General Economic Measures for Fuel Price Trend, Inflation Adjustment, and Discounting

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SEDAR87-DW-08

1 September 2023

Please cite this document as:

Liese, C. 2023. General Economic Measures for Fuel Price Trend, Inflation Adjustment, and Discounting. SEDAR87-DW-08. SEDAR, North Charleston, SC. 6 pp.

SEDAR-87-WP-xx

General Economic Measures for Fuel Price Trend, Inflation Adjustment, and Discounting

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August 28, 2023

This write-up pertains the following three data files:

shr_fuelpri_USEIA_7822_08182023.cvs

shr_infladj_USBEA_2922_08182023.cvs

shr_discount_OMB_future_08182023.cvs

Introduction

SEDAR87 plans to include economic measures and evaluate their potential usefulness for the Gulf of Mexico shrimp stock assessment. Preliminary discussions at the data scoping workshop identified three general economic measures/indices[1] that might be of use, including:

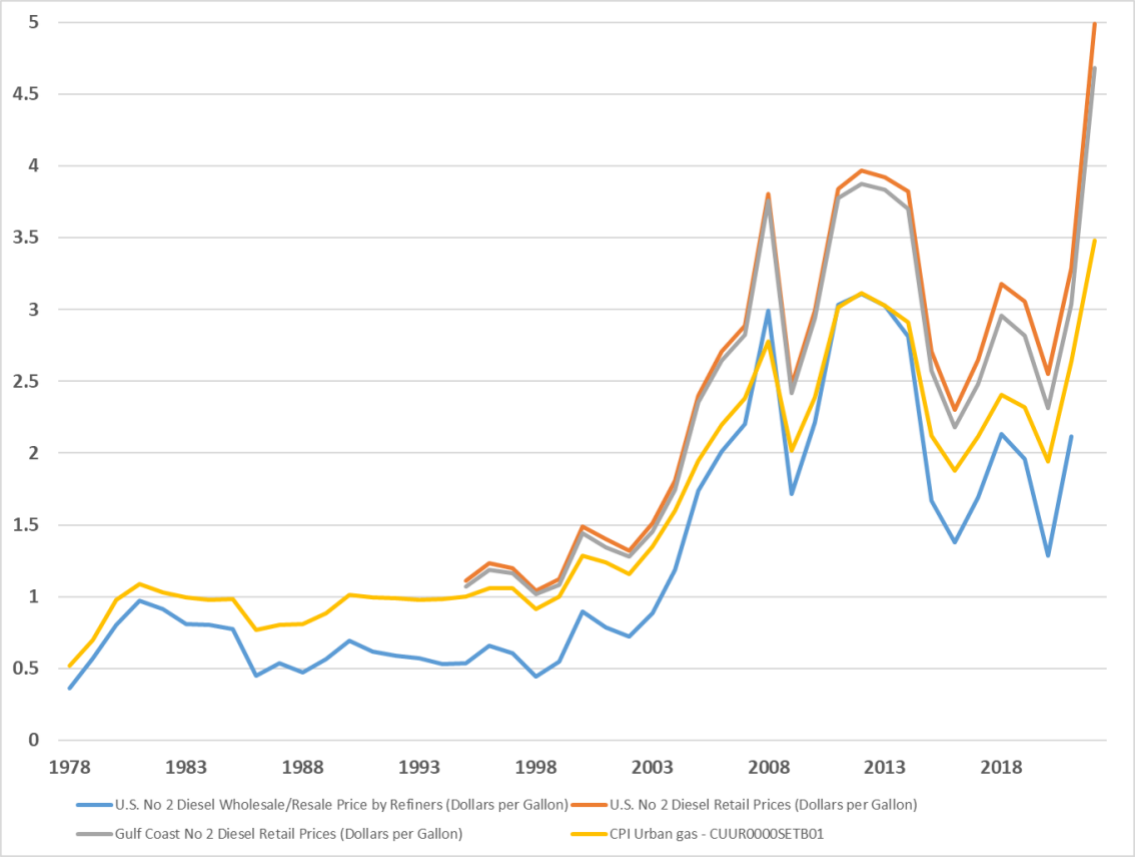
a) A fuel price trend, as fuel represents the single largest expense in the GOM shrimp fishery, averaging over 40% of revenue, i.e., well over $100 million per year. Vessel operators are very cognizant of changes in fuel prices and change their fishing behavior accordingly (in light of shrimp abundance and the price of shrimp, i.e., profit maximization).
b) An inflation adjustment, in order to make nominal dollar values comparable across different years of a time series. Typically denominated in dollars are fuel and shrimp prices and shrimp revenue, costs, and profits.
c) A discount rate, in order to discount future net benefits (in dollar terms) into current dollars. This would be apply to stock assessment outputs such as evaluating in economic terms, i.e., make comparable, different rebuilding plans for a stock, where foregone harvest (the cost) and harvest (the benefit) occur across different future years.

Further discussion among NMFS economist identified a specific national government source or index for each of these measures.

[1] The workshop also identified economic data specific to the Gulf of Mexico shrimp fishery, which is deal with in a separate working paper.

Fuel Price Trend

Various national and regional fuel price indices from different federal government agencies are available, all differing in minor ways, e.g., gasoline vs. diesel, wholesale vs. retail, or national vs. regional. Yet the trend within each, driven mostly by the global oil market, is pretty much the same across the years of interest, as can be seen in the figure below.



For this SEDAR, we recommend using a regional index for retail diesel over a national one for retail gasoline or wholesale diesel (which is also being discontinued by the EIA) as it might be more applicable to GOM shrimpers. That said many vessels are probably buying fuel in wholesale volumes and hence at less than retail prices, e.g., buying fuel by the truckload for refilling 70+ ft. vessels).[2]

The specific source/cite is:

[2] Note: The GOM shrimp fishery specific economic data (reported elsewhere) includes an estimate of the actual fuel price and expenses paid by the federal shrimpers (since 2006). If actual fuel prices or expenses are needed, those data will be a better source. That said, as those data are likely to be endogenous (fuel cost for sure, fuel price a little) with all other GOM shrimp fishery variables, national or regional indices are better for situations where a strictly exogenous trend is wanted.

U.S. Energy Information Administration (EIA)
Gulf Coast No 2 Diesel Retail Prices (Dollars per Gallon)
Sourcekey: EMD_EPD2D_PTE_R30_DPGa
Release Date: 8/7/2023

Source:

https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=EMD_EPD2D_PTE_R30_DPG&f=A

A limitation of this index is that it is only available since 1995. If a longer fuel price time series is necessary, a national index would need to be substituted; either from the U.S. EIA (back through 1978) or from the U.S. Bureau of Labor Statistics' Consumer Price Index Databases (back through 1935), specifically:

CPI for All Urban Consumers (CPI-U)
Series Title: Gasoline (all types) in U.S. city average, all urban consumers, not seasonally adj.
Series ID: CUUR0000SETB01

Inflation Adjustment

For this SEDAR, to adjust nominal dollar values from different years into constant (or current) dollars, we recommend using the implicit price deflator for the gross domestic product published by the U.S. Bureau of Economic Analysis (BEA). The specific index can be found under:

National Income and Product Accounts
GDP and Personal Income
SECTION 1 – Domestic Products and Income
Table 1.1.9 Implicit Price Deflators for Gross Domestic Product (A) (Q)

The U.S. BEA's website provides detailed explanation of inflation, inflation indices, methodology, and proper use.

Brief excerpts are summarized here:

"The prices you pay for goods and services change all the time – moving at different rates and even in different directions. Some prices may drop while others are going up. A price index is a way of looking beyond individual price tags to measure overall inflation (or deflation) for a group of goods and services over time."

"BEA produces several types of price indexes that help policymakers, business leaders, and consumers see the big pictures of price movements. The Federal Reserve, the central bank of the United States, relies on one of BEA's inflation measures when setting monetary policy. Federal agencies use them to help make spending plans."

“The gross domestic product price index measures changes in prices paid for goods and services produced in the United States, including those exported to other countries. Prices of imports are excluded. The gross domestic product implicit price deflator, or GDP deflator, basically measures the same things and closely mirrors the GDP price index, although the two price measures are calculated differently. The GDP deflator is used by some firms to adjust payments in contracts.”

“The ‘NIPA Handbook’ begins with introductory chapters that describe the fundamental concepts, definitions, classifications, and accounting framework that underlie the national income and product accounts (NIPAs) of the United States and the general sources and methods that are used to prepare the NIPA estimates. It continues with separate chapters that describe the sources and methods that are used to prepare the expenditure and income components of the accounts and presents an appendix that defines each entry in the seven summary NIPA accounts and a glossary of terms that are associated with the NIPAs. The Handbook is intended to be a living reference that can be updated to reflect changes in concepts or methodology as they are introduced into the NIPAs.”

United States. Bureau of Economic Analysis. Measuring the economy [electronic resource]: A primer on GDP and the national income and product accounts. U.S. Dept. of Commerce, Economics and Statistics Administration, Bureau of Economic Analysis [Washington, D.C.] 2007.

Source:

https://apps.bea.gov/iTable/?reqid=19&step=3&isuri=1&1921=survey&1903=13

Suggested citation: U.S. Bureau of Economic Analysis, "Table 1.1.9. Implicit Price Deflators for Gross Domestic Product" (accessed Monday, August 14, 2023).

Discount Rate

The recommended discount rate for this SEDAR is 1.7%, as recommended in (draft) U.S. Office of Management and Budget’s Circular A-4 (April 6, 2023). This circular provides guidance to Federal agencies on the development of regulatory analysis, as updated by the Biden Administration.

Circular A-4 also provides detailed explanation of discounting and rationale for using the specific rate.

Brief excerpts are summarized here [from pages 74-76] :

“Benefits and costs often take place in different time periods. When this occurs, simply adding all of the expected benefits or costs without regard for when they actually occur fails to account

for differences in those values that result from the differences in timing. If benefits or costs are delayed or otherwise separated in time from each other, the difference in timing should be reflected in your analysis through appropriate discounting."

"To avoid the misleading effects of inflation in your estimates, it is important to measure the stream of effects in constant dollars. […] Please note any conversion into constant dollars is a separate calculation from discounting future effects to present value, ..."

"Benefits or costs that occur sooner are generally understood to be more valuable, all else equal. The main rationales for the discounting of future impacts are:
(a) If consumption continues to increase over time—as it has for most of U.S. history—an increment of consumption will be less valuable in the future than it would be today (all else equal); as total consumption increases, the value of a marginal unit of consumption declines.
(b) People may exhibit "pure time preference," meaning that even in the absence of future changes in consumption, people prefer consumption now rather than later.
(c) In addition, regulations that displace or induce capital investments at a point in time can affect future consumption differently than regulations that increase or decrease consumption at a point in time, because capital investments are normally expected to yield a positive return."

"In your analysis, it is advisable to carefully consider the types of effects that need to be discounted. Depending on the effects that you are analyzing, you may be discounting using rates reflecting either society's perspective or a private entity's perspective. The social rate of time preference corresponds to the rate at which society is willing to trade current consumption for future consumption."

"Default Approach to the Social Rate of Time Preference

One approach assumes that the real (inflation-adjusted) rate of return on long-term U.S. government debt provides a fair approximation of the social rate of time preference. It is the rate available on riskless personal savings and is therefore a rate at which individuals may increase future consumption at the expense of current consumption. It is also the rate at which society as a whole can trade current consumption for future consumption. Over the last thirty years, this rate has averaged around 1.7 percent in real terms on a pre-tax basis."

Source:

https://www.whitehouse.gov/wp-content/uploads/2023/04/DraftCircularA-4.pdf