

The Evolving Link between Oil Prices and U.S. Consumer Spending

By Nida Çakır Melek and Robert J. Vigfusson

Oil prices have fluctuated widely since the 1970s. Starting around 2000, oil prices began a steady rise, reaching historic highs in the mid-2000s. Then, in the wake of the 2007–09 global financial crisis, oil prices plummeted, before rebounding sharply in the early stages of the subsequent economic recovery. This rebound in prices helped fuel investment in the U.S. oil sector and propelled the fracking revolution. As the fracking revolution took hold and U.S. oil production ramped up, prices again fell sharply in 2014. Although oil prices began to recover again in recent years, they took yet another sharp hit in the economic shutdown precipitated by the COVID-19 pandemic.

Historically, consumers have tended to increase spending on non-oil goods and services when oil prices decline and cut back on such spending when oil prices rise. This response is due, in part, to the United States being a major oil importer and the demand for oil being relatively price-inelastic—that is, slow to adjust to price changes (see, for example, Hamilton 2009; Edelstein and Kilian 2009; Yellen 2011; Ramey 2016). However, this relationship may have changed more

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recently. In particular, the domestic oil sector has grown strongly in the last decade, increasing its importance to overall U.S. economic activity, and consequently the United States has become less reliant on oil imports. In addition, oil expenditures have fallen as a share of households' budgets. As a result, price swings may no longer have the same effect on household consumption as they did in the past.

In this article, we look at two channels through which oil price changes affect consumption—the (direct) discretionary income channel and the (indirect) oil producer channel—and describe how the net oil import position influences these channels. We then provide evidence that the effect of oil price changes on consumption has become more muted. Our analysis suggests changes in oil prices are less likely to yield major changes in consumption, even among lower-income households.

In describing the channels through which oil price changes affect consumption, we limit our focus to how oil prices can affect consumer spending holding other influences fixed. In particular, we abstract from how changes in consumption might affect oil prices. For example, during the global financial crisis and Great Recession, both consumption and oil prices fell sharply, likely due to a steep decline in aggregate demand. Although the factors affecting consumption and oil prices are wide-ranging, we concentrate our discussion on how an independent change in oil prices might affect consumption through these channels.

Section I describes and discusses the channels through which oil prices can affect consumption. Section II presents evidence that these channels on net have likely reduced the sensitivity of consumer spending to oil price changes. Section III explores the distributional effects of oil price changes.

I. Channels through Which Oil Prices Affect Consumption

We focus on two main channels through which oil price changes affect consumer spending. Through the first channel—the discretionary income channel—changes in oil (specifically, gasoline) prices directly affect consumers' spending on other goods and services as consumers' discretionary income changes. Through the second channel—the oil producer channel—oil price changes indirectly affect consumption through their effects on oil sector revenues and the costs associated with

reallocating labor and capital from the oil sector to other sectors of the economy. The overall effect of these two channels is determined by the degree to which a country relies on oil imports to meet its energy needs.

Discretionary income channel

Changes in oil prices can affect consumption directly through the discretionary income channel (Edelstein and Kilian 2009). Specifically, consumers can benefit from lower oil prices that pass through to lower gasoline prices by redirecting their spending on gasoline toward non-energy-related items. Assuming the demand for gasoline is price-inelastic, consumers can purchase the same volume of gasoline for less when oil prices fall, freeing up cash for them to spend on other goods and services (Edelstein and Kilian 2009; Hamilton 2009; Blanchard and Galí 2010; Baumeister and Kilian 2016).

Oil producer channel

In addition to the previous direct channel, which implies that lower oil prices boost consumption, changes in oil prices may also affect consumption through an indirect channel: the oil producer channel. This channel captures the effect of oil price changes on oil producer income as well as the costs associated with the reallocation of labor and capital across sectors (Hamilton 1988; Davis and Haltiwanger 2001). Importantly, this channel operates in the opposite direction of the discretionary income channel in that it implies that a contraction in the oil sector resulting from lower revenues in response to an unexpected drop in oil prices may result in *lower* consumer spending. For example, workers in the energy sector may not be able to easily translate their specialized skills for use in other sectors should low oil prices lead to layoffs, which in turn, could reduce consumption. In this way, frictions in the reallocation of sector-specific labor (or capital) can affect consumption beyond the direct effect of oil price changes.

The role of net oil imports

In addition to these two channels, a country's net oil import status—that is, whether it is a net importer or a net exporter—also matters for the overall effect on consumption of a given change in oil prices. Although some researchers consider the net oil import status a separate

channel, we argue that a country's net import status instead determines the relative importance of the direct and indirect consumption channels. Lower oil prices benefit some consumers through the discretionary income channel, but negatively affect domestic oil producers' income and hence their consumption; the net oil import status affects the balance between the two.

The effect of a change in the relative price of a good in an economy open to trade works through a change in its domestic income. For a net oil importer, this means a decline in oil prices would reduce the domestic income spent on oil imports.¹ As less income is transferred abroad to pay for the same amount of oil consumed, the resulting increase in domestic income should boost (non-oil) consumption. This benefit to a country's consumption of spending less on oil imports has been frequently cited in discussions of oil price effects on consumption in the United States, which has been a major net oil importer for decades (see, for example, Yellen 2011; Ramey 2016).

Ramey (2016) questions whether the discretionary income channel exists independent of this import status effect. She argues that absent the import status effect, changes in relative prices should not boost aggregate consumption, because independent of their effect on income, a decrease in the relative price of one good means a corresponding increase in the relative price of another good. Baumeister, Kilian, and Zhou (2018) emphasize that the discretionary income channel comes through gasoline price changes, and that the discretionary income channel is closely related to the import status effect. One may indeed resolve this debate by interpreting a country's net oil import status as what determines the relative importance of the direct benefits to consumers of lower gasoline prices versus the indirect harm done to the consumption of oil producers. The weaker the net oil importer status, the more the burden of lower oil prices is borne by domestic rather than foreign oil producers. The balance between the two, hence, would likely determine the overall effect of oil price changes on consumption, which would also depend on the more immediate effects.

Although the role of imports is important, a change in oil prices could still affect consumption without involving income transfers abroad. For example, one could see a boost to consumption from an oil price decline if the oil price decline benefited consumers who spend a

larger share of their household budgets on gasoline and who are more likely than average to spend rather than save a windfall from lower gasoline prices. Hamilton (2016) makes a related distributional argument that lower gasoline prices boost some consumers' discretionary income more immediately than lower gasoline spending lowers the incomes of others. Because of this distributional effect, a decline in the relative price of oil could still support aggregate spending even if none of the oil was imported.

II. Why the Effect of Oil Price Changes on Consumption Has Likely Diminished

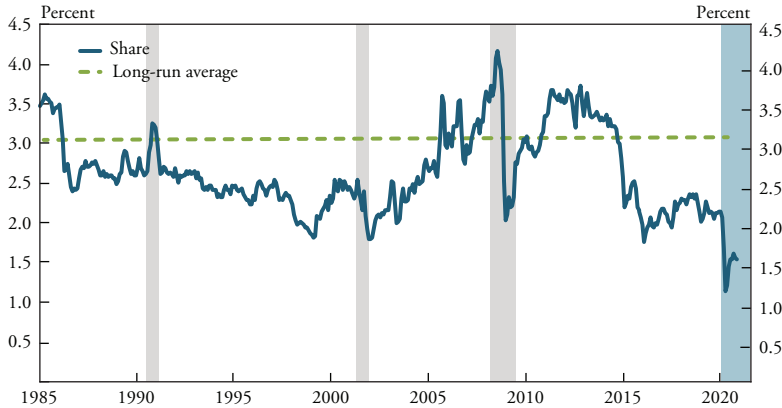
Recent developments may have altered the channels through which oil price changes affect consumption. On net, we argue that the response of consumption to oil price changes has become more muted.

First, the empirical importance of the discretionary income channel is likely lower now than in the past. Chart 1 shows how the share of gasoline expenditures in total personal consumption expenditures has evolved since 1985. After fluctuating from about 2 to 4 percent of spending since the mid-1980s, the share fell below its long-run average value of 3 percent in late 2014 and has remained below this value since then. Notably, the share has declined even more since the onset of the pandemic, suggesting a more muted effect of lower oil prices on consumption.

However, the decline in the expenditure share since the onset of the pandemic highlights an additional channel that might help boost consumption in the near term: increased work from home. Restrictions to slow the spread of COVID-19 forced many U.S. businesses to close their offices and allow their employees to work from home. To the extent that this experiment encourages more work from home going forward, changes in gasoline prices may lead workers to adjust their commuting rather than divert income toward gasoline expenditures. Based on a survey of working-age adults, Bick, Blandin, and Mertens (2020) document that 35 percent of the workforce worked entirely from home in May 2020, up from 8 percent in February. According to Barrero, Bloom, and Davis (2020), from May to October 2020, about half of all paid hours were worked from home. Bartik and others (2020) suggest that at least 16 percent of American workers in professional offices will switch to working at home at least two days per week post-pandemic.

Chart 1

Share of Gasoline Spending in Total Personal Consumption Expenditures



Note: Gray bars denote National Bureau of Economic Research (NBER)-defined recessions; blue bar indicates the pandemic recession.

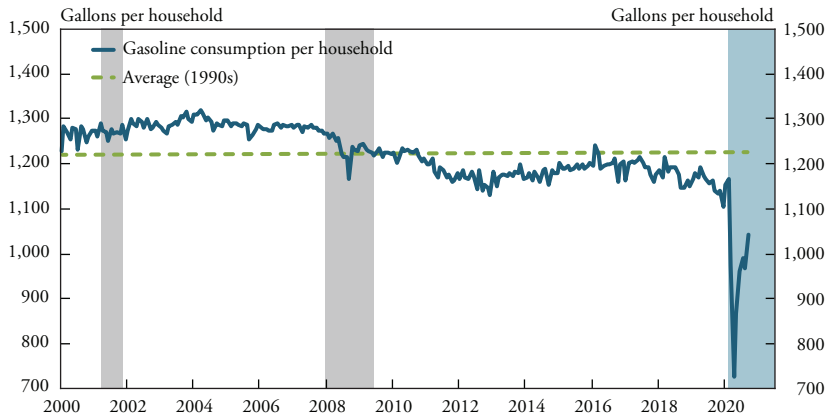
Sources: Bureau of Economic Analysis (BEA) and NBER. Both data sources accessed through Haver Analytics.

Reflecting both less-frequent commutes and other associated declines in mobility, gasoline consumption per household fell during the pandemic. Chart 2 shows that after fluctuating narrowly around the 1990s' average since 2000, gasoline consumption per household dropped by more than one-third from February to April 2020. Although mobility has increased with the lifting of stay-at-home restrictions, gasoline consumption remains well below pre-pandemic levels and is unlikely to fully recover due in part to the potential for greater workplace flexibility in the future. This reduction in gasoline consumption may boost non-oil consumption in the near term, but going forward, increased ability to work from home will likely dampen the effect of oil price changes on consumption. If more consumers have the ability to work from home, higher gasoline prices could cause them to reduce their commuting rather than spend more of their income on gasoline. In this way, gasoline demand is likely to become more responsive to price changes, while total consumption becomes less responsive to changes in gasoline prices.

The oil producer channel is also likely less important for the U.S. economy today than it was the last time oil prices declined substantially. During the 2014–16 oil price slump, some researchers attributed the

Chart 2

Gasoline Consumption per Household



Note: Gray bars denote NBER-defined recessions; blue bar indicates the pandemic recession.

Sources: U.S. Census Bureau (Haver Analytics), U.S. Energy Information Administration, and NBER (Haver Analytics).

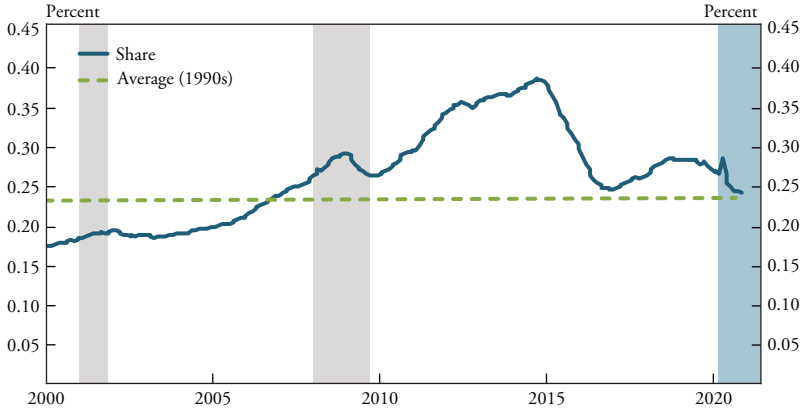
mutated economic benefits of lower oil prices to the oil industry's increased importance to the U.S. economy (see, for example, Baumeister and Kilian 2016). The resulting plunge in U.S. oil investment took about 2 percentage points off U.S. nonresidential business investment growth in 2015 and 2016. However, the oil industry's importance to the overall economy has waned somewhat more recently. For example, Chart 3 shows that while U.S. oil production has continued to increase since 2016, neither the employment share (Panel A) nor the investment share (Panel B) of the oil industry is as high as it was in 2014. As such, the losses realized by oil producers from lower oil prices will be relatively smaller compared with the overall economy, resulting in a more muted negative effect on consumption from this channel now than in the recent past.

In addition to the weakening of the discretionary income and oil producer channels, the share of net oil imports in U.S. GDP has declined considerably over the past decade due to the shale oil revolution and associated growth in U.S. oil production. Accordingly, the import share of oil in GDP has declined. Chart 4 shows that the share of net imports of petroleum and petroleum products in U.S. GDP fell close to zero in 2019, well below the long-run average of 1 percent. The United States moved slightly into net exporter territory in 2020, when oil prices and U.S. demand fell precipitously in response to the economic

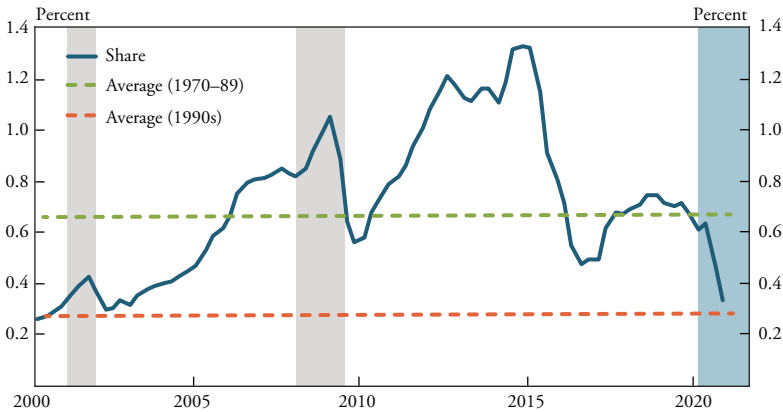
Chart 3

Importance of the Oil Industry in the Overall Economy

Panel A: Share of Oil Employment in Total Employment



Panel B: Share of Oil Investment in GDP

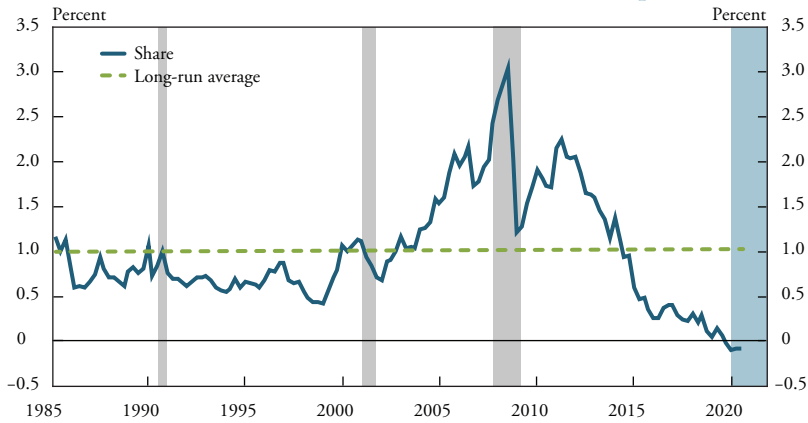


Note: Gray bars denote NBER-defined recessions; blue bar indicates the pandemic recession.

Sources: BEA, U.S. Bureau of Labor Statistics (BLS), and NBER. All data sources accessed through Haver Analytics.

Chart 4

Share of Net Petroleum and Petroleum Products Imports in GDP



Note: Gray bars denote National Bureau of Economic Research (NBER)-defined recessions; blue bar indicates the pandemic recession.

Sources: BEA and NBER (Haver Analytics).

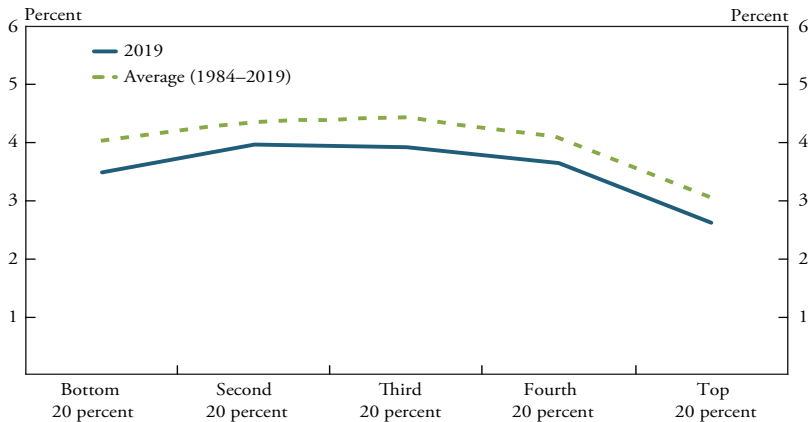
slowdown caused by the COVID-19 pandemic. Overall, this decline in the net import share of oil in recent years has likely diminished the relative importance of the positive discretionary income channel relative to the negative oil producer channel, weakening the overall positive effect of lower oil prices on consumption.

III. Distributional Effects of Oil Price Changes

Although this reduced responsiveness is likely to hold in the aggregate, gasoline price changes could still affect the consumption of lower-income individuals, who spend a larger share of their income on gasoline and are less likely to work from home. To explore this possibility, Chart 5 presents the share of gasoline expenditures in total expenditures by income quantile. Consistent with Chart 1, across the income distribution, spending on gasoline accounted for a smaller share of total spending in 2019 (blue line) than in the past (green line). Thus, even low-income households affected disproportionately by the COVID-19 shock are likely to see a smaller boost to consumption from a drop in gasoline prices.² Moreover, Chart 5 shows that gasoline's expenditure share across the income distribution is relatively flat. Indeed, data show that the difference between the lowest-income and the highest-income quantiles' expenditure shares of gasoline has been about 1 percentage

Chart 5

Share of Spending on Gasoline by Income Quantile



Note: 2019 is the latest year for which data are available.
Source: BLS (Haver Analytics).

point since 1984. As a result, gasoline price changes may have similar effects on consumption across different income groups.

However, results from previous studies have reached somewhat conflicting conclusions regarding differences across consumers. Macroeconomic theory predicts that the responses of consumers to changes in income could vary depending on their asset holdings or access to credit. For example, Kaplan and Violante (2014) examine varying responses of consumers to changes in fiscal transfers and find that hand-to-mouth consumers—those who may be liquidity constrained and generally consume all their income to meet basic needs—exhibit a larger marginal propensity to consume (MPC) after transitory, anticipated income shocks than non-hand-to-mouth consumers. If hand-to-mouth consumers respond in a similar way to changes in discretionary income due to an oil price change, their behavior could lead to a relatively large response of consumption to oil price changes.

In this context, Gelman and others (2016) focus on the sudden, large drop in gasoline prices in 2014 and estimate the change in consumers' spending from the considerable income freed up by lower gasoline prices. Given a low elasticity of demand for gasoline, they interpret the MPC as measuring the response of spending to a permanent, unanticipated income shock. In contrast with Kaplan and

Violante, they show that consumers' liquidity constraints did not generally affect the strength of the spending response—that is, hand-to-mouth and non-hand-to-mouth consumers had similar MPCs out of savings generated by reduced gasoline prices. Gelman and others (2016) argue that this conflicting finding is likely driven by the more persistent and less anticipated gasoline price shocks over the 2013–16 period relative to the fiscal transfer shocks considered in Kaplan and Violante. Even so, the differences in results are puzzling.

Another underexplored question is how commuting costs interact with consumption. Ready, Roussanov, and Zurowska (2019) document that as oil prices increase, lower-paid workers or those who live in areas with lower population density work fewer hours. Although the authors do not document consumption effects, fewer hours worked would likely depress consumption for these low-income workers beyond the direct effect of gasoline prices, worsening the distributional consequences of an oil price change. In this context, the rise of work from home will also likely have distributional consequences, benefiting higher-income households more than lower-income households, who are less likely to work from home.³

Conclusion

The pandemic has created a global economic slowdown, resulting in a large decline in oil prices in early 2020. Historically, low oil prices have boosted consumption. However, we argue that the channels through which oil prices can affect U.S. consumption—the discretionary income channel and the oil producer channel—have likely weakened, and that any boost to consumption from a decline in oil prices is likely to be modest. In particular, the dramatic decline in the net oil import share has diminished the relative importance of the (positive) discretionary income channel relative to the (negative) oil producer channel, meaning consumers would likely experience less of a boost from lower oil prices now than in the past.

Nevertheless, the increase in work from home during the pandemic and potential workplace flexibility post-pandemic may lead individuals who can work from home to redirect their gasoline expenditures toward other categories of U.S. consumption. Of course, this effect is distributional in that it would benefit only those who have the

flexibility to work from home and not those who are tied to their workplaces. Therefore, a useful area of further research would be consumption behaviors across different groups, which may help us better understand the distributional effects of oil price changes in an evolving environment.

Endnotes

¹For example, Backus and Crucini (2000) find that oil accounts for much of the variation in the terms of trade—the relative price of exports in terms of imports—in the 1970s and early 1980s.

²For example, Chetty and others (2020) investigate the economic effects of COVID-19 and show that low-wage workers experienced much larger job losses than high-wage workers, and these losses persisted for several months.

³Mongey, Pilossoph, and Weinberg (2020) study the characteristics of individuals who cannot work from home and find that they are more likely to be lower income, lack a college degree, rent their dwellings, be non-white, and lack employer-provided health insurance.

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