



China's System of Price Stabilization: Buffering Systemically Significant Sectors

Isabella Weber, University of Massachusetts Amherst

Peizhi Pu, University of Massachusetts Amherst

Jingyi Zhou, University of Massachusetts Amherst

Jesús Lara Jáuregui, University of Massachusetts Amherst

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Non-uniformed shockflations across countries with fiscal stimulus during 2020-2022:

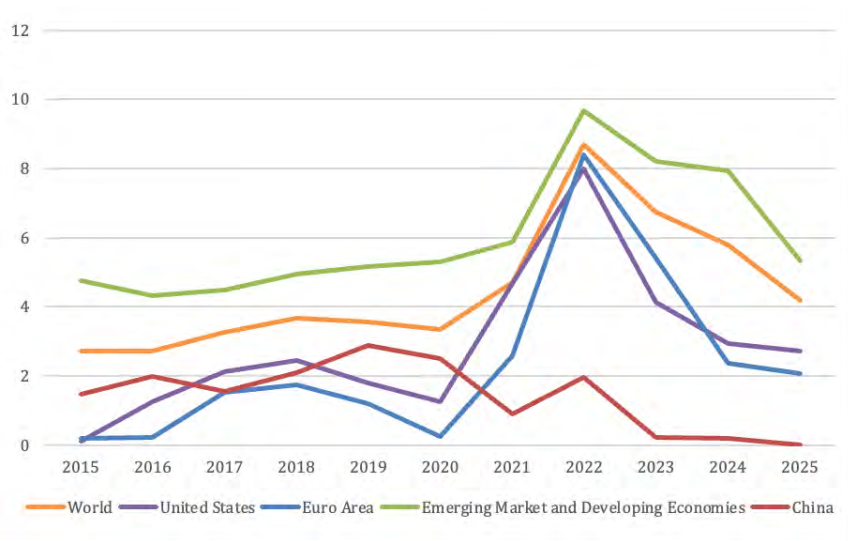


Figure 1. Percent change of annual average Consumer price index (CPI), 2015-2025. Data source: IMF

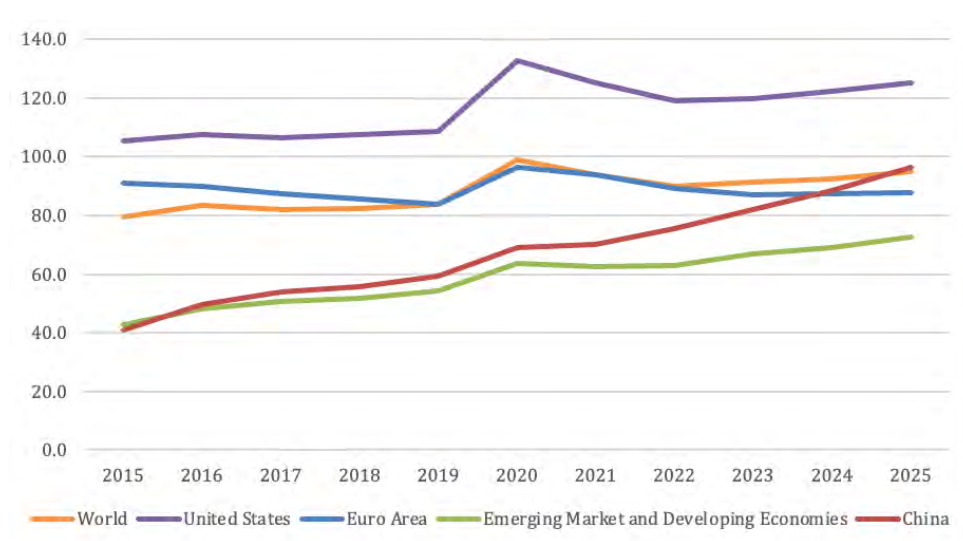


Figure 2. General government gross debt as percent of GDP, 2015-2025. Data source: IMF

China has managed to **maintain price stability** despite the rapid **increase in government expenditure**.

How has China buffered its economy against global cost shocks?

China utilizes a lot of **direct/indirect sectoral price regulation policies**, rather than monetary policy alone.



A **sectoral analysis** to understand China's system of price stabilization:

- 1. Identification** of China's systemically significant sectors for inflation.
- 2. Analyze** the specific price stabilization institutions corresponding to these systemically significant sectors

Methodology and Data to Identify China's Systemically Significant Sectors:

Leontief price model with import matrix developed from Weber et al. (2024) "Inflation in times of overlapping emergencies: systemically significant prices from an input-output perspective"

$$P_E = (I - A'_{EE})^{-1} A'_{XE} P_X + (I - A'_{EE})^{-1} (m_E + v_E)$$

$$\Delta P_E = (I - A'_{EE})^{-1} A'_{XE} \Delta P_X + (I - A'_{EE})^{-1} \Delta m_E$$

Sectoral Price
Volatility/Annual Price Change

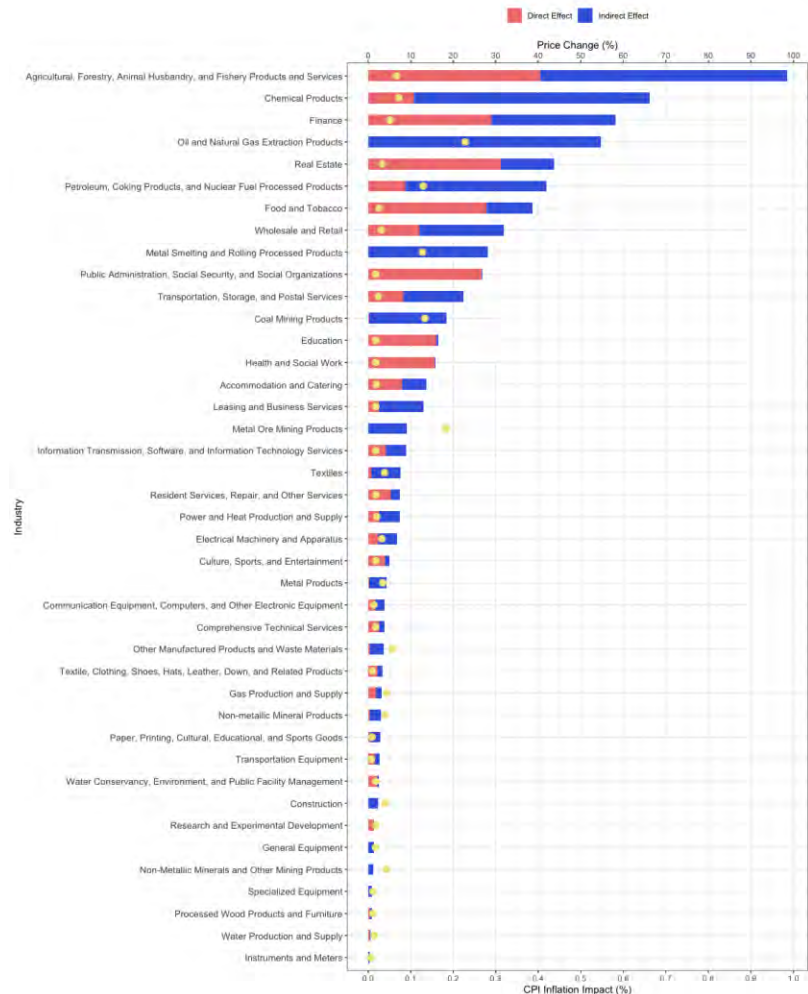
$$IP(\Delta P_X) = c_X \Delta P_X + \sum_{i \notin X} c_i \Delta P_{Ei} = IP_{dir} + IP_{ind}$$

Direct/Indirect Inflation Effects

Conduct simulations using **China's 2018 input-output table** and applying sectoral price volatility from 2004-2019 and the annual price change from 2021 to 2022.

Identification of systemically significant sectors:

Latent inflation impact simulation, using China's sectoral price volatility 2004-2019



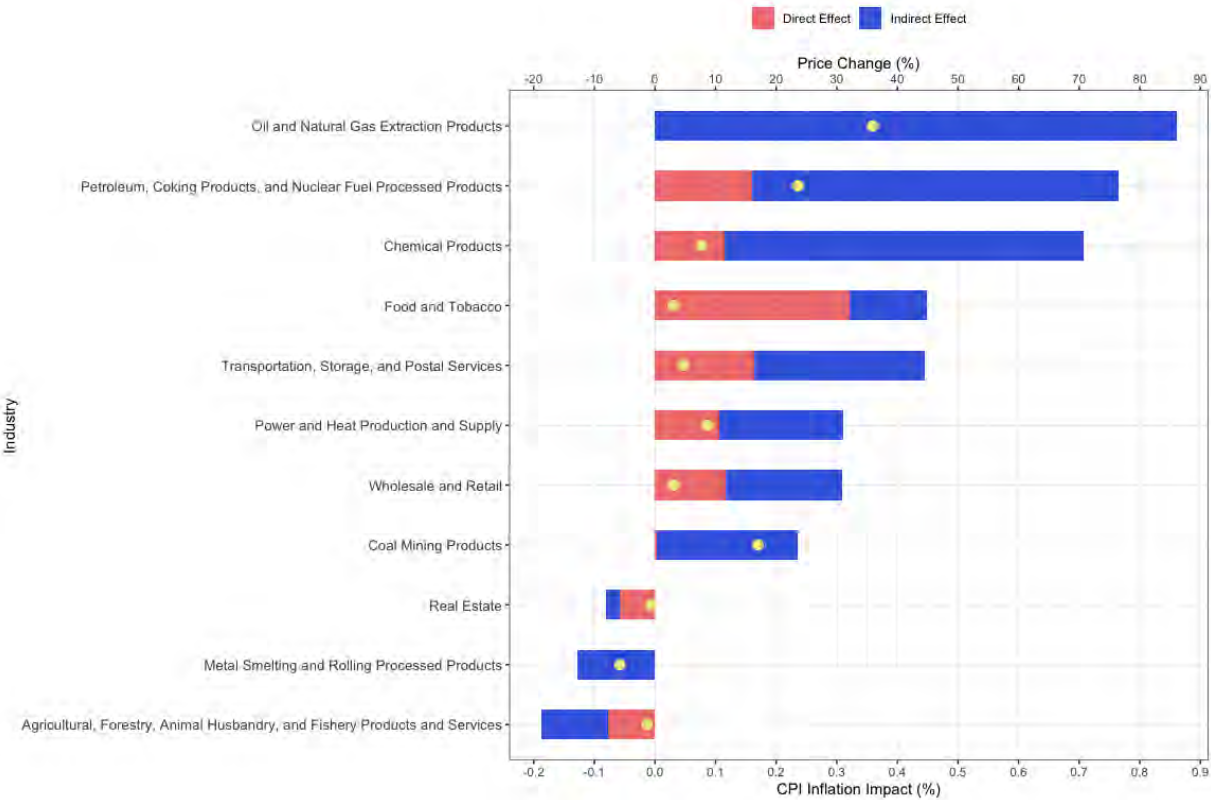


Identification of Systemically Significant Sectors

8 key sectors were identified based on their **inflation impact**, we also take into consideration of their **direct consumption weight (high)** and whether they are **critical inputs in production**.

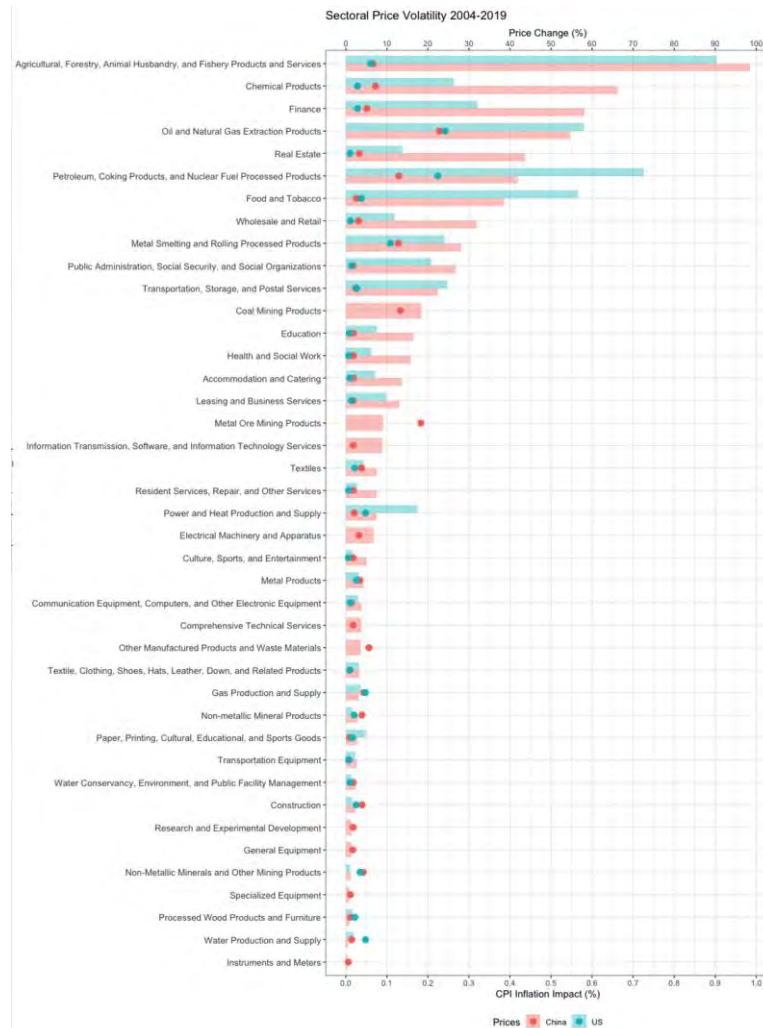
1. *Agricultural, Forestry, Animal Husbandry, and Fishery Products and Services;*
2. *Chemical Products;*
3. *Oil and Natural Gas Extraction Products;*
4. *Petroleum, Coking Products, and Nuclear Fuel Processed Products;*
5. *Food and Tobacco;*
6. *Coal Mining Products;*
7. *Real Estate;*
8. *Power and Heat Production and Supply*

Systemically significant prices in the post-COVID and the Ukraine war inflation : Inflation impact simulation, using China's annual sectoral price change 2021-2022



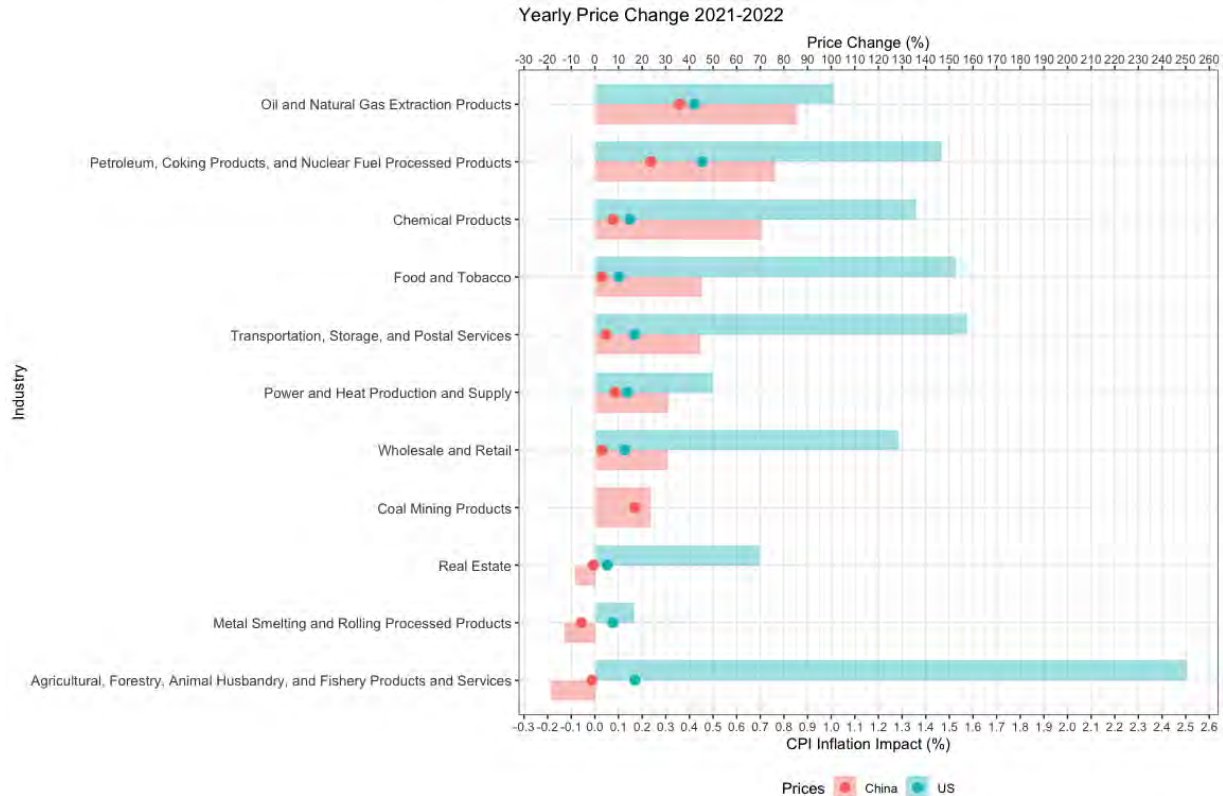
Counterfactual: What if China had experienced US price volatility (2004-2019)?

China (red) and US (blue)



Simulation of annual price change (2021-2022)

Using **China (red)** and **US (blue)** price changes



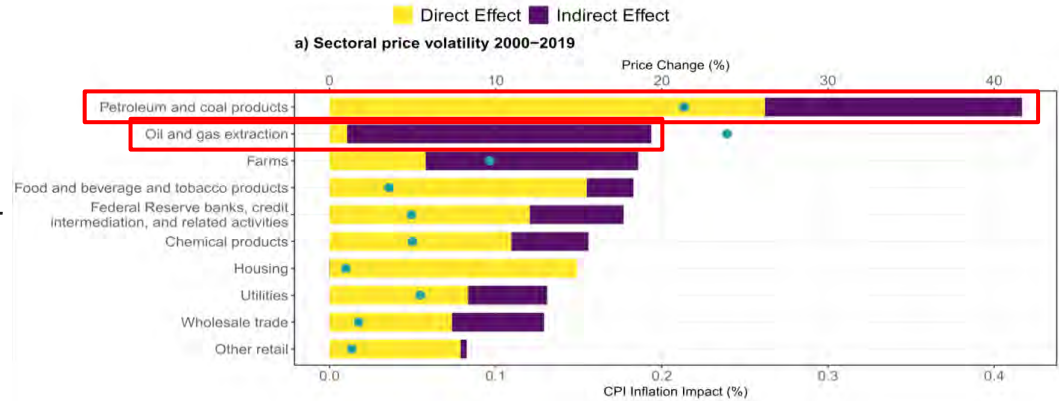


Part II: Sectoral Analysis on the Systemically Significant Sectors

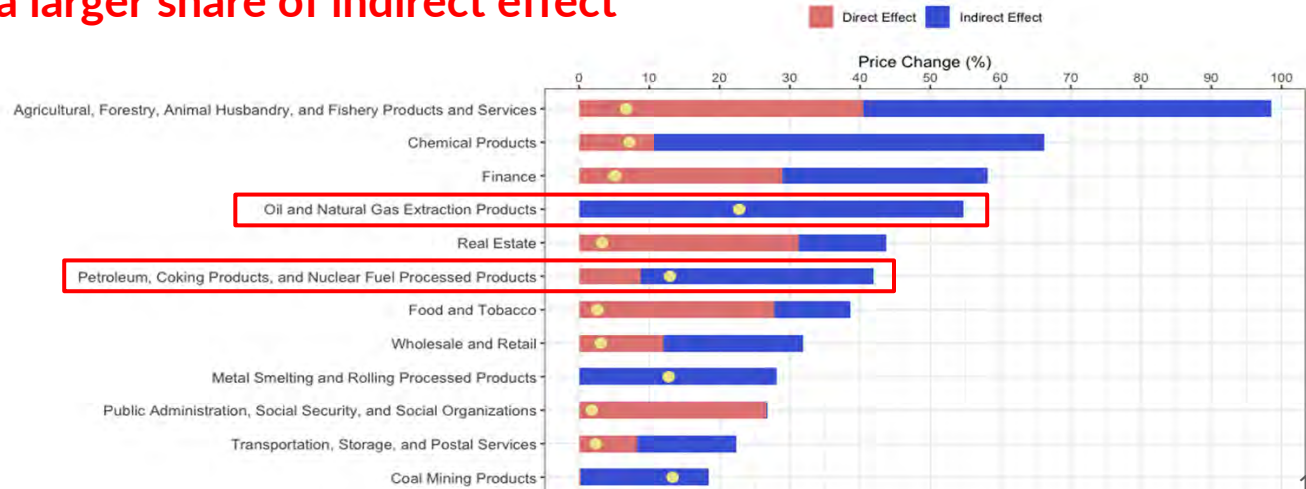
- Sector 1: Oil & Natural Gas
- Sector 2: Electricity & Coal
- Sector 3: Chemical Products
- Sector 4: Food
- Sector 5: Real Estate

Sector 1: Oil & Natural Gas

Weber et al. (2024) "Inflation in Times of Overlapping Emergencies: Systemically Significant Prices from an Input-Output Perspective." The magnitudes of the price shocks to each sector (indicated by a green dot) are the sectoral price volatility of the sector during 2000-2019.



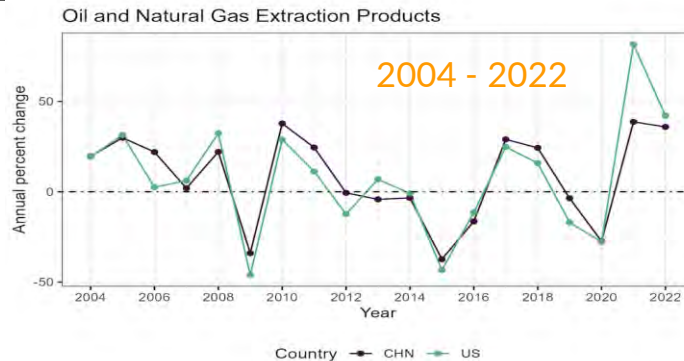
China's oil industry has a larger share of indirect effect



Our simulation: The magnitudes of the price shocks to each sector (indicated by a yellow dot) are the sectoral price volatility of the sector during 2004-2019.

Sector 1: Oil & Natural Gas

1. Oil Usage in China vs US: China's oil usage by end users is different from that of the US. As of 2022, China: transportation 30%, industrial 44%. US: transportation 67%, industrial 28%.
2. Import Dependency: highly reliant on crude oil imports (import dependency over 70%)



Import Diversification & Stockpiling

Domestic Gas/Diesel Price Ceilings

Sector 1: Oil & Natural Gas

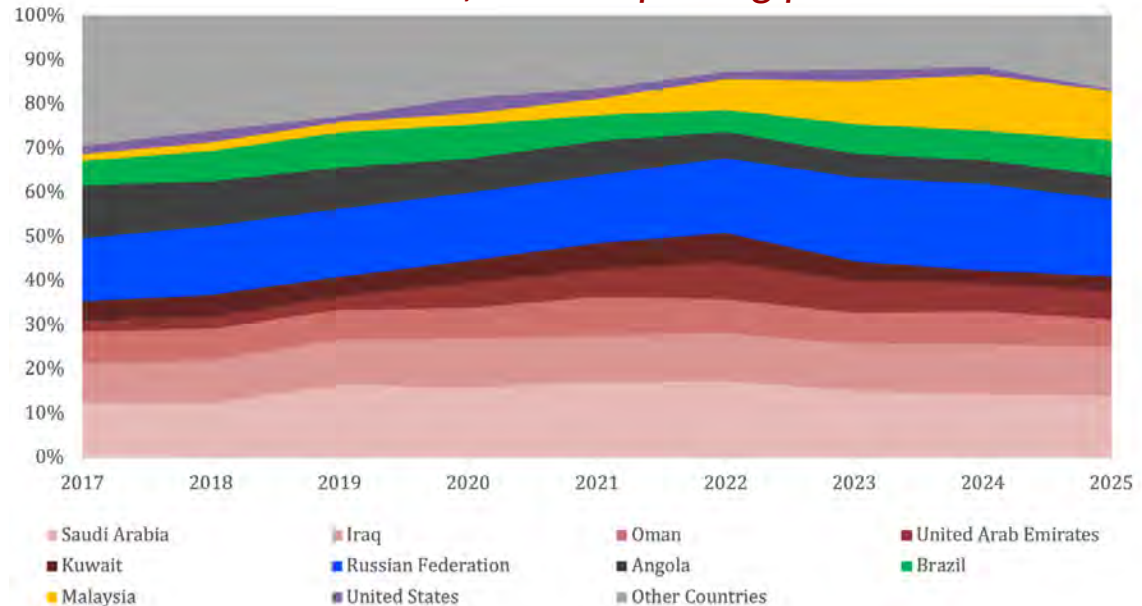
Import Diversification & Stockpiling

In the context of the ongoing *Iran war*, China may prove *more resilient* than many other Asian economies.

China's dependency on *Middle East* crude oil is lower (around 50%) than an Asian average of 60%.

Russia remains China's largest crude oil supplier despite western sanctions.

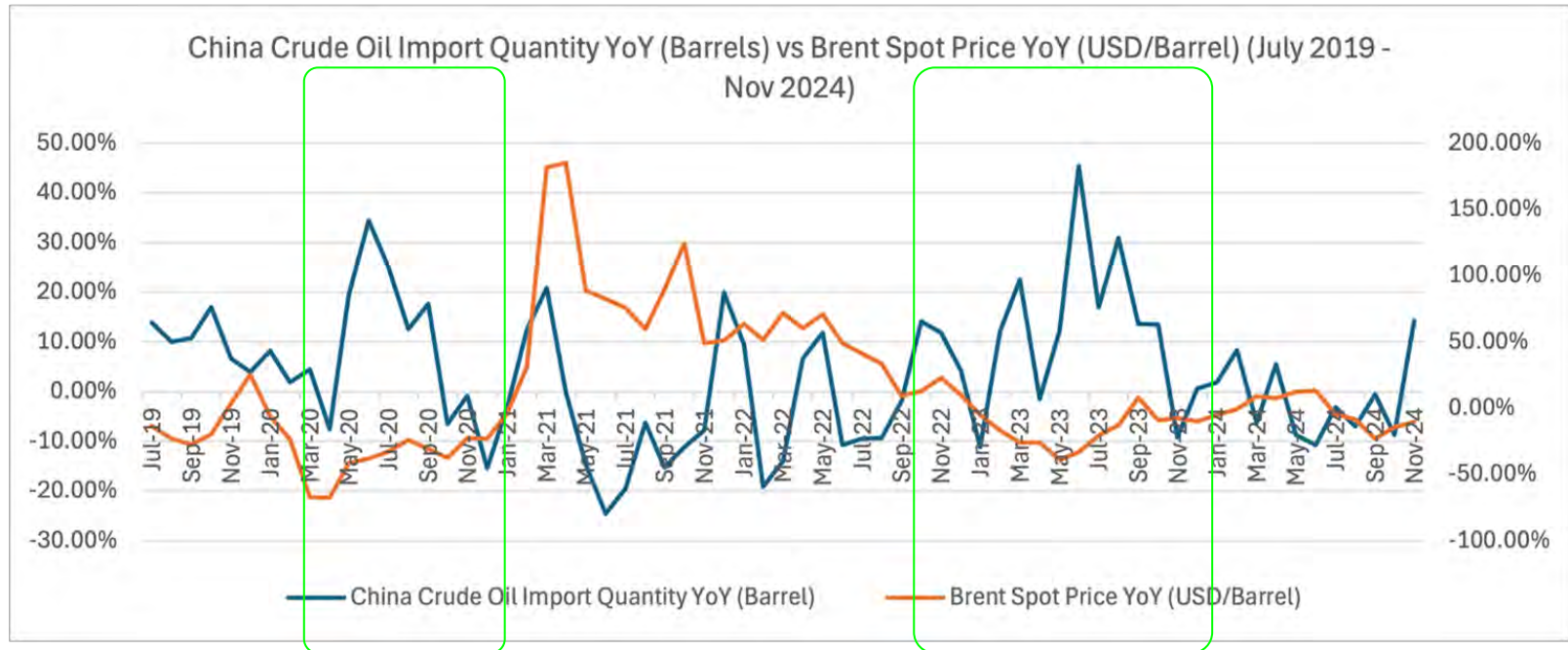
China diversifies its importing partners



Sector 1: Oil & Natural Gas

Import Diversification & Stockpiling

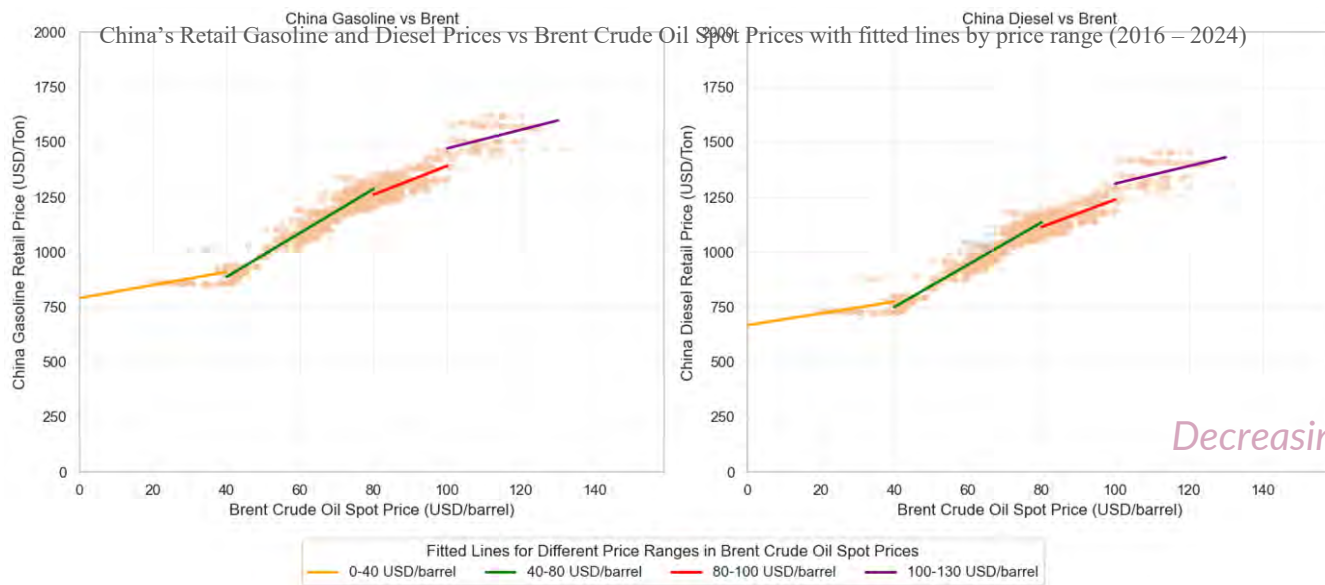
China stockpiles crude oil during international low prices



Sector 1: Oil & Natural Gas

Domestic Gas/Diesel Price Ceiling

Government sets **gas and diesel price ceilings** for each province, and adjusts every 10 work days based on international oil prices. It uses a **flattening** adjustment mechanism, allowing normal international price shock pass-through when oil prices are moderate (40–80 USD/barrel) but **dampening changes** when prices are **very low (0-40 USD/barrel)** or **very high (above 80 USD/barrel)**.



Decreasing Slopes

Sector 1: Oil & Natural Gas

1. Natural Gas Usage in China vs US: China's natural gas usage by end users is different from that of the US. As of 2023, **China**: residential 15%, manufacturing 47%, utilities (includes electricity generation) 18.7%
US: residential 15%, industrial 29.6%, electricity generation 44%
2. Supply Assurance: China **imports less than 50%** of its natural gas, of which 60% was maritime transported liquefied natural gas (LNG) and 40% was cross-country in-land pipeline natural gas (PNG).
3. Market Structure: **Control the middle + Liberalize the two ends** → **X+1+X**

The two **Xs** = **supply** and **retail** ends (encourages market competition, **with the exception to residential users**)

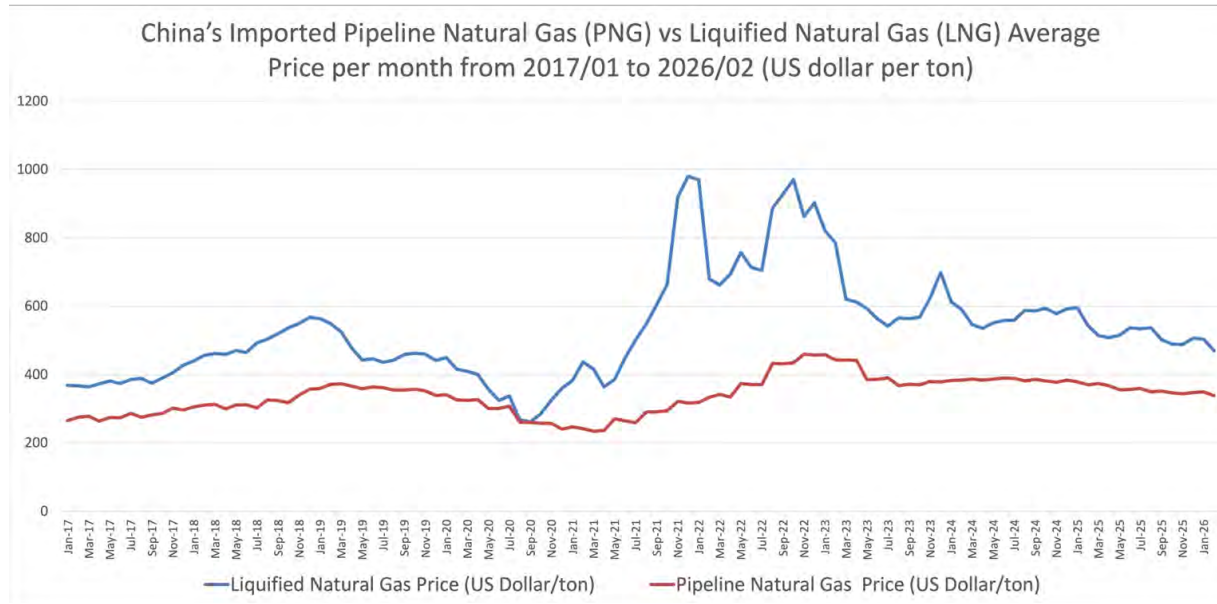
1 = **interprovincial transporting pipeline**, mostly controlled by **PipeChina** (an SOE established in 2019), which standardizes transportation fees to promote fair market access.

Interstate highways of natural gas

Sector 1: Oil & Natural Gas

Supply Assurance

1. China's PNG import price is consistently **lower and more stable** compared to LNG import prices.
2. China stabilizes PNG import prices through **trade agreements (particularly with Russia) and long-term contracts**, while leaving LNG prices largely market-based.

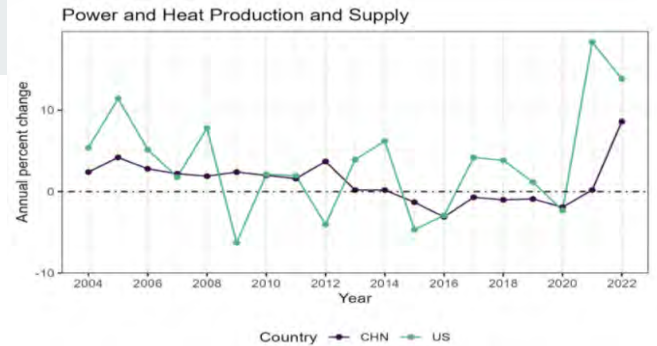


Sector 1: Oil & Natural Gas

Mandatory Residential Low Price

- China encourages upstream (supply) and downstream (retail) natural gas market competition, and has loosened price control in recent years, but **residential natural gas prices remains tightly controlled**.
- China separates the user group into residential users (15.7% of total usage) and non-residential users (industrial 71.8%, commercial 2.0%, others 10.5%).
- **Residential users pay cheaper prices subsidized by non-residential users paying extra**. Keeping the residential price low is considered **public welfare** and is mandated by the state to not change frequently or drastically even during rising production costs

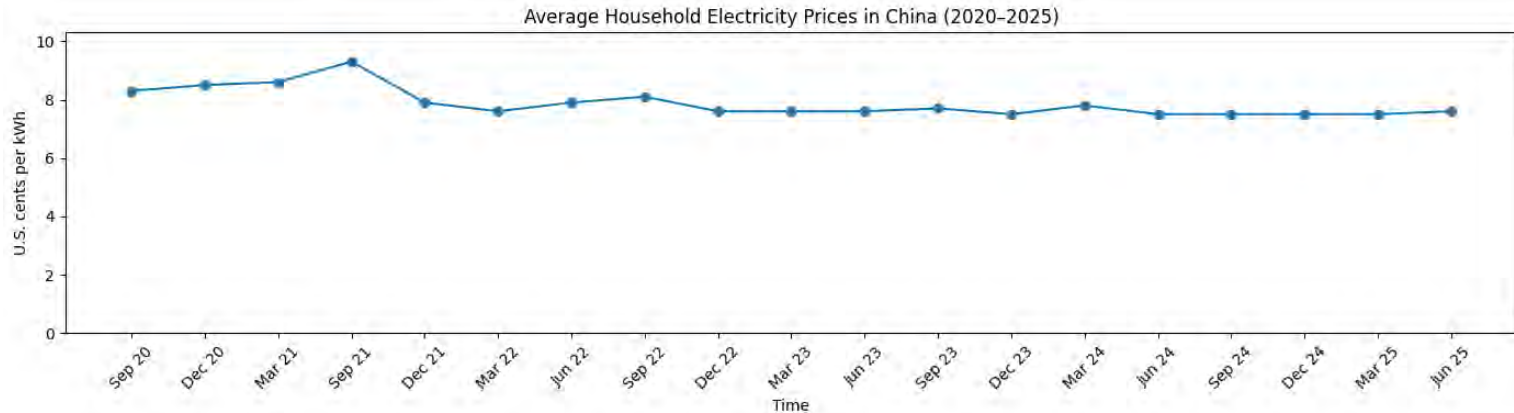
Sector 2: Electricity & Coal



- **Coal Dominance:** In 2023, China's electricity supply was **dominated by coal (over 60%)**, 13.6% hydraulic power, 9.4% wind power, and 4.6% nuclear power, natural gas 3.2%.
- **National Power Market:** China's electricity system increasingly operates through a **national unified market**, enabled by Ultra-High-Voltage (UHV) transmission technology and strong cross-regional dispatch.
- **Price Regulation:** Similar to natural gas, electricity pricing also follows the **"control the middle, liberalize the two ends"** model. Transmission is regulated, while generation and end-use transactions are marketized.
- **Residential & Agricultural Mandatory Low Price:** Industrial and commercial users pay extra to cover the subsidies to residential & agriculture users.

Sector 2: Electricity & Coal

<u>2019 Data</u>	Share (U.S.)	Share (China)	Price (U.S.) dollar/kWh	Price (China) dollar/kWh	China / U.S. Price Ratio
Industrial	25%	53%	0.068	0.092	134.5%
Residential	39%	20%	0.131	0.079	60.2%
Commercial	36%	22%	0.107	0.093	87.0%



Sector 2: Electricity & Coal

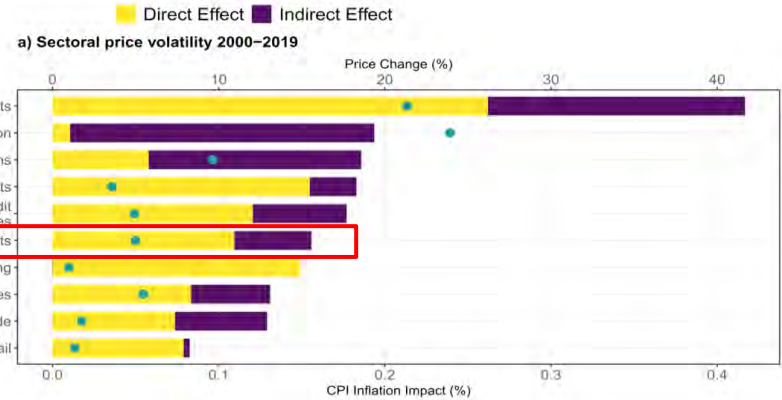


- Dual-Track Coal Pricing: **Thermal coal prices** are subject to **government regulation** due to their close linkage with electricity pricing, while other types of coal prices are largely market-determined.
- Coal-Centered Economy: China's energy and industrial systems has long been built around abundant domestic coal (import < 8%), but environmental costs have driven a gradual shift toward **renewables**.
- Coal as Buffer Stock to Electricity: To offset renewable intermittency, China's 2024 **capacity-pricing reform** preserves coal power as standby capacity. Thermal plants are paid to **remain available even when idle** so that they can be dispatched during peaks or supply shortfalls. The subsidies are shared by industrial and commercial users. Each province's capacity electricity subsidy price is **reversely** related to its clean energy proportion.

Sector 3: Chemical Products

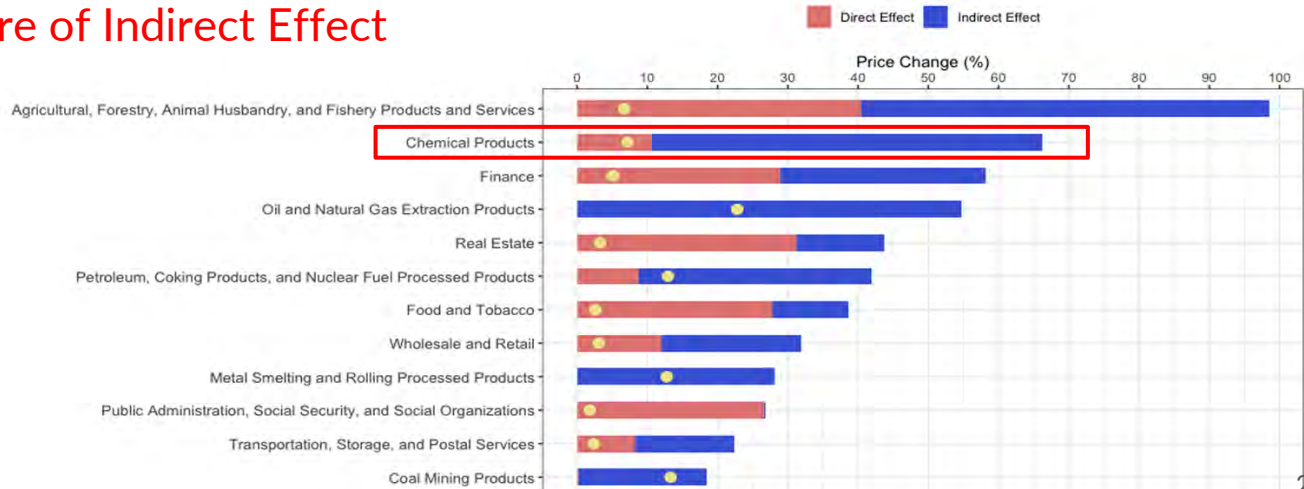
- Different role of China's Chemical Products sector:

Weber et al. (2024) "Inflation in Times of Overlapping Emergencies: Systemically Significant Prices from an Input-Output Perspective." The magnitudes of the price shocks to each sector (indicated by a green dot) are the sectoral price volatility of the sector during 2000-2019.



China has a larger share of Indirect Effect

Our simulation: The magnitudes of the price shocks to each sector (indicated by a yellow dot) are the sectoral price volatility of the sector during 2004-2019.



China: Pricing in commodity markets–intense competition leaves minimal margins.

US: Pricing in concentrated manufactured goods market–monopoly power and wider markup margins



Components of China's Chemical Products Sector:

Chemical Raw Material and Chemical Products (including fertilizers)

-mostly used as domestic intermediate product & **export**.

Chemical Fiber Manufacturing

-mostly used as domestic intermediate product & **export**

Rubber and Plastic Products

-**export** & domestic consumption

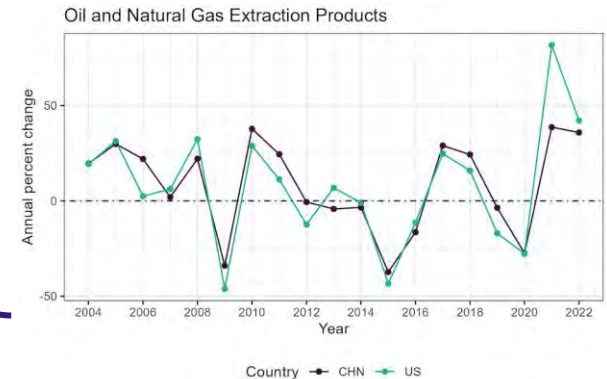
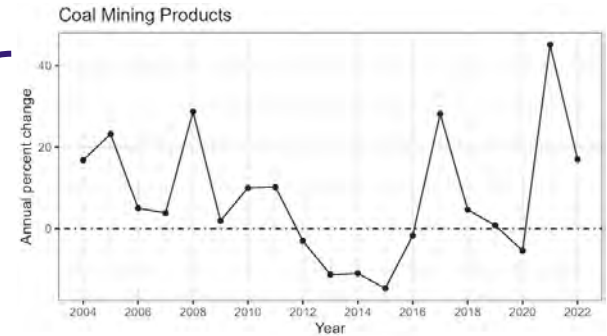
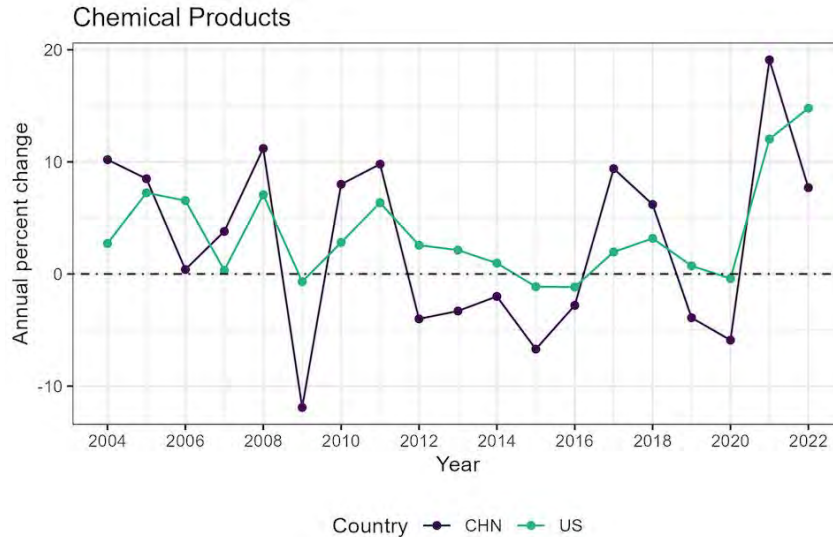
Pharmaceutical Manufacturing

-domestic consumption

Basic chemical products
manufacturing subsectors:

Petroleum and coal intensive,
comprise over 80% of the
chemical products sector's
total output in 2020

Different price volatility patterns of the chemical product sector in China and the U.S.



China: Pricing in commodity markets—intense competition leaves minimal margins.

US: Pricing in concentrated manufactured goods market—monopoly power and wider markup margins

Basic chemical products manufacturing subsectors

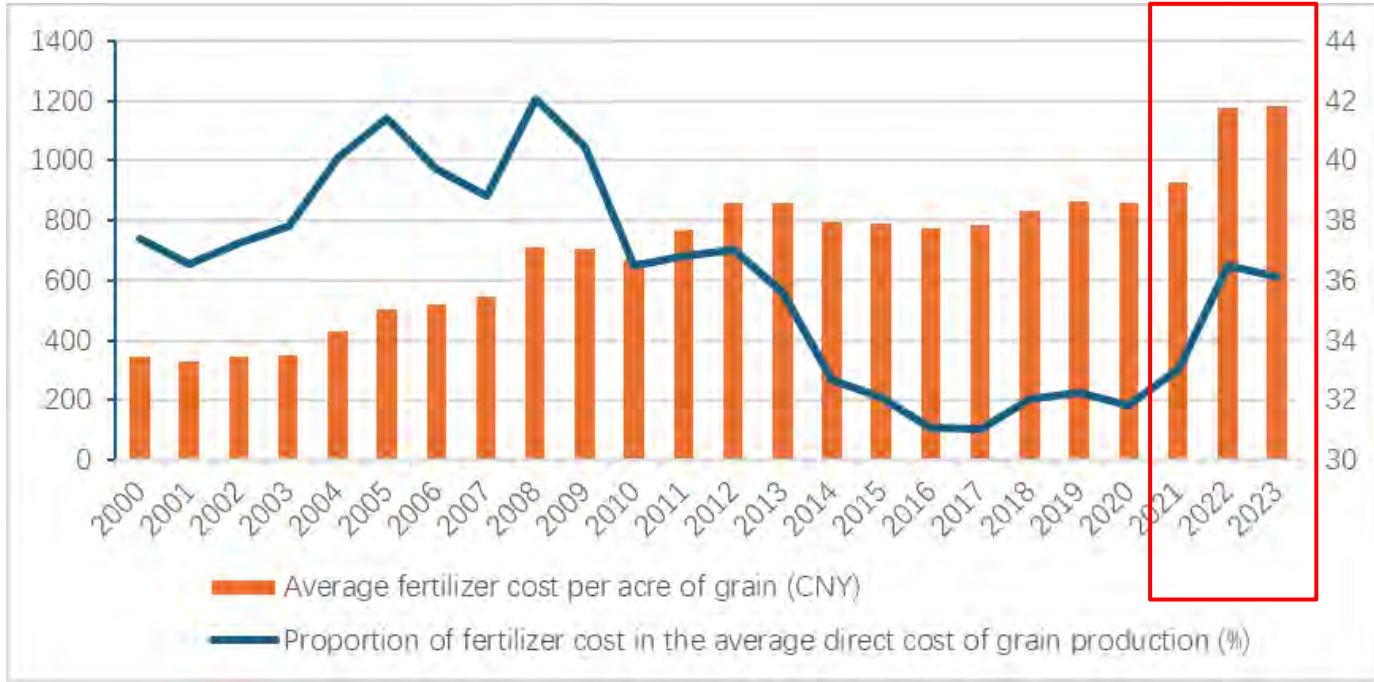
Export tax rebate policy: Government **proactively raises** the export tax rebate rate when encountering **negative export shocks**, and then **drops** the rate in the recession phase to relieve the financial burden.



In 2020, 1084 products' export tax rebate rates were increased to **13%**, including 776 chemical products; 380 products' export tax rebate rates were increased to 9%, including 23 chemical products

Basic Chemical Products: Fertilizers

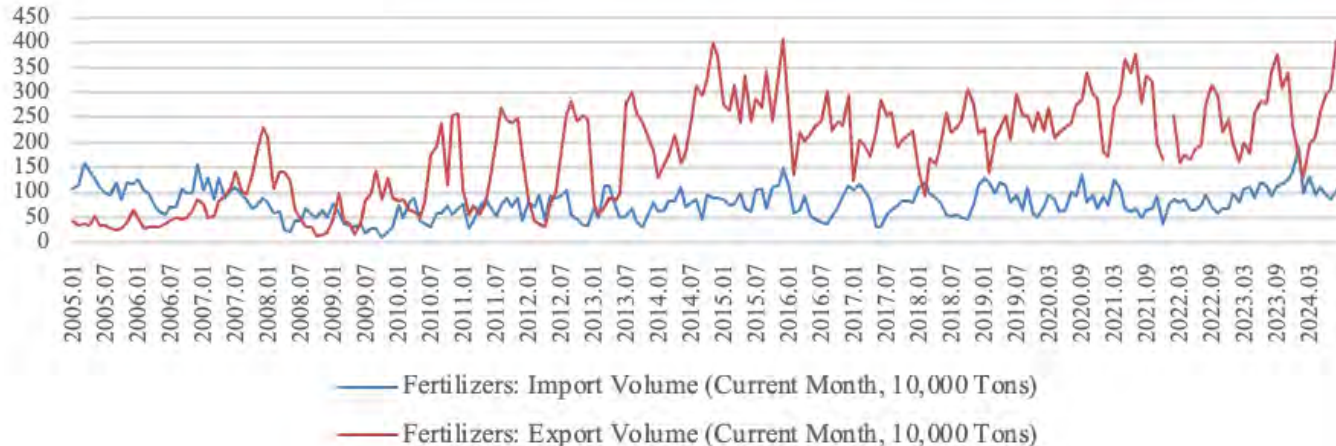
China was also hit by the Fertilizer cost shock



Fertilizers: Commercial Reserve and Seasonal Trade Adjustments

1. National Fertilizer Commercial Reserve: Government-subsidized reserves where enterprises store designated types, quantities, and durations of fertilizers, with the government retaining priority purchase rights.

2. Seasonal trade adjustments: Customs authorities regulate the timing and volume of fertilizer exports via inspection.



Pharmaceutical Manufacturing subsector: Centralized Drug Procurement

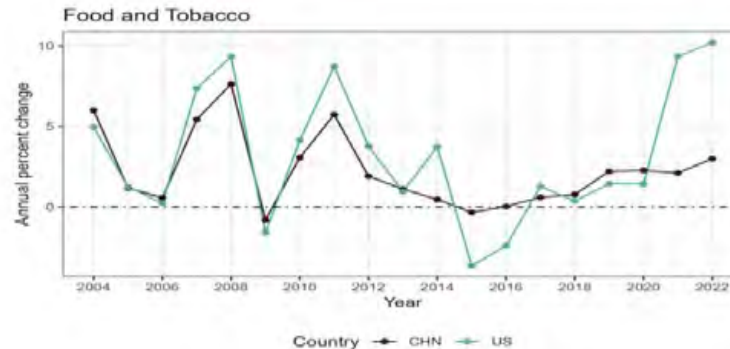
In 2019, China expanded the provincial government procurement into the national scale, launching its pilot program for national centralized drug procurement with volume-based purchasing.

Summary of China's Ten Rounds of Centralized Procurement

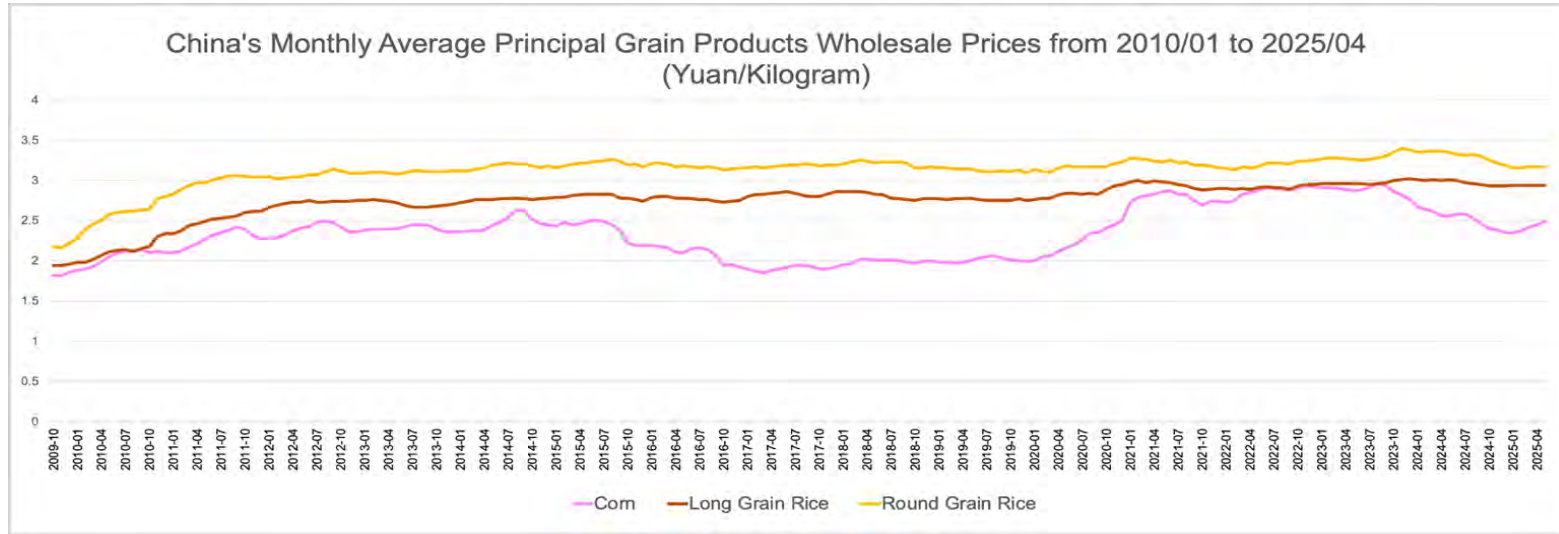
Rounds	Announcement Date	Number of Selected Varieties	Average Price Reduction (compared to the Maximum Valid Bid Price submitted by the participating bidders)
First	2019.09	25	59%
Second	2019.12	32	53%
Third	2020.07	55	53%
Fourth	2021.01	45	52%
Fifth	2021.06	61	56%
Sixth (Insulin Special Procurement)	2021.11	11	48%
Seventh	2022.06	60	48%
eighth	2023.03	39	56%
ninth	2023.10	41	58%
tenth	2024.11	62	N/A

Sector 4: Food (Grain + Pork)

- Grain as Strategic Staple: grain is a core necessity, making **price stability** a central policy priority for ensuring **national food security**.
- Central Reserve System: managed by state-owned **SinoGrain**, buffers market price shocks.
- Pre-announced procurement price floor: the government sets **minimum procurement prices before planting season**, anchoring expectations and guiding production decisions. It also releases **weekly updates** on the **national average purchasing prices of major crops**.

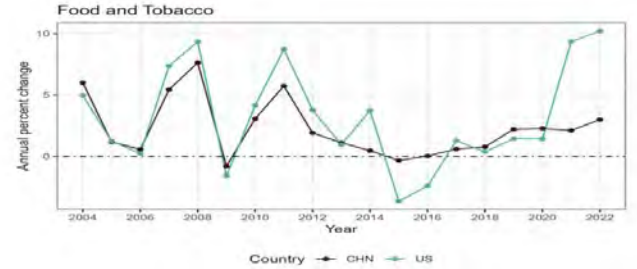


Sector 4: Food (Grain + Pork)

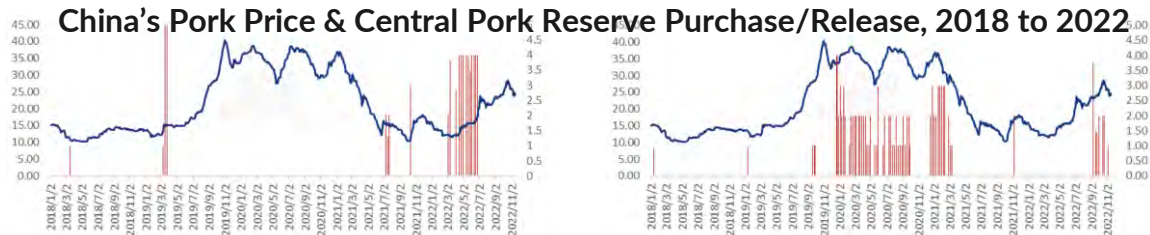


- Grain prices have stayed broadly **stable** in China over the past decade.
- **Corn** prices dipped in 2016 after China **ended state procurement and shifted to direct subsidies for farmers**, then rose moderately from 2020 to 2023 amid COVID-era global supply disruptions and slower domestic output growth.

Sector 4: Food (Grain + Pork)



- Largest Pork Consumer: China consumes over **57.2 million tons** of pork annually, making it the largest pork consumer in the world, followed by the US consuming **10.1 million tons**
- 36-month hog cycle: pork production capacity adjusts with a **lag**, causing **delayed responses to price signals**.
- National pork reserve buffers price shocks: the state-owned reserve **buys pork when prices are low** and **releases pork when prices rise**, helping stabilize supply and limit volatility.

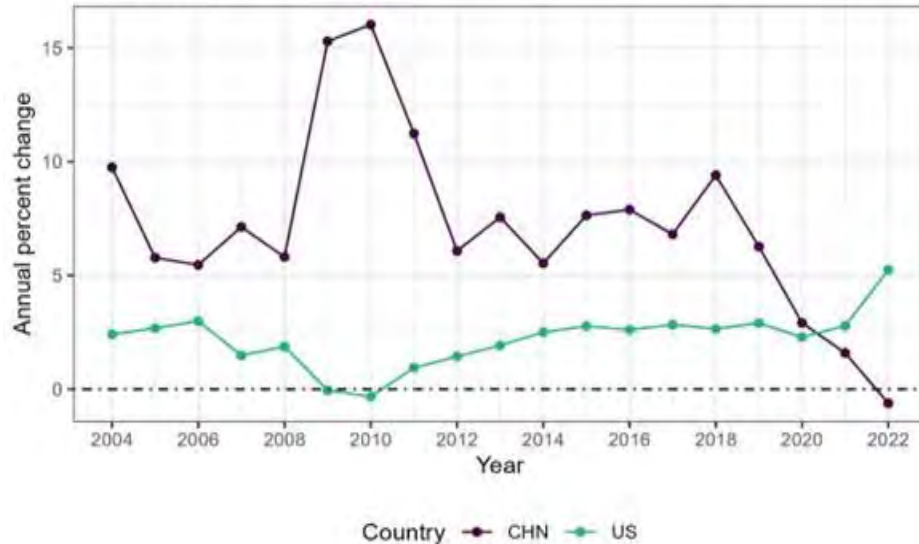


Purchase

Release

Sector 5: Real Estate

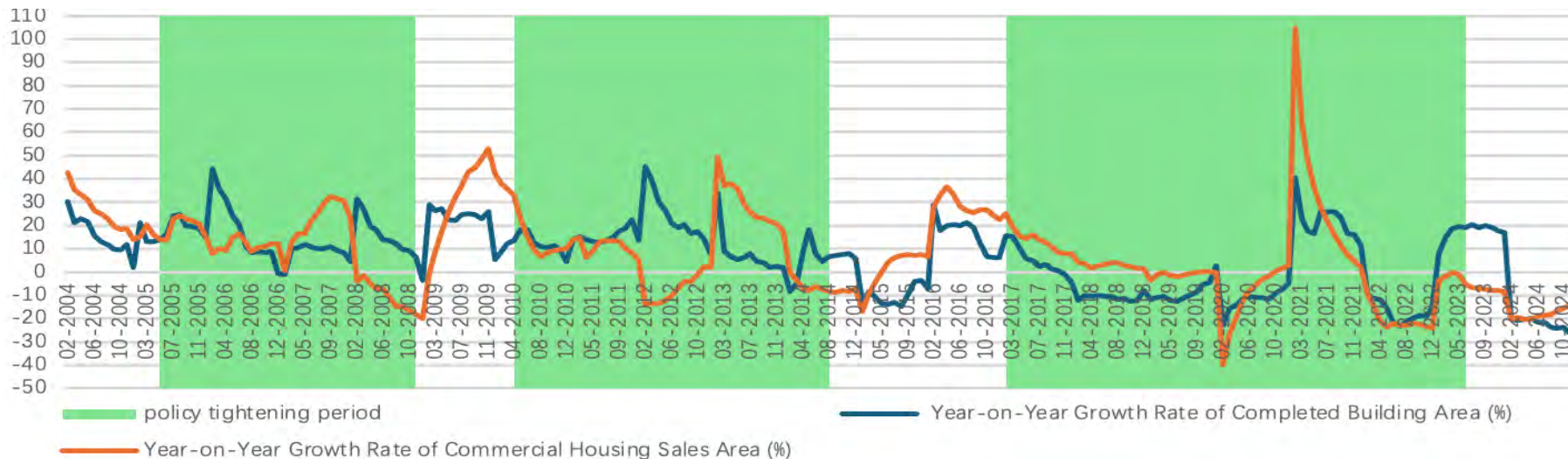
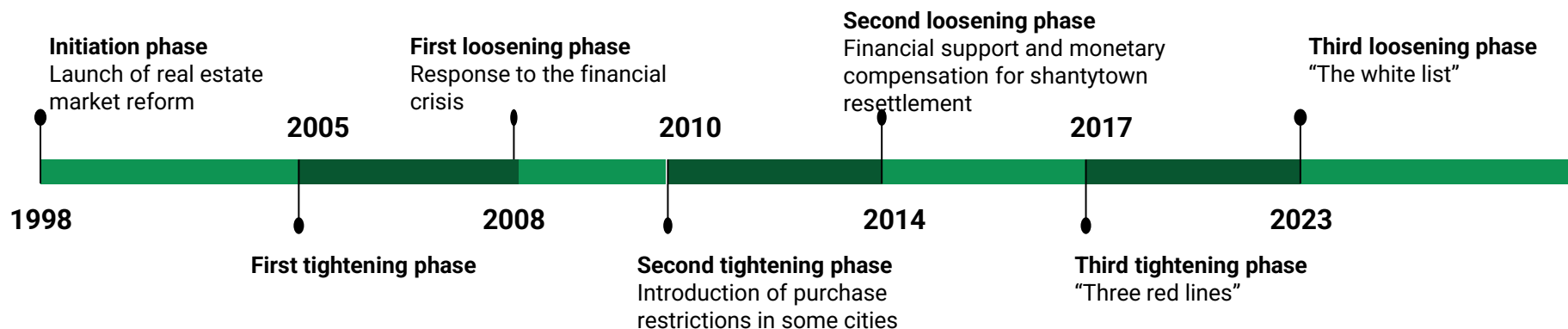
Distinctively different price change trend compared to the US in both long term and the post-2020:
Real Estate



China's commercial housing market only emerged in 1998.

Directive price policy measures that tighten the market when it overheats and relax during downturns.

Tightening and loosening real estate price policy cycles



Conclusion



China's Inflation Stability: State Intervention Matters

- **Key Finding:** China's inflation is maintained by deliberate government interventions in critical sectors.
- **Methodology:** Leontief price model identifies 8 systemically significant sectors (e.g., energy, chemical products, food, etc.) shaping inflation.
- **Counterfactual Analysis:** Simulating U.S. price fluctuations shows China's inflation would be much higher without interventions.

Government Intervention Mechanisms:

- **Energy:** SOEs, price controls, production contracts (oil, gas, coal, electricity).
- **Chemical Products:** Export tax rebates, industrial policy, centralized drug procurement.
- **Food:** Strategic reserves, stockpiling, controlled releases (grain, pork).
- **Real Estate:** Cyclical policy measures to stabilize market fluctuations.