MEKETA
INVESTMENT GROUP

Public Natural Resource Equities

WHITEPAPER
APRIL 2022

CONTRIBUTORS
Alison Adams, PhD
Frank Benham, CFA, CAIA
Stella Mach

Public natural resource equities ("PNR") have long been regarded as a reliable hedge against inflation. This paper examines the historical data and takes a closer look at this long-held theory.

Our analysis shows that PNR was a strong inflation hedge from 1973 to 1991 due to the unique economic environment and energy industry structure that prevailed during that period. However, after 1991, PNR's hedging ability steadily weakened due to the rapidly changing economic environment, the structure of energy markets, and improvements in energy efficiency. Public natural resources can still be an inflation hedge, but its hedging ability depends on its underlying sector weights and is driven by economic events, such as the supply shocks being experienced in early 2022.

Our findings prompt a re-evaluation of the role public natural resources should play as an inflation hedge in an investor's portfolio. To combat inflation under various economic environments, we believe investors will be best served by using a diverse "basket" of inflation-hedging assets that includes public natural resources, as well as TIPS, real estate, infrastructure, and commodities.

What are public natural resource equities?

Public natural resource equities are equity shares in firms that extract and process natural resource raw materials (i.e., commodities). Public natural resource indices tend to have a blend of equities in the energy, metals and mining, and agriculture sectors. For example, the S&P Global Natural Resources Index has a one-third allocation to each of these sectors (see Figure 1), while the S&P North American Natural Resources Index has a weight of 45%, 35% and 20%, respectively.

On the one hand, these firms' revenues are derived from products for which the real value should remain stable even in an inflationary environment, hence providing an inflation hedge. Even if nominal costs also rise due to inflation, earnings and dividends should increase nominally and at least stay stable in real terms. On the other hand, these are equity shares, and their values may fluctuate akin to other equities, not only because of changes in fundamentals, but also due to investor sentiment.

Thus, at times, PNRs' inflation and equity sensitivities may "pull" the investment's value/returns in different directions, which could be an advantage or a drawback. If PNR's equity sensitivity delivers a higher long-term return than other inflation-hedging assets, it reduces the opportunity cost of holding PNRs (in lieu of owning a broad basket of equities or other risky assets). However, if PNR's inflation sensitivity is weaker compared to that of other inflation hedging assets, it reduces the hedging benefit of holding PNRs (relative to other inflation-hedging assets).

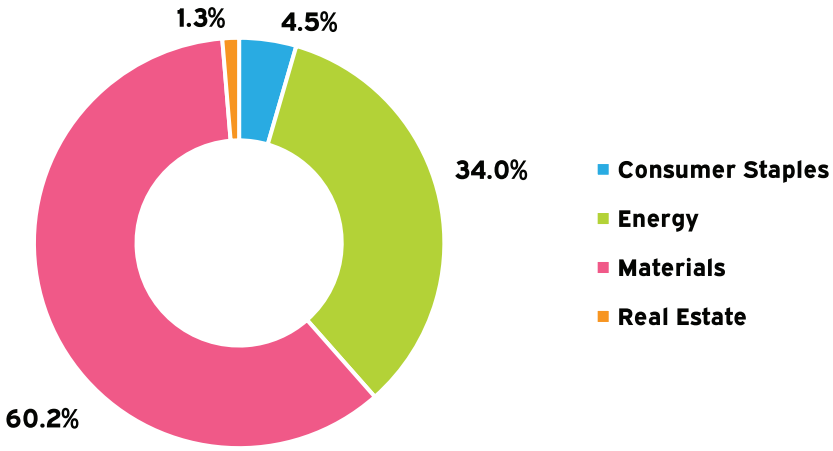

FIGURE 1
S&P Global Natural Resources GICS Sector Weights
Source: S&P
Note: Sector weights based on GICS classification, which varies from the classification used by S&P for purposes of index composition.

Why we need to re-examine public natural resources

Since April 2021, the US has experienced year-over-year CPI inflation levels above 4%, most recently climbing to 7.9% for February 2022. Public natural resources has performed strongly during this period, particularly compared to US equity. From March 2021 to February 2022, PNR experienced a total return of 17.4%, almost 10 percentage points higher than US equity's 7.8% return (Figure 2). Similarly, public natural resources' energy, metals and mining, and agriculture sub-indices each outperformed US equity over this period (Figure 2).

One could infer from this performance that PNR is a strong inflation hedge. However, a closer examination of the data reveals that PNR's performance is rather mixed. If we omit the most recent months in which supply shocks for resources such as oil, natural gas, wheat, and steel became the most severe, we see a different story.

Specifically, from March 2021 to November 2021, US equity's total return (13.7%) outperformed public natural resources' (4%) by more than nine percentage points. This was despite PNR benefitting from a tailwind in energy during this period, as supply for natural gas and oil had not been able to keep up with increased demand since economies temporarily reopened from COVID in the summer of 2021.

	US Equity	Public Natural Resources	Public Natural Resources: Metal and Mining	Public Natural Resources: Agriculture	Public Natural Resources: Energy
March 2021 - November 2021	13.7%	4.0%	-2.9%	2.5%	11.6%
March 2021 - February 2022	7.8%	17.4%	14.8%	11.8%	23.7%

FIGURE 2

US Equity and Public Natural Resources Total Return

Source: Bloomberg. The following benchmarks are used for the asset classes: US Equity – Russell 3000; Public Natural Resources – S&P 500 Global Natural Resources Index; Public Natural Resources, Metal - S&P 500 Global Natural Resources Index, Metals and Mining; Public Natural Resources, Agriculture - S&P 500 Global Natural Resources Index, Agriculture; Public Natural Resources, Energy - S&P 500 Global Natural Resources Index, Energy..

If we examine public natural resources' historical performance during high inflation periods, we see a similarly mixed story.

From the 1970s to the early 1990s, public natural resources experienced strong, positive returns under periods of high inflation compared to US equity. When year-over-year CPI inflation averaged 9% between February 1973 to July 1982, a basket of energy and metal companies had an annualized return of about 10%, substantially higher than the 4% return of the S&P 500.[1] Similarly, energy and metal equities performed strongly between March 1988 to January 1991, when year-over-year inflation, triggered by the First Gulf War, averaged 5%.[2] In fact, for all periods between 1940 and 1991 where year-over-year CPI inflation was 5% or higher, public natural resources outperformed the S&P 500,[2] many times overwhelmingly, making it a seemingly reliable inflation hedge during that period.

[1] Source: "Resource Equities, Inflation Protection Trading at a Discount." GMO Focused Equity Insights. .

[2] Ibid.

Yet, if we analyze inflation periods after the early 1990s, we see that PNR's strong, inflation hedging ability has weakened. Figure 3 shows the average returns under high inflation months in 1973 to 1991 and 1992 to 2022 for energy, public natural resources, and US equity.[3] We define high inflation periods as months when the year-over-year CPI inflation is greater than 3.5%. From 1973 to 1991, annualized public natural resource returns under high inflation months were positive on average (+16.5%) but switched to negative on average (-1.5%) from 1992 to 2022.

[3] We divided the available history into two periods, 1973-1991 and 1992-2022, because the public natural resources-inflation relationship seemed to switch in the early 1990s and to allow a sufficient sample size in both periods for analysis. Moving the split date to the mid-1990s does not change our findings.

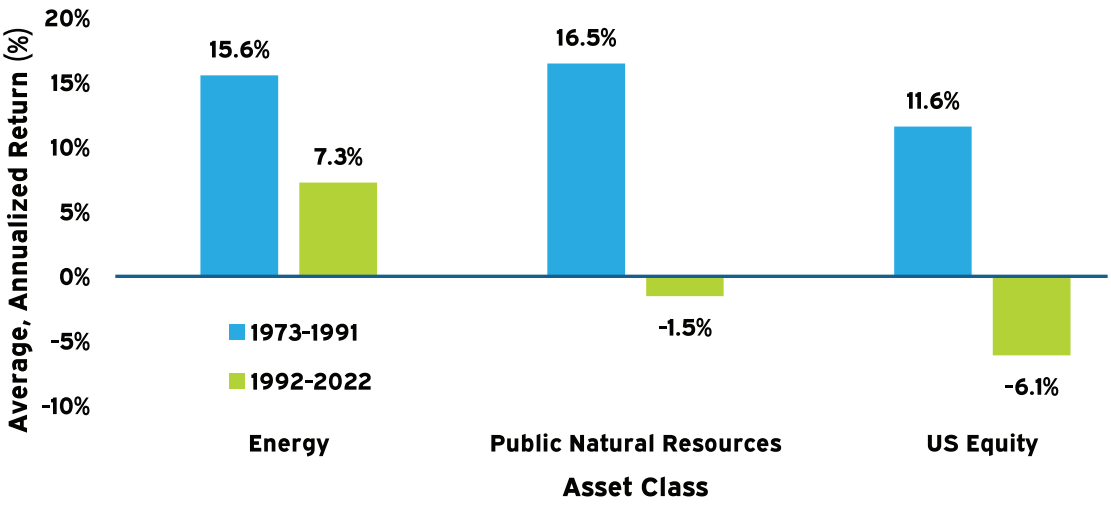

FIGURE 3

Average, Annualized Returns under High Inflation, 1973-1991 vs. 1992-2022

Source: Bloomberg. The sample size for the periods 1973-1991 and 1992-2022 are 198 and 46, respectively.

Focusing on PNR's performance since 1992, we see that its returns are highest under healthy levels of inflation rather than when inflation is high (see Figure 4). When inflation is between 2% and 3.5%, PNR's average annualized return is highest at 12.1%. In contrast, when inflation is above 3.5%, PNR performs poorly, exhibiting an average annualized return of -1.5%.

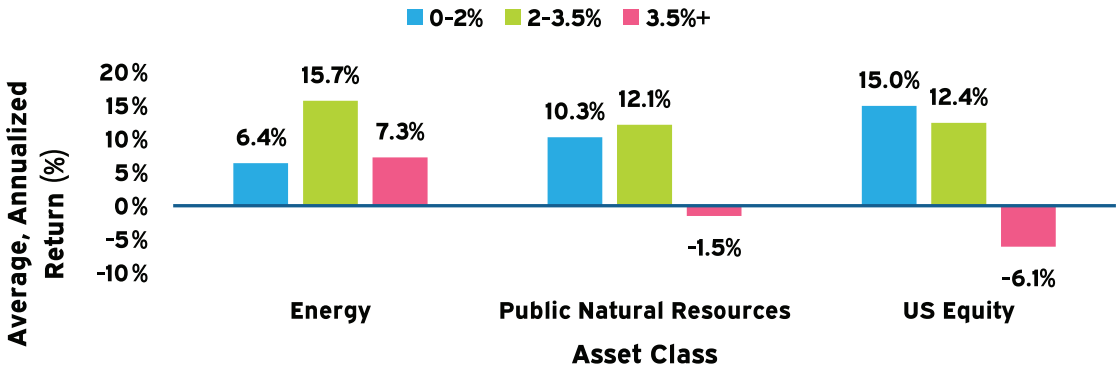

FIGURE 4
1992-2022: Average Annualized Returns, by Inflation Interval
Source: Bloomberg. The sample sizes for each inflation period are: 0-2% = 120, 2-3.5% = 182, 3.5%+ = 46.

Public natural resources' shift from a strong, reliable inflation hedge prior to the early 1990s to a weaker, unreliable hedge post early 1990s begs many questions for institutional investors. First, what can explain this shift in inflation hedging ability? Second, in what environments can public natural resources still serve as an inflation hedge? And most importantly, how should investors structure inflation hedges in their portfolio?

Economy of the 1970s to early 1990s

Since the end of World War II, oil has been heavily used for the transportation of people and goods across the economy in the form of automobiles, buses, trains, ships, and aircrafts. This demand for oil grew after the passage of the Federal Aid Highway Act of 1956, which built and expanded regional and interstate highways. These interconnected roads led to a boom in automobiles and precipitated the migration of families from urban areas to the suburbs, furthering America's reliance on oil. Despite the US's heavy reliance on oil, it was not used efficiently as an energy source. For example, from 1950 to 1980, the average fuel economy of all motor vehicles was below 14 miles per gallon (Figure 5).

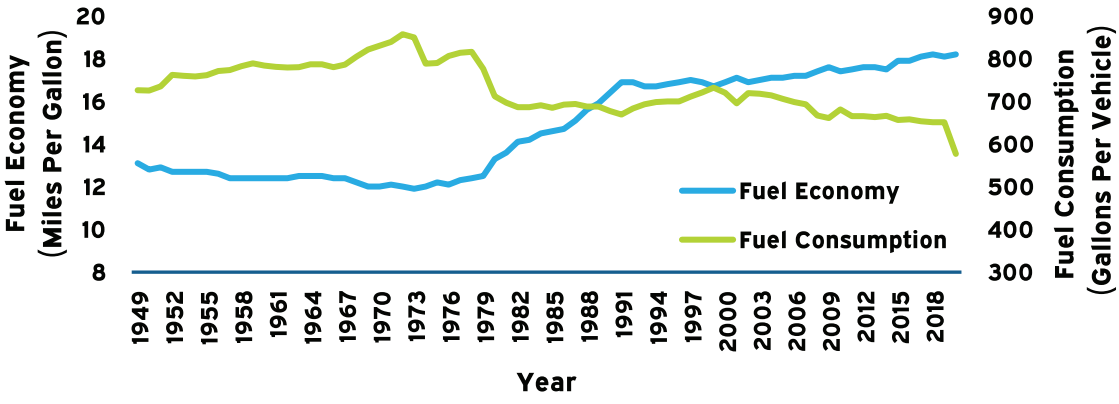

FIGURE 5
All Motor Vehicles Fuel Economy and Consumption
Source: US Energy Information Administration (EIA), February 2022 Monthly Energy Review. Data is for light duty vehicles and heavy-duty trucks.

Aside from transportation, oil was also heavily relied on in industries such as agriculture, forestry, and manufacturing, and a high percentage of homes and businesses used oil for heat. From 1950 to 1981, 20-30% of residential energy consumption and 20-40% of commercial energy consumption was from petroleum (Figures 6 and 7).

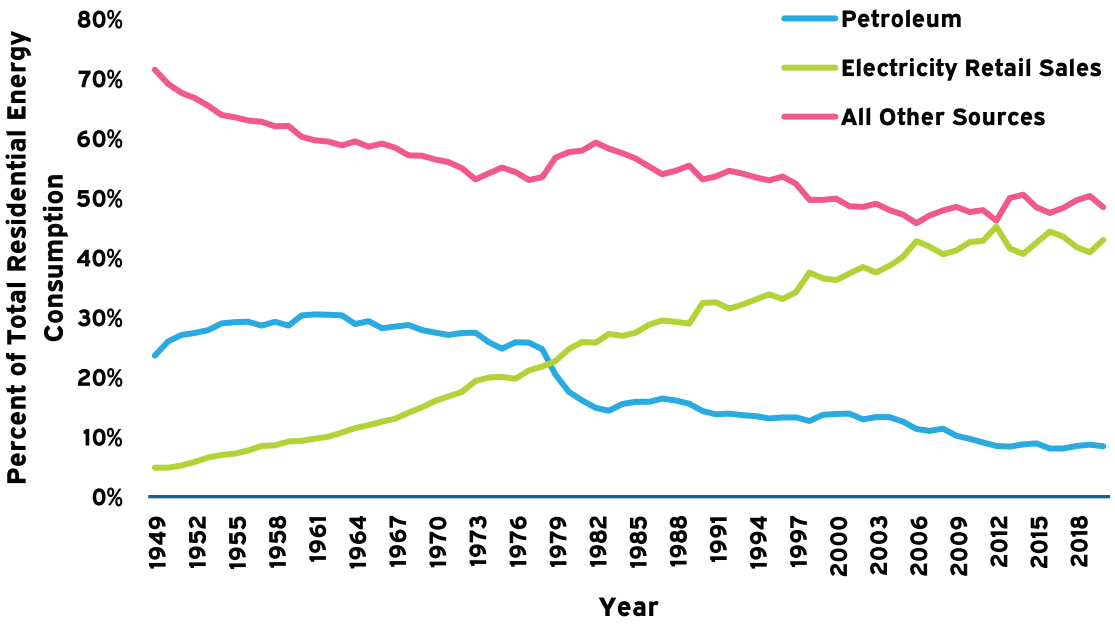

FIGURE 6
Residential Sector Energy Consumption by Major Source
Source: US EIA, February 2022 Monthly Energy Review. Excludes Electrical System Energy Losses.

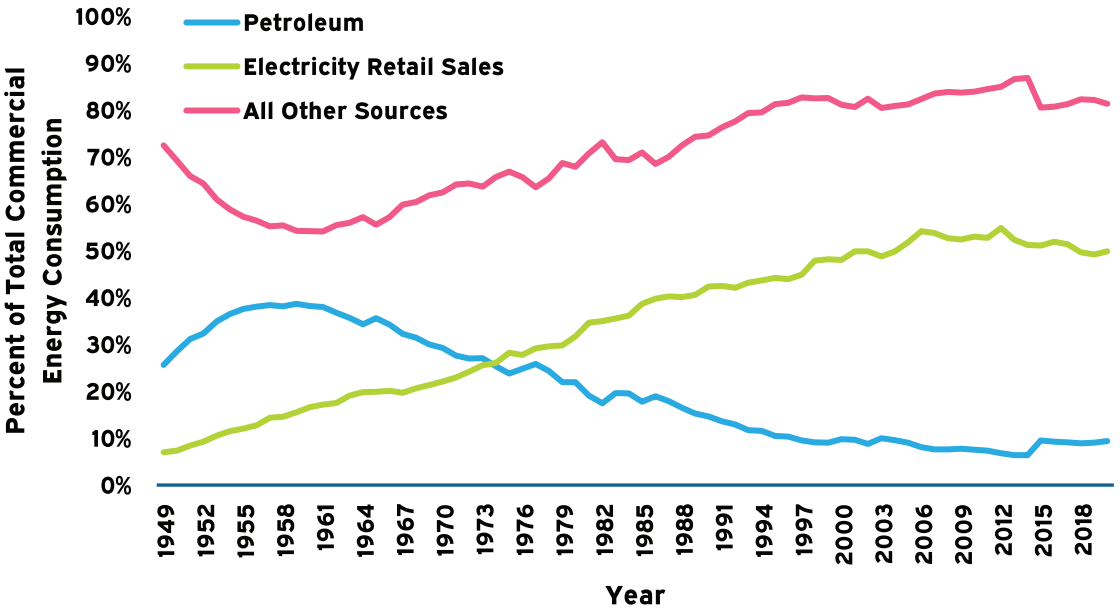

FIGURE 7
Commercial Sector Energy Consumption by Major Source
Source: Ibid. Excludes Electrical System Energy Losses. Petroleum excludes biofuels.

In fact, from 1950 to the late 1980s, petroleum constituted 40-50% of the US total primary energy consumption (Figure 8). With the US's heavy reliance on oil for transportation, industry and heating, oil-related companies dominated the stock market. In 1970, 17 out of the top 20 companies with the largest assets were related to oil. These companies included auto manufacturers like Ford Motors and General Motors, to oil producers like Exxon Mobil, Amoco, and Texaco.[4] As oil underpinned economic life for people and businesses, the US economy and CPI were closely tied to oil prices.

[4] Source: https://money.cnn.com/magazines/fortune/fortune500_archive/assets/1970/

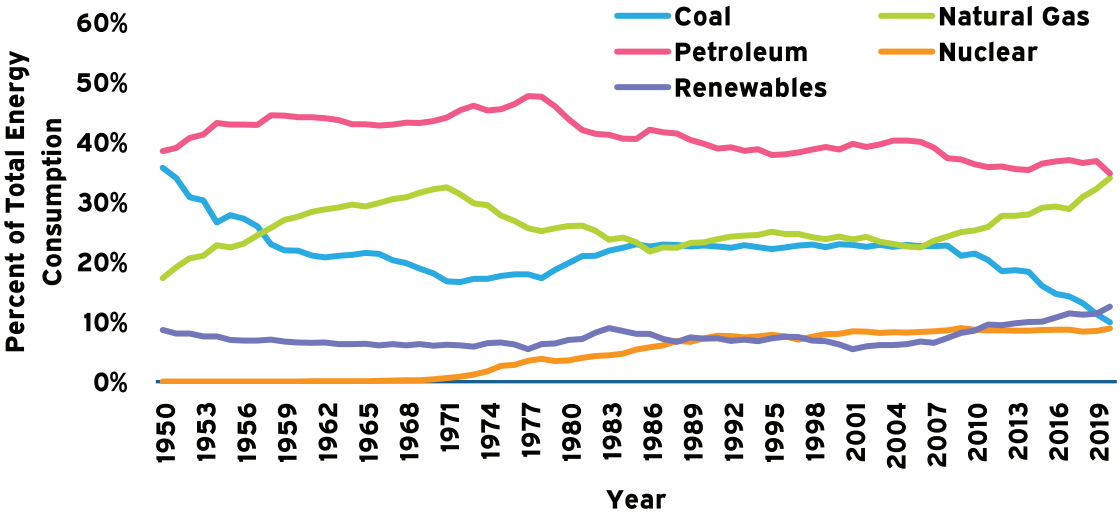

FIGURE 8
US Primary Energy Consumption, by Major Source

Source: US EIA, Monthly Energy Review, April 2021, preliminary data for 2020. Petroleum excludes biofuels, which is counted in Renewables.

Inefficiencies in the oil market made Americans heavily reliant on foreign oil. Oil production in the US peaked at around 9.6 million barrels per day (mbpd). Domestic production price schemes and no off-shore production limited oil company options to boost domestic production. Domestic demand grew and so did oil imports. Beginning in 1971, the OPEC countries steadily gained more price setting power by nationalizing their oil production, marginalizing the oil majors from new oil fields with attractive geologies, and forcing them to sign new resource and pricing agreements.

Around the same time, the Nixon administration implemented price controls on domestic oil and gasoline prices in addition to oil allocation programs and gasoline rationing. These policies were meant to help stabilize consumer prices and better allocate gasoline, but they ended up depressing domestic oil production. US producers shifted to oil imports, mainly from OPEC, to meet demand. In spite of inadequate domestic oil supply, the US kept domestic oil prices capped between 1974 and 1978, during which the US doubled its crude imports.[5]

[5] Source: https://energyhistory.yale.edu/units/oil-shocks-1970s. In 1973 import limits were relaxed and oil imports rose from 2.2 mbpd in 1967 to 6 mbpd by the end of the 1970s. Import limits were designed to protect the domestic oil industry.

America's high reliance on oil, particularly on foreign oil, exacerbated by inefficiencies in the energy market, allowed the economy and CPI to be closely tied with oil prices. During high inflation periods from 1973 to 1991, the correlation between CPI inflation and energy inflation was 0.86 (Figure 9), while the correlation between CPI inflation and WTI price was 0.57. These high, positive correlations suggest that CPI moved cyclically with energy prices (Figure 10). That is, CPI quickly rose when oil prices rose and fell when oil prices declined.

Along the same lines, GDP seems closely tied with oil prices during this period. The correlation between GDP Growth and energy inflation was -.43, while the correlation between GDP Growth and WTI price was -.41 (Figure 9). These negative correlations suggest that the economy tended to move countercyclically with oil prices – as oil prices rose, economic growth stalled, and when oil prices dropped, economic growth boomed. Figure 19 in the Appendix illustrates these patterns as well; between 1973 and the early 1990s, GDP growth was negative each time oil prices dramatically peaked and tended to boom when oil price changes were near zero.

Period	Number of Months	Average CPI Inflation (%)	Average Energy Inflation (%)	CPI inflation, Energy inflation Correlation	CPI Inflation, WTI Price Change Correlation	GDP Growth, Energy Inflation Correlation	GDP Growth, WTI Price Change Correlation
1973-1991	198	7.07	10.09	0.86	0.57	-0.43	-0.41
1992-2022	46	4.49	21.87	0.68	0.28	0.46	0.85

FIGURE 9
Macroeconomic Relationships under High Inflation Periods
Source: Federal Reserve Bank of St. Louis (FRED). Energy inflation is Consumer Price Index for All Urban Consumers: Energy in US City Average. High inflation periods are months where the year-over-year CPI inflation is greater than 3.5%.

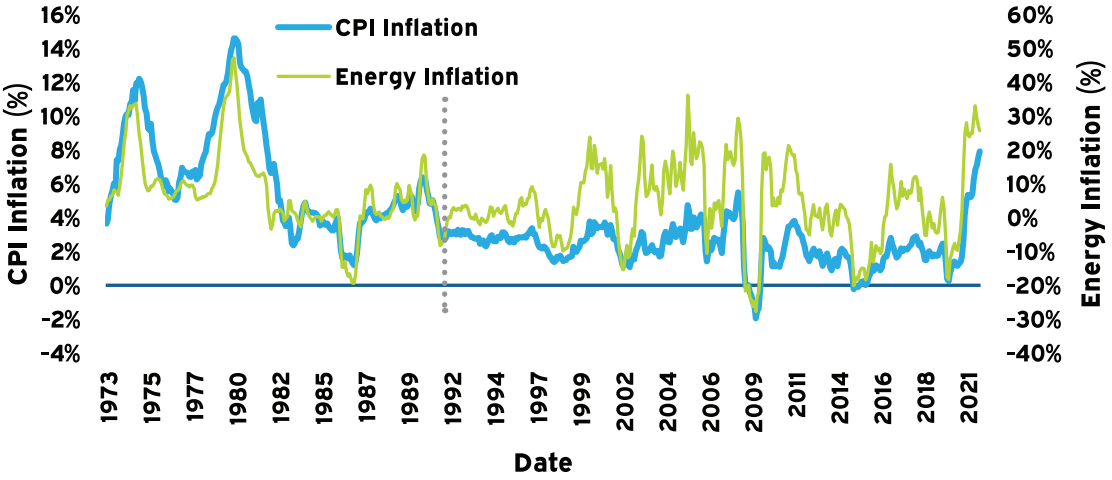

FIGURE 10
CPI Inflation and Energy Inflation, 1973-2022
Source: Ibid.

From 1973 to the early 1990s, public natural resources was a reliable inflation hedge due to the CPI being closely tied to oil prices and to inefficiencies in the energy market. When the global supply of oil became severely limited in the 1973 to 1974, 1979 and 1991 oil shocks, energy prices and inflation rose rapidly. However, because the US economy was heavily dependent on oil, the demand for oil did not drop as much as prices rose. Hence, energy prices rose without energy demand dropping proportionally.

Economy of the mid-1990s to today

In response to the 1973 to 1974 oil crisis, the US began to create energy policies and conservation programs to reduce the country's reliance on oil. The Energy Policy and Conservation Act of 1975 created Corporate Average Fuel Economy (CAFE) standards for lightweight automobiles and the Energy Conservation Program, which developed minimum energy conservation standards for consumer goods like appliances, lighting, and equipment.

During the Carter administration, a slew of legislation and executive orders created energy efficiency programs, established the Department of Energy, increased fuel economy standards, promoted alternative energy sources like natural gas and renewable energy, and created energy conservation programs for commercial, residential, and federal buildings. Most recently, the Energy Independence and Security Act of 2007 increased automobile fuel economy, promoted renewable energy production, and increased energy efficiency in public buildings.

These energy policies and programs helped spur alternative energy sources. Natural gas and electricity have slowly replaced oil for residential and commercial heating. From 1950 to 1980, petroleum comprised 20-30% of residential energy consumption, but that value fell to 9% in 2020 (Figure 6).[6] Similarly, petroleum comprised 20-40% of commercial energy consumption from 1950 to 1980, but that value fell to less than 10% in 2020 (Figure 7).[7] Nuclear energy and renewables like solar, wind and biofuels have slowly taken larger shares of the US's energy source since the late 1970s, and in 2020, they accounted for about 22% of US primary energy consumption (Figure 8).

[6] Source: US EIA, February 2022 Monthly Energy Review.

[7] Ibid.

Further, energy efficiency has steadily increased across many sectors like transportation and manufacturing. The Corporate Average Fuel Economy (CAFE) standards have increased the fuel economy of all motor vehicles since 1980, growing from 14 miles per gallon to over 18 miles per gallon in 2020 (Figure 5). This higher fuel efficiency has lowered the average fuel consumption per vehicle from its high of 850 gallons per vehicle in 1971 to 650 gallons in 2019 (Figure 5). In the manufacturing sector, from 1998 to 2018, gross output increased by 12% as energy intensity dropped by 26%, indicating strong energy efficiency gains.[8] Perhaps most importantly, the total energy intensity of the US has dramatically fallen since 1970. From 1970 to 2020, the total primary energy consumption per real dollar of GDP fell from 13.2 thousand BTUs per dollar to 5 thousand BTUs per dollar, a fall of 62% (Figure 18 in Appendix).

[8] Source: US EIA, 2018 Manufacturing Energy Consumption Survey. https://www.eia.gov/consumption/manufacturing/

Additionally, starting with the Carter administration, government policies that harmed US oil production were removed and the energy market became more efficient and competitive. The Carter administration removed price caps to encourage domestic oil production, while in 1981 President Reagan completely deregulated US oil production and allowed off-shore drilling in Alaska and the Gulf of Mexico. Further, technological breakthroughs in the 1990s and 2000s allowed for hydraulic fracturing ("fracking") and horizontal drilling of shale gas and tight oil formations[9], increasing the amount of proved natural gas reserves by 10% and drastically increasing the US's tight oil production by 2014.

[9] Source: Council on Foreign Relations, Hydraulic Fracturing (Fracking). https://www.cfr.org/backgrounder/hydraulic-fracturing-fracking

The deregulation of the oil market, coupled with growth in US oil production, allowed US crude oil and petroleum field production to grow from 10 mbpd in December 1980 to 17.8 mbpd by February 2020 (Figure 11). In addition, non-OPEC countries have also increased domestic oil production, increasing the number of producers in the oil market. In 2019, imports of petroleum and crude oil from OPEC consisted of only 18% of total petroleum imports to the US, a small fraction of its 70% high in 1977 (Figure 12). The increase in the number of domestic and foreign oil producers has allowed the US to be less reliant on non-US entities like OPEC for its energy needs.

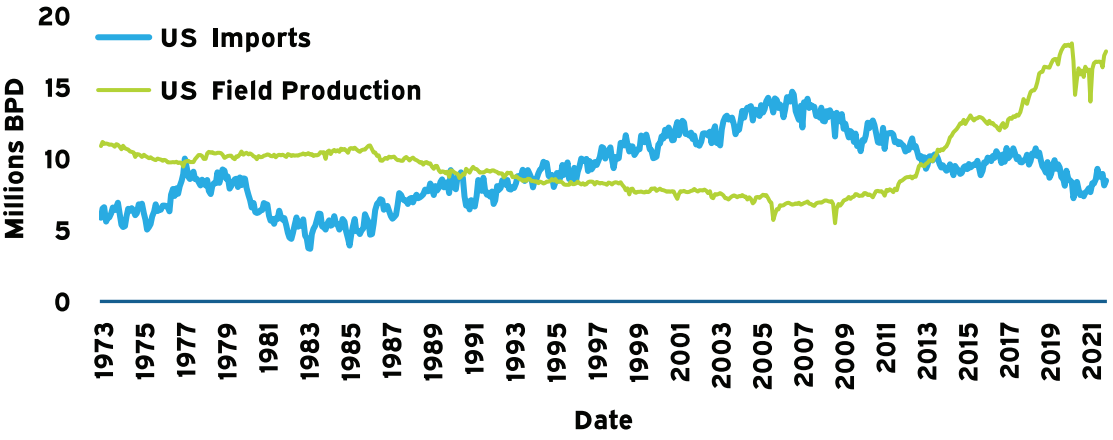

FIGURE 11

US Imports and Field Production of Crude Oil and Petroleum Products, 1973-2021

Source: US Energy Information Administration, US Supply and Disposition.

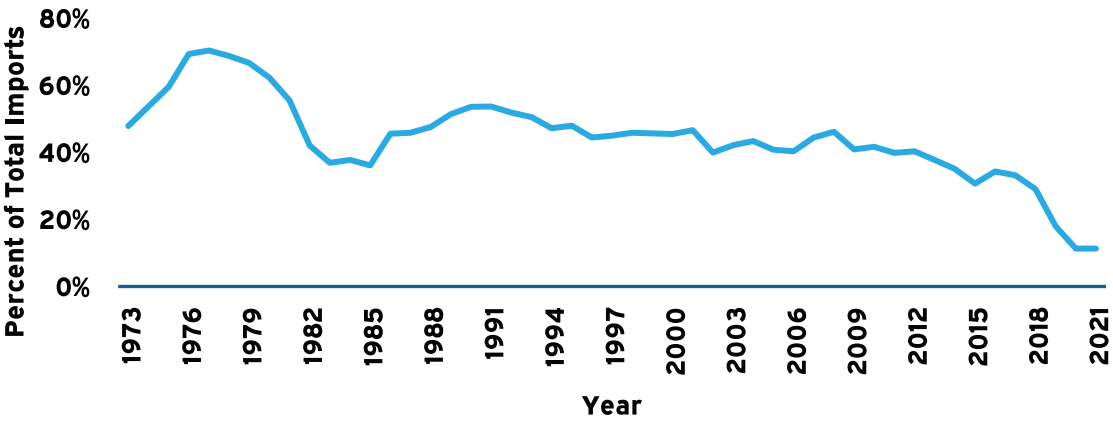

FIGURE 12

US Imports of Crude Oil and Petroleum Products from OPEC Countries, 1973-2021

Source: US Energy Information Administration, US Total Crude Oil and Products Imports.

The US's declining demand for oil and the improved efficiency of the oil market allowed the economy and CPI to be less tied to oil prices. Figure 10 illustrates CPI inflation's divergence from energy prices from 1992 to 2022. From 1973 to 1991, energy inflation and CPI inflation tended to move hand-in-hand. In contrast, starting in the 1990s, energy price inflation tended to have frequent but short periods of high volatility, but these movements were not accompanied by jumps and troughs for CPI inflation.

Figure 9 further illustrates this phenomenon. The correlation between CPI inflation and energy inflation is 0.68 for high inflation months in 1992 to 2022, which is about 0.2 points less than the correlation from 1973 to 1991. Along the same lines, oil's declining importance in the US economy is reflected in its relationship to GDP growth. The correlation between GDP growth and energy inflation (and between WTI price) is positive in 1992 to 2022 high inflation months, which starkly contrasts to that of pre-1991 (Figure 9). The positive correlation suggests that energy prices move cyclically with GDP growth – as the economy grows, energy prices rise (likely due to higher energy demand), and energy prices fall when the economy contracts.

Energy has not been a strong, reliable inflation hedge the past two decades because CPI is less tied to oil prices and the energy market is more efficient. WTI price has fluctuated more, but its effect on CPI is much lower due to lower US dependence on oil and better energy efficiency. Energy supply shocks that occur are shorter-lived and less impactful due to alternative energy sources, more energy producers in the domestic and foreign market, and greater competition.

Implications for public natural resources today

Public natural resources is no longer the reliable inflation hedge of the 1970s and early 1990s, but it can still hedge inflation under the right conditions. Normal business cycle inflation associated with healthy growth of demand can lead to inflationary pressure, but PNR may fail to offer an inflation hedge when inflation rises within normal ranges. However, given the index weighting to energy and the strong relationship between inflation and energy, PNR may offer event-driven inflation hedging properties.

From our close analysis of US inflationary periods, we find that an equity asset like PNR can be an inflation hedge only if it has an inelastic demand curve and experiences long-term, negative supply shocks during inflationary periods.

A product has an inelastic demand curve if it cannot be easily substituted with another product, while a long-term, negative supply shock is an event that decreases the supply of a product for a long period. When a non-substitutable product experiences a long-term supply shock, its price rises, but because consumers cannot easily substitute it for another product, customers continue to buy about the same amount of that product. This in turn allows producers to immensely profit when there are supply chain disruptions that limit the product's supply and cause its prices to rise.

The oil supply shocks in 1973 to 1974, 1979 to 1980 and 1990 to 1991 illustrate these economic concepts perfectly. The WTI spot price increased 135% from September 1973 to January 1974 after OPEC's embargo of oil shipments, but because the US economy was highly dependent on oil, the US demand for crude oil only dropped 3.8% in response (Figure 13).[10] If oil were a substitutable product, US demand would have dropped more proportionally to its price increase, but demand only dropped slightly as oil was essential for households, businesses, and across multiple sectors. Similarly, when global oil production dropped during the Iranian Revolution of 1979 to 1980, the WTI spot price increased 149% and US oil demand decreased only 6.8% in response, while during the first two months of the First Gulf War, the WTI spot price increased by 93% and US oil demand only dropped 1% in response (Figure 13).

[10] We use WTI spot price rather than WTI front month as a proxy for oil price because WTI front month starts in 1983. We still find crude oil's demand curve is inelastic using WTI front month - at the height of the First Gulf War, front month increased by 70% but US demand only dropped by 1%.

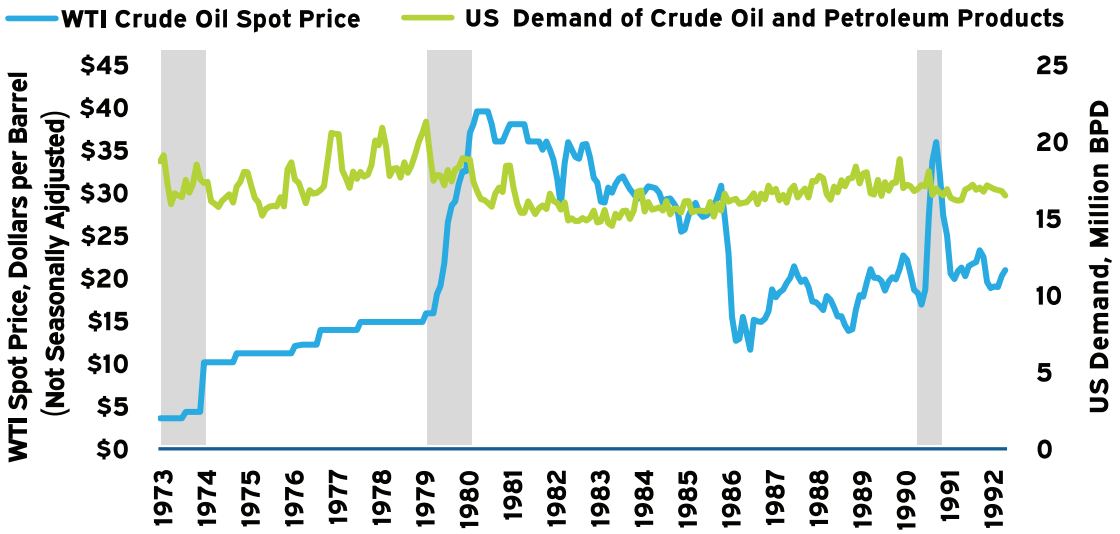

FIGURE 13

Crude Oil Spot Price and US Crude Oil Demand

Source: US EIA, US Supply and Disposition. EIA defines US Demand as US Product Supplied of Crude Oil and Petroleum Products.

Major oil producers reported higher earnings during each of these supply shocks. Financial reports from US-based major energy producers shows that from 1974 to 1975, when OPEC ended the embargo of oil shipments, their annual aggregate net income went from $48.5 billion to $33.6 billion, a drop of 40%.[11] Similarly, from 1988 to 1992, aggregate net income of US oil majors dropped 40% after the First Gulf War ended.[12] One oil major, Occidental Petroleum Company, even announced that 1973 earnings were 665% higher than those of 1972.[13]

[11] Source: US EIA, Performance Profiles of Major Energy Producers 2009 https://www.eia.gov/finance/performanceprofiles/pdf/020609.pdf

[12] Ibid.

[13] Source: https://www.nytimes.com/1979/10/14/archives/the-case-against-the-oil-companies-1920-a-taste-of-the-future-oil.html

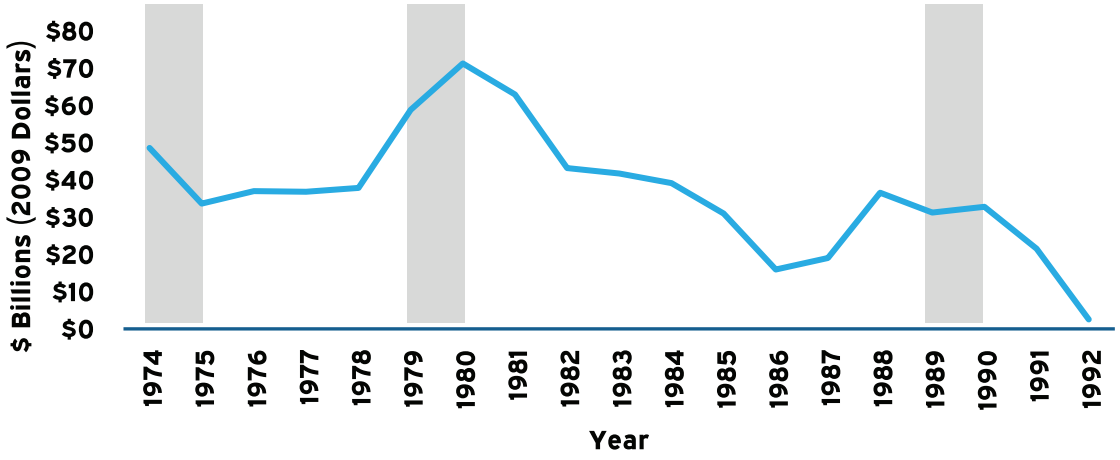

FIGURE 14

Annual Aggregate Net Income of US-based Major Oil Producers

Source: US EIA, Performance Profiles of Major Energy Producers 2009.

Public natural resources are unlikely to provide the same high returns as in past oil shocks, but it can still hedge some kinds of inflation, and its blend of subsectors is key in determining its inflation hedging ability in a modern environment. Its underlying energy, metals and mining, and agriculture are broad sectors that each contain various subsectors with unique economic characteristics.[14] For example, coffee producers and beef producers are in the agriculture subindex, but neither of these products fit the criteria of an inflation hedge as both are substitutable. In order for PNR as a whole to be an inflation hedge, either 1) a large proportion of its subsectors must have inelastic demand curves and experience long-term, negative supply shocks, or 2) a small portion of its subsectors must experience extremely severe supply shocks that outweigh the negative returns of other subsectors, allowing PNR as a whole to produce strong returns.

[14] See Figure 20 in Appendix for a full list of PNR sectors.

	1973-1991 Oil	1992-2022 Oil	Coffee	Beef	Paper	Fertilizer	Real Estate
Is it substitutable?	No	No	Yes	Yes	No	No	No
Can it experience long-term supply shocks?	Yes	Yes	Yes	Yes	Not likely	Yes	Yes
Does it experience long-term supply shock when inflation increases?	Yes	Possibly	Not likely	Possibly	Possibly	Possibly	Possibly
Can it be an inflation hedge?	Yes	Yes	No	No	Not likely	Yes	Yes

FIGURE 15
Inflation Hedge Criteria for Equity Assets
Source: Meketa.

The latter of these conditions is currently playing out. Divestments from fossil fuels and COVID lockdowns encouraged oil production to slow down in 2020 and early 2021, but as the economy opened up and demand for travel increased, oil production has not increased fast enough to keep up with demand. Since February 2021, PNR energy has provided high returns due to the high demand but low supply of oil and natural gas. More recently, PNR agriculture and metals/mining produced strong returns in January and February of 2022, as wheat and sunflower production became severely reduced from Russia's invasion of Ukraine and the recent supply shortages of cobalt and steel. Prior to these agricultural and metal/mining supply shocks, public natural resources had lower total returns compared to US equity under recent high inflation months (Figure 2).

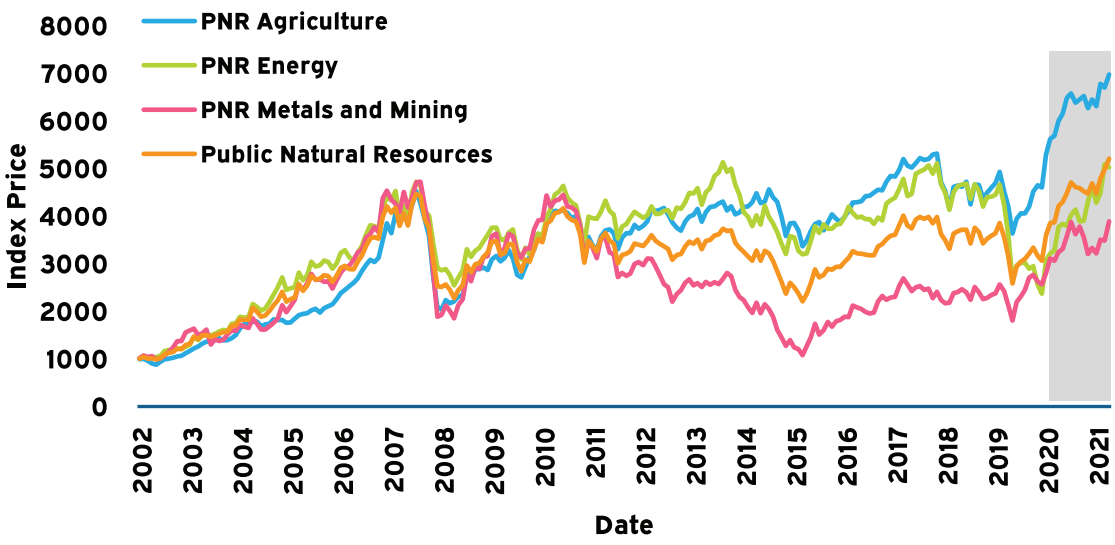

FIGURE 16
Public Natural Resources Prices, 2002-2022
Source: Bloomberg.

Conclusion

Public natural resource equities are unlikely to be as reliable an inflation hedge as they once were. Through a detailed analysis of the economic and historical composition of two periods, 1973 to 1991 and 1992 to 2022, we find that the change in public natural resources' inflation hedging ability was due to the shift in economic environment and energy market structure between the two periods. In the 1970s to early 1990s, PNR was a reliable inflation hedge because CPI and the overall economy was closely tied to oil prices, and substantial inefficiencies existed in the energy market. Since then, public natural resources has not been a reliable inflation hedge because CPI and the overall economy is less tied to oil prices and the energy market is more efficient.

These findings illustrate that public natural resources can still be an inflation hedge, but only under certain circumstances – specifically, a substantial supply shock in a high number of underlying PNR subsectors. To combat inflation under various economic environments, and not just a single type of inflationary environment, Meketa recommends using a diverse "basket" of inflation-hedging assets such as TIPS, real estate, infrastructure, commodities, and natural resources.

Appendix

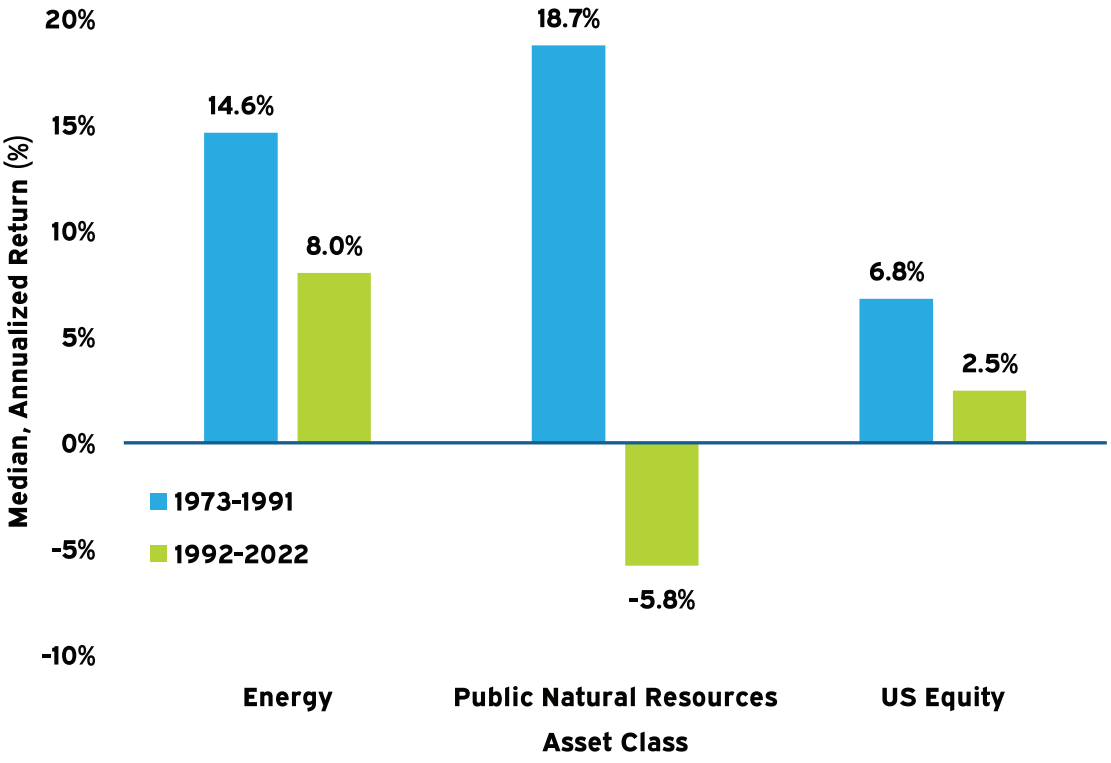

FIGURE 17

Median Annualized Returns Under High Inflation, 1973-1991 vs. 1992-2022

Source: Bloomberg. The sample sizes for each inflation period are: 0-2% = 120, 2-3.5% = 182, 3.5%+ = 46.

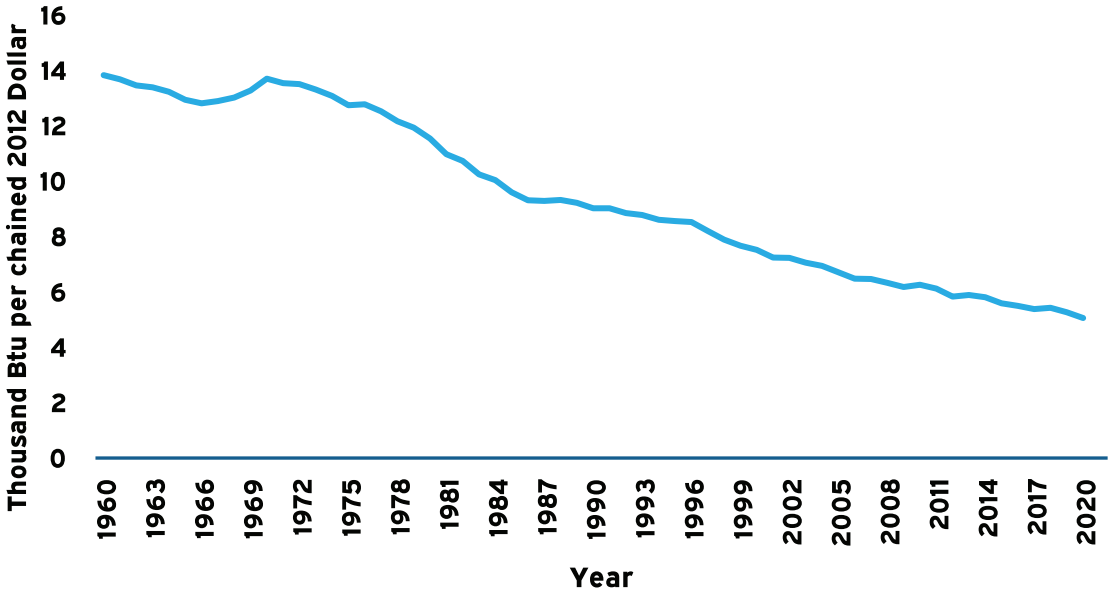

FIGURE 18
US Total Primary Energy Consumption per Real Dollar of GDP, 1960-2020
Source: US EIA.

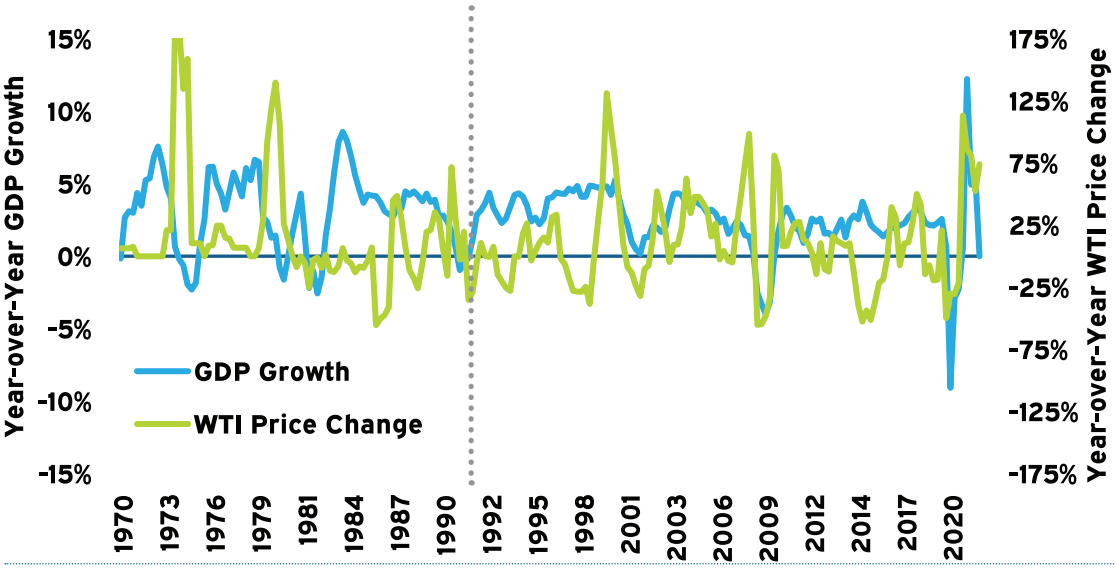

FIGURE 19
GDP Growth and WTI Price Change, 1973-2022
Source: FRED.

Sector	Subsectors
Energy	Integrated oil and gas; oil and gas drilling; oil and gas exploration and production; oil and gas refining and marketing; oil and gas equipment services; coal and consumable fuels
Metals and Mining	Diversified metals and mining; steel; aluminum; copper; gold; silver; lead; zinc; nickel
Agriculture	Agricultural, forest and paper products; fertilizers and agricultural chemicals; diversified chemicals; metal and glass containers; paper packaging; construction materials; timber real estate investment trusts ("REITs"); wheat; cattle, grains; livestock; corn; coffee; sugar

FIGURE 20
Public Natural Resources Subsectors
Source: S&P.

Disclaimers

This document is for general information and educational purposes only, and must not be considered investment advice or a recommendation that the reader is to engage in, or refrain from taking, a particular investment-related course of action. Any such advice or recommendation must be tailored to your situation and objectives. You should consult all available information, investment, legal, tax and accounting professionals, before making or executing any investment strategy. You must exercise your own independent judgment when making any investment decision.

All information contained in this document is provided "as is," without any representations or warranties of any kind. We disclaim all express and implied warranties including those with respect to accuracy, completeness, timeliness, or fitness for a particular purpose. We assume no responsibility for any losses, whether direct, indirect, special or consequential, which arise out of the use of this presentation.

All investments involve risk. There can be no guarantee that the strategies, tactics, and methods discussed in this document will be successful.

Data contained in this document may be obtained from a variety of sources and may be subject to change. We disclaim any and all liability for such data, including without limitation, any express or implied representations or warranties for information or errors contained in, or omissions from, the information. We shall not be liable for any loss or liability suffered by you resulting from the provision to you of such data or your use or reliance in any way thereon.

Nothing in this document should be interpreted to state or imply that past results are an indication of future performance. Investing involves substantial risk. It is highly unlikely that the past will repeat itself. Selecting an advisor, fund, or strategy based solely on past returns is a poor investment strategy. Past performance does not guarantee future results.