Inflation: Energy shocks, sectoral inflation, and the energy transition

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I will discuss:

1. Persistence of housing and services inflation
2. Energy shocks and inflation
3. The energy transition and inflation
   a. Recent trends in U.S. fossil fuel prices & price volatility
   b. (Dis)inflationary impacts of renewables and EVs
4. Climate change and inflation

Peak of energy inflation = June 2022
Background: Inflation measures

Inflation measures, 12-month pct chg (ar)
Background: Energy event timeline

- Peak of energy inflation: June 2022
- Nordstream 2 explosion: 9/26/22
- Ukraine invasion: 2/24/22
- Pre-Ukraine runup begins: August 2021

Source: U.S. Energy Information Administration
1. Persistence of housing & services inflation

**VAR**
- Variables:
  - PCE-energy (12 mo)
  - PCE-services (12 mo)
  - CPI-housing (12 mo)
  - Ugap
  - SPF-10 year expectations
- Energy ordered first
- Estimation 1984-2022m6
- Focus on dynamics (persistence) of the disinflation post-2022m6 – does observed persistence match actual?

**Forecast and actual: PCE-energy, 12-month inflation**

VAR(6), estimation 1984m1-2022m6, forecasts (dashed) and +/- 1 SE forecast bands
1. Persistence of housing & services inflation, ctd.

- Persistence/dynamics during the disinflation largely match the post-1984 historical dynamics
- Many of the energy shocks are plausibly exogenous (Ukraine-related, mild U.S. & European winters)
- As energy shocks have reverted, so have services and housing prices
- Implications: Absent energy price shocks, housing and services inflation will be in normal range in 8-12 months
- A (too?) simple story – no supply chain disruptions, no v/u, no nonlinearities, no FTPL, not even COVID-induced consumption switching
2. Energy price shocks and inflation – a pass-through perspective

\[ \pi_t = \alpha + \beta(L)w_t + u_t \]

- Plot is cumulative coefficients
- Monthly data
- Inflation: PCE-xfe
- Energy:PCE-energy

- Pass-through from energy to core is greater during the current episode than since 1984 – but less than in the 1970s
  - XFE has energy-sensitive components, e.g.:
    - Air travel services
    - Freight delivery services
    - Mechanically, working through the supply chain results in long and increasing CIRF (Minton 2022)
In the U.S., the prices of oil, natural gas, and coal now move together.

- Liquified natural gas (LNG) exports have connected U.S. to world gas prices, which are largely indexed to oil.
- Coal and gas compete on the margin in U.S. power generation.
- Implication: greater volatility – and higher levels – of home heating and electricity prices.
- Gas & oil will be important over (at least) the next 10 years.
- Will geopolitics of the energy transition be tranquil?
Renewables and EVs will reduce dependency on fossil fuels, total fossil fuel share of GDP, and – in the long run – will reduce volatility.

But:

- In wholesale energy markets, the marginal generator will be gas for ~15 years – so marginal wholesale electricity price volatility will remain.
- U.S. gasoline consumption peaked in 2019, but it will take 2-3 decades to phase out internal combustion engines.
- Ongoing vulnerability to geopolitical energy transition risks
4. Climate change and inflation

Climate change risks - jargon:
• **Physical risks:**
  o direct effects (hurricanes, etc.)
  o institutionally intermediated effects (e.g., increasing wildfires + insurance carrier/regulator problems = insurance market failure)
• **Transition risks:** policy vicissitude, energy transition, political risk, geopolitics

There is a lot of current work on macro risks/consequences of climate change.
• NGFS, BIS
• FSOC-CFRAC
• NASM climate round table

Over the time frame relevant for monetary policy and planning (decade?) (my take):
• Direct physical risks are unlikely to have macro stability consequences on their own
• Inflation risks – sectoral shocks (mainly bad) – ag prices, supply chain disruptions, etc. (how large though?)
• Indirect physical + institutional? Maybe, in the context of correlated compound risks with accelerators
  • Housing price vulnerability to climate change (hurricanes, sea level rise, wildfires) + insurance market failures + misperceptions
• Energy transition risks?
  • Efficient policy and smooth transition? Limited macro impacts.
  • The actual energy transition? Potentially substantial, through multiple channels.

*Ref: Acharya presentation to CFRAC (3/8/24)*
Extra slides
Inflation measures

Expected inflation series

- SPF CPI 10-year expectations, monthly
- Michigan 1-year inflation expectations
Out-of-sample Phillips curve inflation decomposition

Actual, predicted, and contributions of $\pi^e$, slack, and energy

pce_all/spf10/ugap/pce_nrg (linear) est8420
Out-of-sample Phillips curve inflation decomposition

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Phillips curve out of sample fit (12-month inflation)
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Phillips curve out of sample fit (12-month inflation)