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US: Will AI-driven productivity lead to disinflation?

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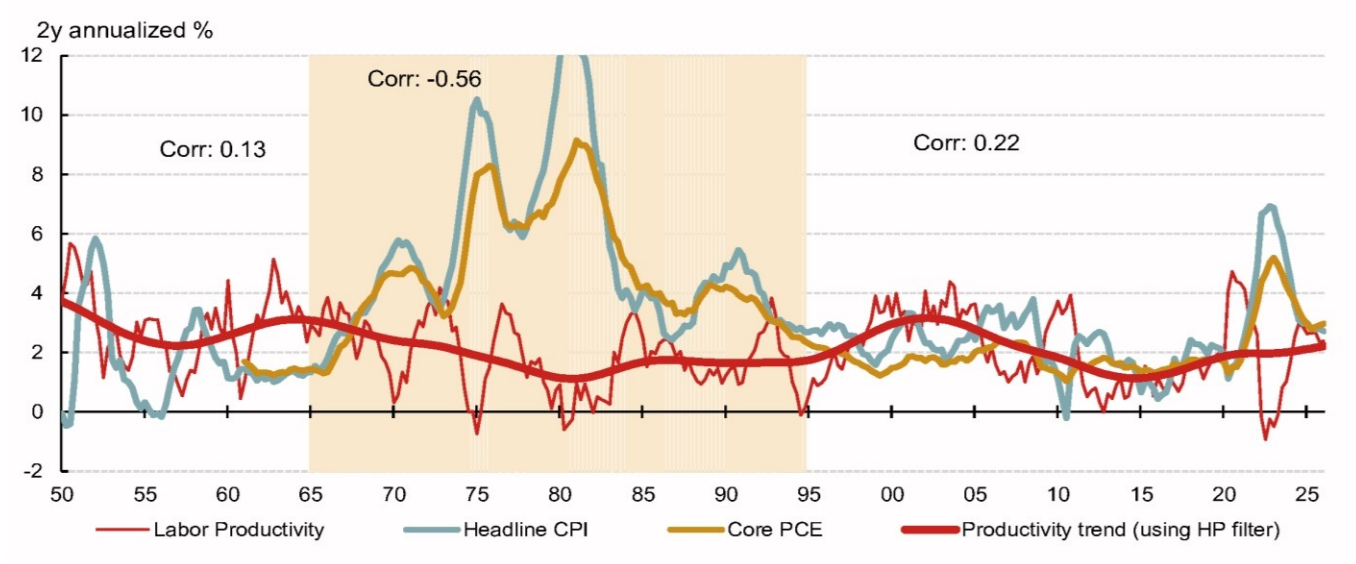
- We view Chair Warsh's optimism on the disinflationary impact of productivity as an important signal of his dovish inclination.
- In theory, productivity can have either a positive or negative impact on inflation. Historically, there is some negative correlation, but the relationship is inconsistent and has performed especially poorly in recent decades.
- The policy implications of productivity trends are subtle. In real time, strong productivity growth is a good reason to tolerate hawkish signals from growth or wages. This is different from assuming *future* productivity growth will drive incremental disinflation.
- Warsh has not convinced other Fed officials that AI will be predictably disinflationary. His repeated emphasis on productivity and supply growth makes us skeptical that he will turn hawkish and support pre-emptive rate hikes though.

Fig. 1: Data point to little evidence for "disinflationary productivity"
Correlation between trend productivity and headline CPI



Note: Labor productivity is real output per hour of all persons. Following Gordon (2005), we define trend productivity growth as the HP trend of the 8 qtr change (with smoothing parameter as 6400, based on Gordon (2003))
Source: BLS, BEA, Haver, Nomura

As Fed Chair, Kevin Warsh consistently emphasizes productivity growth, suggesting this should be an important driver of policy decisions. One of his *five task forces* will focus on "productivity and jobs in an era of transformation." And despite aggressive editing through most of the *June FOMC* statement, one conspicuous *addition* was a reference to strong productivity growth.

Warsh claims that technological progress is a reason to expect disinflation. Before his nomination, he *wrote that* "AI will be a significant disinflationary force." In his Humphrey-Hawkins testimony he added that "productivity improvements over time will be structurally disinflationary," and that "everything technology touches ultimately gets cheaper."

In this note, we argue that productivity is not inherently disinflationary. In the near term, technological progress is driving investment higher, likely boosting inflation. Many (including Warsh) argue that relief is on the way from a future productivity payoff, but we

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do not see evidence for a clear directional impact.

In real time, productivity can be a helpful benchmark for gauging inflation trends – if productivity accelerates, it should make policymakers more willing to tolerate stronger growth in output and wages.

This is different from assuming *future* productivity growth will drive incremental disinflation though. Productivity itself tends to drive output and wage growth trends. Consequently, even if it seems certain that there would be an acceleration in labor productivity in the future, this would not be a sufficient reason to forecast a *gap* between wage growth and productivity or between actual output and potential.

Is productivity disinflationary in theory?

There are early signs that AI diffusion is leading to productivity gains. That said, the read-through to inflation and interest rates is not clear.

In theory, productivity can have either a positive or negative impact on inflation.

Intuition tends to point to a disinflationary impact. For any particular business or industry, productivity growth typically leads to cost cutting and falling prices. Economic history adds to the intuition for "disinflationary productivity." Under certain policy regimes – like a gold standard – productivity growth tends to be disinflationary. A managed money supply will tend to keep nominal GDP steady – implying faster real growth will lead to cooling inflation. Indeed, strong productivity growth is often cited by economic historians as a factor behind deflationary episodes in the late-19th century[1] .

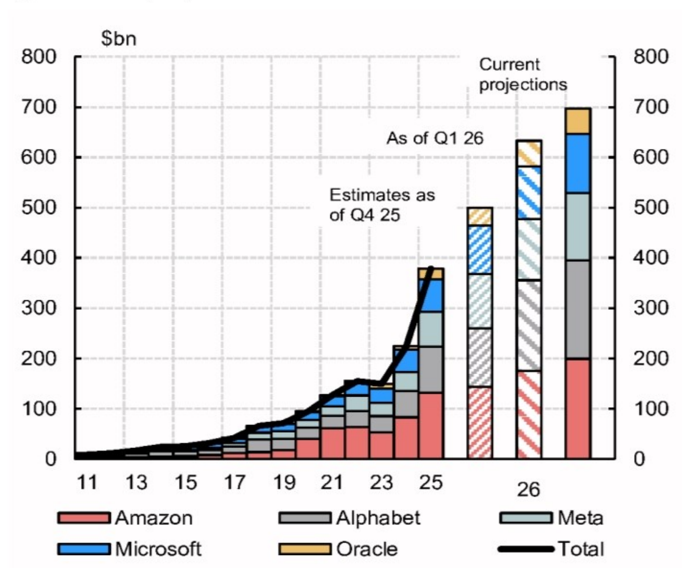
What we think this intuition misses is the dynamic impact of productivity on demand. Productivity raises real income, and more importantly, can incentivize business capex. This implies that even if the most productive sectors see cost relief from productivity gains, the economy-wide effect could be inflationary. Again, the policy regime matters. This demand channel could be especially prevalent for modern central banks, which target interest rates and manage financial conditions.

Inflation pressure has already materialized

This inflationary impact of technological progress is already on clear display. Capex in AI is booming (*Fig. 2*), driving up tech component prices and leading to inflation pressure for consumer electronics (*Fig. 4*).

Fig. 2: Earnings calls and anecdotal evidence indicate businesses are increasingly willing to spend on capex

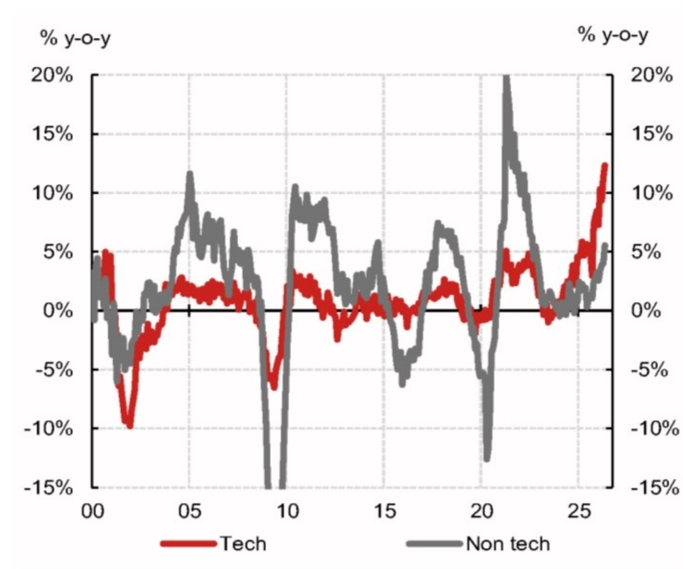
Hyperscalers' capex plans



Source: Company filings, Bloomberg, Nomura

Fig. 3: Strong capex appears to be broadening out to other industries

Contribution from net imports plus shipments

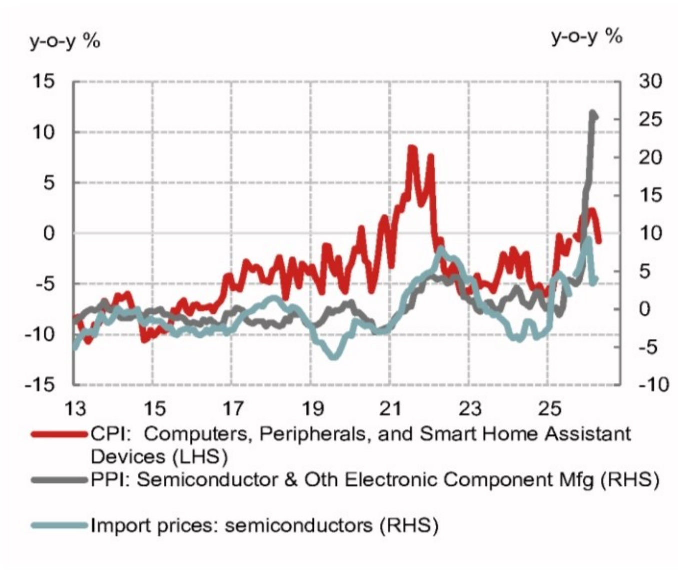


Source: BEA, Census Bureau, Haver, Nomura

With the Fed remaining on hold, there is no circuit breaker for this strong demand. Financial conditions have remained easy, and rather than crowding out other sectors, strong capex appears to be broadening out to other industries (*Fig. 3*).

From the perspective of a hyperscaler, policy likely appears procyclical. Given rapid *price* *increases for tech equipment*, the “real interest rate” for pulling forward debt-financed investment is likely deeply negative (and becoming even more negative as demand strengthens) (*Fig. 5*). Earnings calls indicate businesses are increasingly willing to spend on capex, with activity only constrained by supply and availability of equipment.

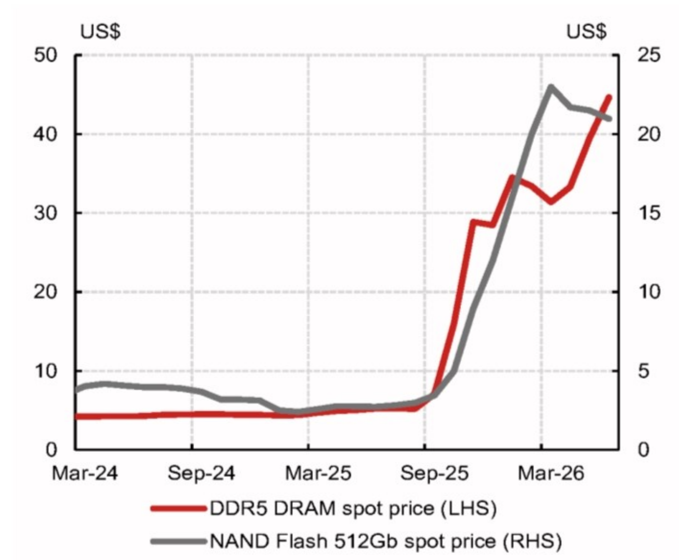
Fig. 4: Booming capex in AI is driving up tech component prices



Source: BLS, Haver, Nomura

Fig. 5: Rising equipment costs incentivize hyperscalers to frontload orders

Memory prices in USD



Source: Bloomberg, inSpectrum, Nomura

Is there relief on the way?

Warsh has acknowledged the demand impulse from AI, but he has also suggested that a disinflationary impulse from productivity is still likely to occur with a lag.

At the *June FOMC press conference*, he said “it may well be an intuition the supply side is going to expand, but it’ll take longer.” In the Humphrey-Hawkins testimony, Warsh went even further to say that this lagged disinflationary impact was sufficient reason to discount the demand-driven inflation already evident in current data.

Evaluating potential channels for productivity led disinflation

In our view, productivity growth on its own is insufficient reason to expect meaningful inflation relief. Strong productivity can coincide with disinflation in some scenarios, but the relationship is inconsistent and has weakened in recent decades. In particular, it is important to consider both inflationary and disinflationary pressure from productivity growth, as well as potential attenuating factors like wage growth and margins adjustments.

Beyond the theoretical reasons to be skeptical of “disinflationary productivity,” historical data also point to ambiguity (*Fig. 1*). There was some negative correlation between labor productivity and inflation from the mid-1960s through the early 1990s. However, the relationship has weakened since then though and has especially broken down post-GFC. Weak productivity growth in the 2010s coincided with a period of low inflation (at the time, theories of ‘secular stagnation’ often cited the era’s low productivity growth as a *cause* of sluggish inflation). In contrast, inflation has surged post-pandemic alongside an acceleration in trend productivity.

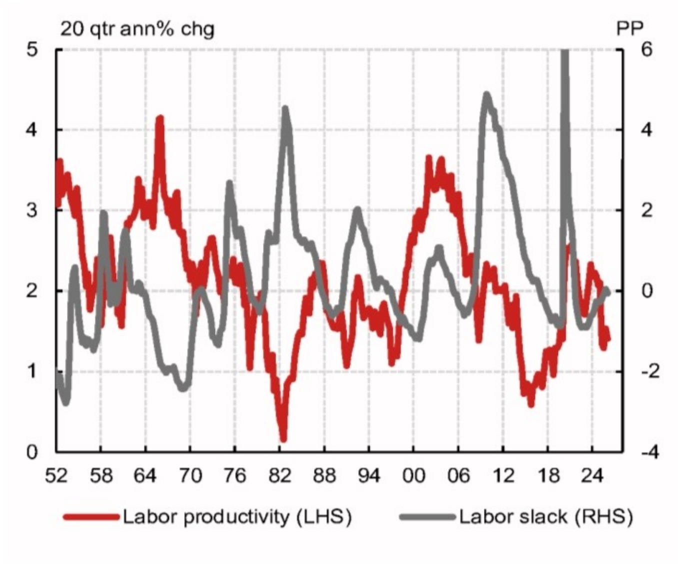
Can productivity growth cause an output gap?

Productivity growth is often viewed as a positive shock to aggregate supply – which could in theory lead to a negative output gap (actual growth lower than potential) and therefore disinflation.

In practice though, there is almost no correlation between productivity trends and economic slack measures (*Fig. 6*).

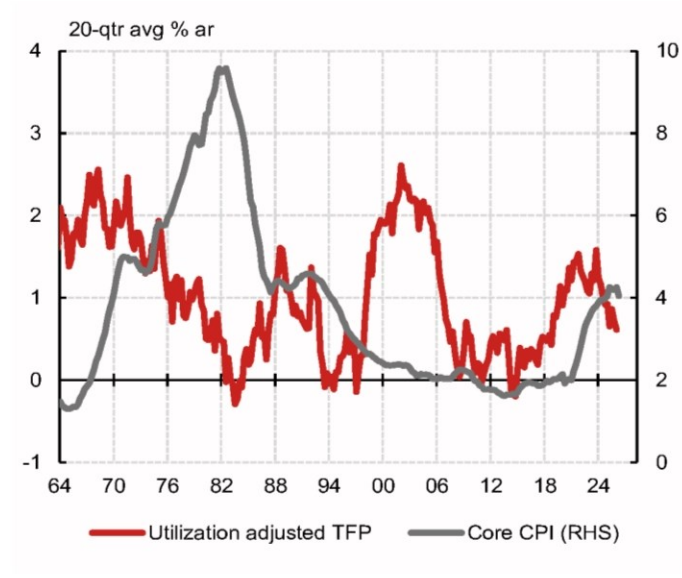
And at least some of the limited relationship between productivity and slack is likely driven by reverse causality. Productivity often rises early in recessions as businesses prioritize their most essential workers (and *remaining workers increase their efforts*) during periods of slack demand and layoffs. The recent pandemic also saw a technical spike in productivity as shutdowns tended to impact lower-productivity service sectors. Adjusting for cyclical fluctuations, measures such as trend labor productivity and *utilization-adjusted total factor productivity* offer no evidence that productivity is associated with disinflationary slack (*Fig. 7*).

Fig. 6: There is almost no correlation between productivity trends and economic slack measures



Note: Labor slack refers to the difference between realized u-rate and CBO's estimate of the noncyclical rate of unemployment (formerly called NAIRU)
Source: CBO, BLS, BEA, Haver, Nomura

Fig. 7: Adjusting for cyclical fluctuations, alternative measures offer no evidence that productivity is associated with disinflationary slack



Note: The utilization adjustments follows Basu, Fernald, and Kimball (BFK, 2006)
Source: SF Fed, BLS, Haver, Nomura

It is true that strong growth is less likely to be inflationary if it is driven by productivity gains rather than cyclical tightening. This is close to the argument Chair Greenspan made in the 1990s, when inflation was subdued and the Fed was debating pre-emptive tightening.

It's more difficult to explain why ex ante productivity growth would be a reason to expect disinflation though, specifically when inflation has remained elevated and above the Fed's target for five years.

One possibility is that AI is a uniquely disruptive technology for labor markets, causing productivity growth mostly through a reduction in hours worked, rather than through faster output growth. *We see little evidence in recent labor data to support this view though*.

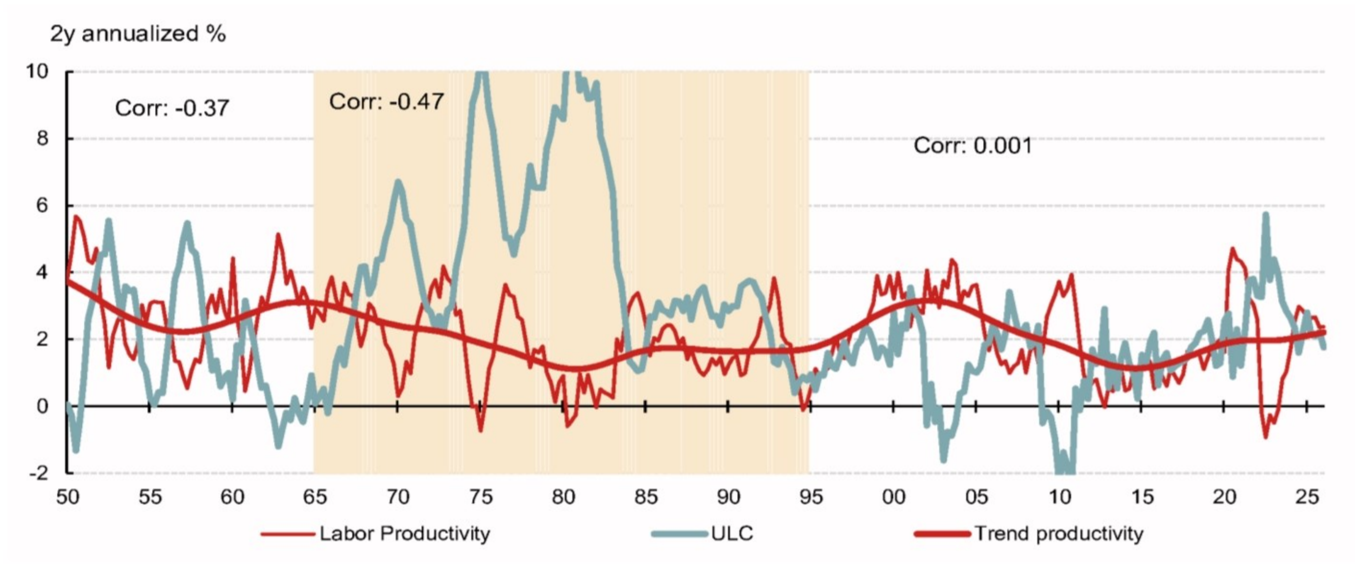
Unit labor costs

Another channel linking productivity to inflation is unit labor costs (ULC). This measures the ratio of total-economy compensation and output, which can also be expressed as the ratio of average wages and labor productivity. ULC has a strong contemporaneous correlation to inflation, so this appears to be a channel for productivity to put downward pressure on inflation. However, despite a strong intuitive connection, we see two shortcomings with this framework.

First, productivity trends do not consistently drive ULC growth. Although productivity is the denominator in the formula for unit labor costs, it does not follow that ULC mechanically slows when productivity accelerates (*Fig. 8*). (This would be like saying a baseball player's batting average inevitably falls as they get more at bats, or a stock's P/E ratio declines whenever there is faster earnings growth.) The implicit assumption behind this formulaic interpretation is that the numerator, wage growth, is held constant. This is reasonable for short-run forecasts, but over a longer time horizon, productivity growth is one of the strongest drivers of real wages (*Fig. 9*). Empirically, the relationship between productivity and ULC varies over time and has tended to be weak in recent decades (*Fig. 8*).

Fig. 8: Productivity does not mechanically reduce ULC, since wage growth also changes over time

Correlation between trend productivity and ULC

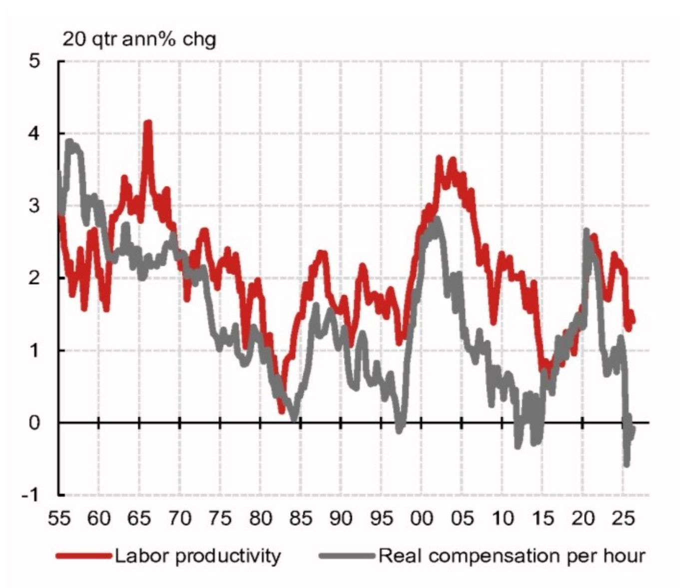


Source: BEA, Haver, Nomura

Second, the causal relationship between ULC and inflation tends to be overstated. Profit margins often adjust to limit the pass-through of labor costs to final prices especially, if labor productivity improves due to capital deepening (*Fig. 10*). A large share of the consumer basket is also relatively insensitive to labor costs – including imported goods and housing services.

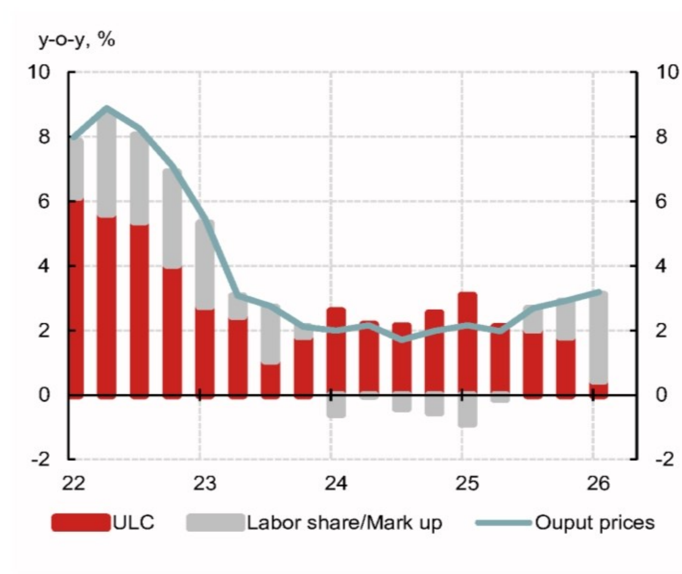
In practice, while ULC has a reasonable contemporaneous correlation to inflation, it adds *little or no value* as a forecast of future inflation.

Fig. 9: Over a longer time horizon, productivity growth is one of the strongest drivers of real wages



Source: BEA, BLS, Haver, Nomura

Fig. 10: Profit margins often adjust to limit the pass-through of labor costs to final prices



Source: BLS, Haver, Nomura

Productivity in inflation models

Some macro inflation forecast equations will incorporate trend productivity growth with a negative coefficient.

In most cases though, these models are capturing a partial or conditional impact of productivity growth. For instance, *Robert Gordon's "Goldilocks" inflation model* includes trend productivity growth in addition to demand indicators and lagged inflation.

In other words, these models do not consider the full impact of productivity on inflation but instead take demand indicators as a given.

This is a reasonable approach for short-term inflation forecasting and can help to shed some light on real-time policymaking. Faster trend productivity should make officials more willing to tolerate a strong labor market or above-trend GDP growth.

In our opinion, these models are less helpful when analyzing productivity from a forward-looking perspective though. The main channel for productivity growth to be inflationary is by boosting demand (because of faster real income growth or by increasing incentives to invest). A policymaker who expects *future* productivity strength would want to consider the unconditional impact, not a partial relationship which takes demand growth as a given.

Productivity surprises and policy mistakes

One possibility is that productivity does not drive inflation in general, but *productivity surprises* can. This could help explain why productivity and inflation are correlated at times, but inconsistently.

The *narrative record of the 1970s inflation episode* demonstrated Fed officials' slowness in realizing that trend productivity had shifted (the *reasons for the slowdown were still being debated well into the subsequent decades*). This, in turn, contributed to overly dovish policy as inflation was attributed to cost shocks rather than an overheated economy.

Considering the current context, it seems unlikely that policymakers would be caught off guard by an AI-driven productivity boom. (The Fed chair *described* the productivity impact of AI as the most important narrative in his adult life). While mismeasurement and misperception of growth trends are always risks, we do not expect faster productivity growth to lead the Warsh Fed into persistent hawkish policy errors that drive inflation lower.

Policy implications

Economic theory and history do not make a strong case for disinflationary productivity. Recent price pressure in IT goods suggest the near-term impact of technological progress may be *inflationary.* And we do not see strong evidence to expect disinflationary relief in the longer run.

Most Fed officials do not appear convinced by Warsh's argument that AI will lead to disinflation. The June FOMC meeting minutes showed "many participants" concerned about the inflationary impact of AI investment, while only "some" expected offsetting downward pressure from productivity growth. (The June minutes also show disinflationary productivity optimists pushing out their expected timing for inflation relief, claiming "this effect would likely take time to materialize.")

Warsh's repeated emphasis on productivity and supply growth has led to our skepticism that he will turn hawkish and support pre-emptive rate hikes. His views on the impact of productivity growth appear deeply held – he has *de scribed these* in terms of his "intuition," and has continued to emphasize the importance of supply growth, even while noting it is difficult to measure. And given Warsh's criticism of official government statistics, it appears unlikely that near-term data would dissuade him from this view.

Incidentally, the near-term inflation trajectory is also likely to be encouraging for FOMC doves. Inflation momentum appears to have peaked. Headline inflation has cooled, and we expect a gradual slowdown in monthly core readings driven by waning tariff pass-through and residual seasonality. We do not expect disinflationary productivity growth, but "disinflation and productivity" should be enough to keep policy on hold.

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1. For example, see "The Myth of the Great Depression (1873-1896)" by S.B. Saul

Appendix A-1

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