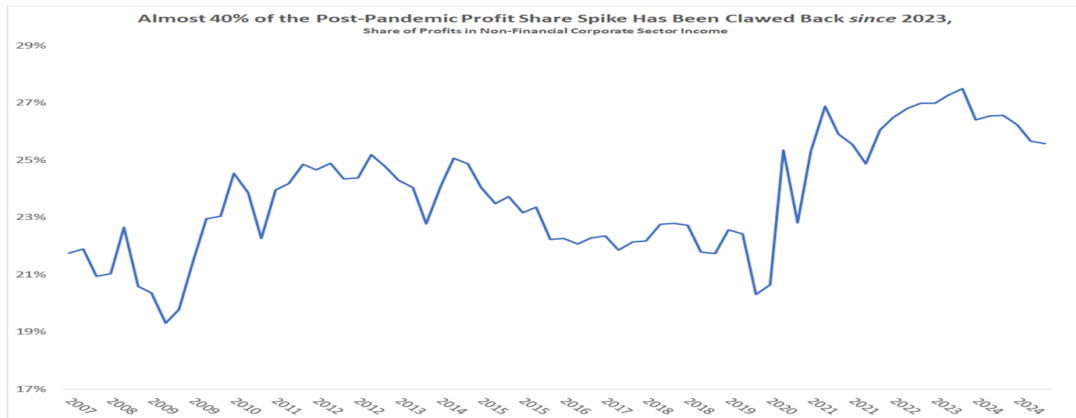
Labor Market for Young College Grads is Softening – But So Is Wider Labor Market



Also, worth checking in on the group generally id'd as the most susceptible to displacement from AI – young workers with a college degree. The labor market has cooled for them over the past year – but it was really, really hot and good for them in the early 2020s. And, lots of this cooling is possibly just a pure demand slowdown – we've seen lots of measures of economic activity slide recently. If you look at the youngest college grads – anybody 16-24 with a degree – their unemployment rate was up in 2024, but so was everybody else's?

Direct estimates looking to link AI-exposure of industries and hiring of workers – especially young workers with a college degree, are all over the place – it has absolutely not been pinned down yet, for sure.

As AI Investment Ramped Up, Profit Share Actually Declined



Finally, there is occasionally a vague worry expressed that AI will lead to a surge of inequality. Obviously to the degree that it leads to huge wealth spikes for a very few company owners, this is true. But, the worry is usually linked to the job displacement issue – the idea that companies will be able to make do with AI and machines rather than human workers and this will force wages lower and see firms capture more of the surplus of production in profits.

It is worth noting that since the end of 2023 there has been a pretty pronounced reduction in the profit share of income in the non-financial corporate sector. Basically, the post-pandemic period of strained supply chains and temporary (if quite extended!) pricing power saw the profit share in the non-financial corporate sector rise by about 5 full percentage points between the end of 2019 and its peak at the end of 2023. Since then, however, 2 of these percentage points have been reclaimed by labor, and during precisely the two years – 2024 and 2025 – when AI was allegedly being adopted more rapidly. Again, like the unemployment rates of young college grads, broader macro trends besides AI are the real story here.

Policy Thoughts

- For recession worries, the playbook is largely the same regardless of source of demand shortfall: use monetary and fiscal policy to boost the demand that was erased
 - Would be nice to have strong automatic stabilizers in the US, but, we don't and the OBBB just weakened the ones we do have (Medicaid/SNAP)
- We probably don't need it – but a better playbook for what happens during financial crises still needed
 - Don't want to coddle banks/financial institutions, but also don't want to hobble Fed's ability to do rescue measures
- For long-run worries about inequality, AI changes very little – we need full employment, strong unions, robust labor standards and a progressive tax/transfer system. Very little AI-tailored needed here

In the short-run, the main concern is that AI-spending is providing an outsized role in supporting GDP growth, yet might be fragile. I think the policy issues here are mostly just Keynesianism – be ready with monetary and fiscal policy support to spending if there is a recession. There is still some room to lower short-term rates and there should be a lot of mortgage holders out there who could refinance and get some income so monetary policy should (unlike the 2010s) have a little bit of traction. The trade channel of lower interest rates might be gummed up by the chaos of Trump trade policy, unfortunately.

We all know the drill with effective fiscal policy to fight recessions. You need to send resources to low/moderate income families to support their spending during a downturn. Boost UI, boost SNAP, boost the CTC (and make it fully refundable). I personally wouldn't do broad-based checks again – not a ton of bang for buck and they're expensive relative to effect. Obviously the best macro policy is just the existence of very strong automatic stabilizers that kick in rather than requiring legislative and executive discretion, but we don't have those. We should, but we don't. And, if a recession comes in 2027, some of the OBBB cuts to SNAP and Medicaid will have measurably harmful effects in further weakening the already too-weak automatic stabilizers we have.

There are going to be concerns about the financial amplification effects of an AI spending downturn. I don't so far think there is a huge amount to worry about here, but it's worth thinking about. I mentioned before that the financial amplification of the 2008 crisis was actually a huge potential problem but a problem that largely didn't happen due to policy responses. I think much of our approach then – especially the TARP – was overly generous and deferential to big banks. But I think lots of our responses – like the Fed setting up a commercial paper lending facility and expanding its balance sheet – were very good responses that provided needed financial liquidity broadly without bailing out specific firms. I hope this time we won't be so deferential to powerful

financial players but I also hope we don't overlearn the "no bailouts" lesson and tie the Fed's hands too much. We saw a lot of anti-bailout talk in 2020 directed at the Fed. I don't think it was useful and think the Fed's actions in that year were helpful on net without providing a bunch of corporate welfare. I think figuring out what the Fed's response will be and should be for the next big financial shock is a pretty open question?

Finally, for issues related to long-run concerns about inequality and the ability to generate decent incomes from the labor market, I just don't see a ton yet that worries me about AI. Historically, fast periods of productivity growth have been very good for workers overall, not bad. Also historically we have been terrible at helping those workers who are displaced by technology (or trade, or anything else). We should get better at that, but that's mostly about a stronger welfare state and more-broadly available pockets of labor market strength that come thru widespread unionization and taking full employment seriously. We should do all this AI or no, and, nothing about AI makes it all that much more important to do – it was already incredibly important to do. There are of course some regulatory and workplace issues that might be specific to AI and could benefit from some smart policy attention – but it really changes nothing about the really big picture stuff regarding either macroeconomics or what needs done to generate a more-equal economy.

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Very rough figure notes from .ppt:

P/E ratio from Robert Shiller's [online database](#). Takes the rolling 10-year CAPE directly from that.

Current tech rally v dot-com bubble taken from: <https://cepr.org/voxeu/columns/unpacking-us-tech-valuations-agnostic-assessment>

AI Capex Contributions: Data from underlying detail investment data from National Income and Product Accounts. Construct nominal shares and real growth rates for investments in computer equipment, software, research and development, power structures, and data centers to calculate contributions to growth. First graph estimates by quarter, second graph smooths over 4 quarters.

Net borrowing/lending by sector: Data on savings/investment balance by sector from NIPAs, Table 5.1

Corporate sector financing gap: Table F.103 from the Financial Accounts of the United States, Federal Reserve Board

Forecasted productivity changes: Historical data from NFB productivity series from BLS, accessed thru FRED. Forecasted estimates from Acemoglu (2024) and Goldman Sachs (2025) research notes.

Unemployment for young college grads and overall from: data.epi.org

Profit share in non-financial corporate sector from NIPA Table 1.14