



**Calhoun: The NPS Institutional Archive**  
**DSpace Repository**

---

Acquisition Research Program

Faculty and Researchers' Publications

---

2022-05-06

# Assessing Policy Changes on the Cost of Husbanding Services for Navy Ships

Ferrer, Geraldo

Monterey, California. Naval Postgraduate School

---

<http://hdl.handle.net/10945/70217>

---

*Downloaded from NPS Archive: Calhoun*



Calhoun is the Naval Postgraduate School's public access digital repository for research materials and institutional publications created by the NPS community. Calhoun is named for Professor of Mathematics Guy K. Calhoun, NPS's first appointed -- and published -- scholarly author.

**Dudley Knox Library / Naval Postgraduate School**  
**411 Dyer Road / 1 University Circle**  
**Monterey, California USA 93943**

<http://www.nps.edu/library>



# Naval Postgraduate School

## Assessing Policy Changes on the Cost of Husbanding Services for Navy Ships

---

Professor Geraldo Ferrer  
Chair of Naval Supply Chain Management  
Department of Defense Management  
Naval Postgraduate School



## Acknowledgements

- MBA Capstone Project:

**Husbanding Service Provider Price Analysis Factors** – Graduation June 2021

LCDR Austin W. Gage, Lcdr Luis C. Escobar, and Lcdr Bradford R. Sturgis Jr.

June 2021 (*available at NPS Dudley Know Library*)

- Journal Article:

**Assessing Policy Changes on the Cost of Husbanding Services for Navy Ships**

Margaret Hauser, Geraldo Ferrer, and Robert Mortlock

Defense Acquisition Research Journal (*forthcoming*)



## What are the effects of policy changes on the cost of husbanding services?

- Off-Ship Bill Pay (OSBP)
  - Formalized a process for **procuring, rendering, and paying** for husbanding services to increase oversight
  - Effective FY 2016
- Multiple Award Contracts (MACs)
  - Multiple vendors are awarded contract over region, **increasing competition** for individual ports
  - Replaces single award contracts – SACs – and single visit contracts – SVCs

*Study period is FY2010 – FY2020, prior to Global MAC awarded by NAVSUP in October 2020 (FY2021).*



## HSPortal Data

- Port visits by 5<sup>th</sup>, 6<sup>th</sup>, and 7<sup>th</sup> fleets
- From 1 October 2009 to 11 June 2020
  - Raw data: 14,700+ port visits
- Data base fields:
  - Total Cost
  - Exhibit line-item number (ELIN)
  - Mooring type
  - Ship type
  - Days in Port
  - Dates of Visit
  - Contract
- **Filtered for normal visits**
  - Exclude: maintenance, transit, brief stop for fuel, cancellations
  - Exclude ship-ports combinations with < 15 visits
  - Filtered data: 8,700+ port visits
- **Contract Data**
  - Identified MACs with contract numbers in HSPortal
- **Historical Crude Oil Prices (Nominal)**
  - Price on the date of port visit



# Multiple Regression Analyses

## (1) Global Cost Model

Objective: Identify general trends in total cost of port visits

- Evaluates entire dataset
- Uses FY as categorical variable

*\*Assumes fixed factor effects over time horizon*

## (2) FY Cost Model

Objective: Test assumption in Global Cost Model that explanatory variables have fixed effect over time

- Unique regression model for each FY
- Statistical significance is reduced with reduced

- Models provide a base value for the total cost of a port visit
  - Response Variable: Natural Log of Total Cost
  - Explanatory variables: multipliers to the base cost
  - Unbalanced panel



# Global Cost Model Design

Cost of port visit

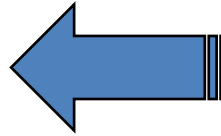
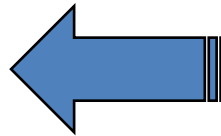


Exhibit Line-Item Number (ELIN)  
Days in Port  
Fiscal Year  
Crude Oil Price



Type of mooring  
Ship Type  
Contract Type

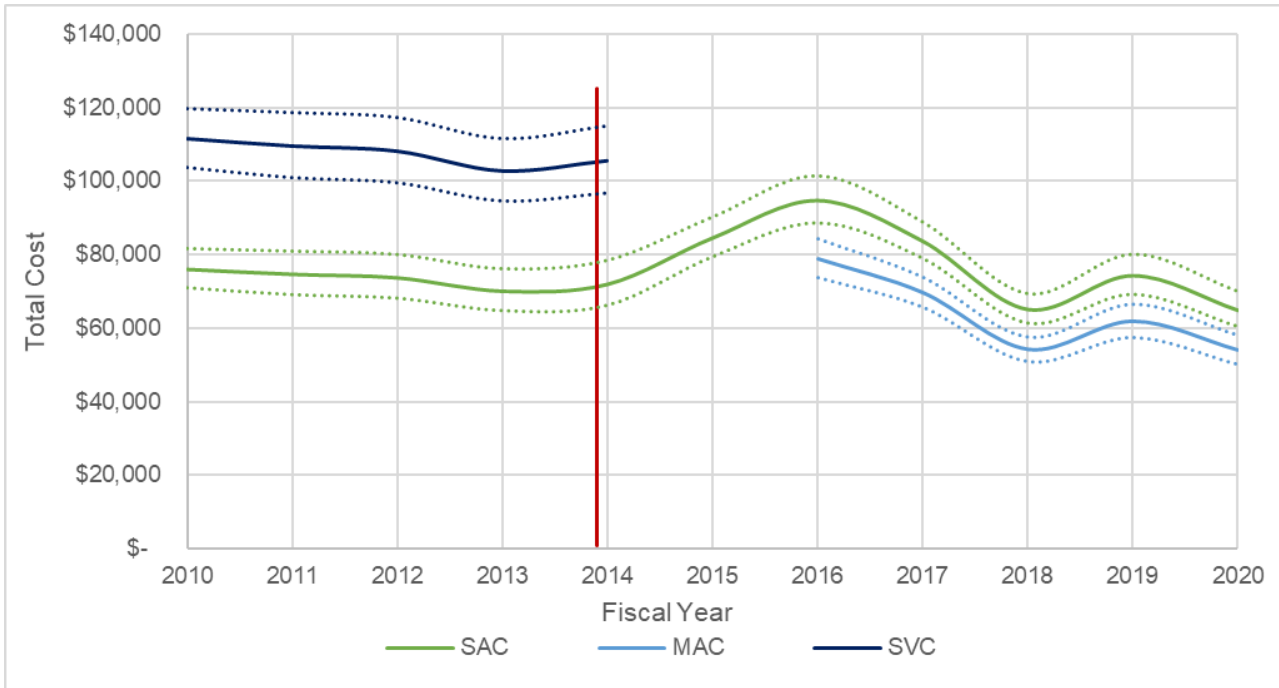
*Benchmarks:*  
1) Anchorage  
2) DDG  
3) SAC



# Global Cost Model Results

## Average Cost of 5-day DDG Port Visit

*Reference Level Used for all Explanatory Variables*



## Key Factor Effect Summary

| Factor       | Reference | Total Cost Impact                  |
|--------------|-----------|------------------------------------|
| MAC          | SAC       | - 17%                              |
| SVC          | SAC       | + 46%                              |
| Anchorage    | Pier side | + 30%                              |
| Days in Port | 5 days    | 2 days → - 40%<br>10 days → + 115% |
| ELIN Count   | 23        | 70 → + 200%<br>100 → + 570%        |

- *Ship type and port had statistically significant effects in most instances.*
- *Crude oil price also had a statistically significant effect however, it was very small (> 5% for the full range).*

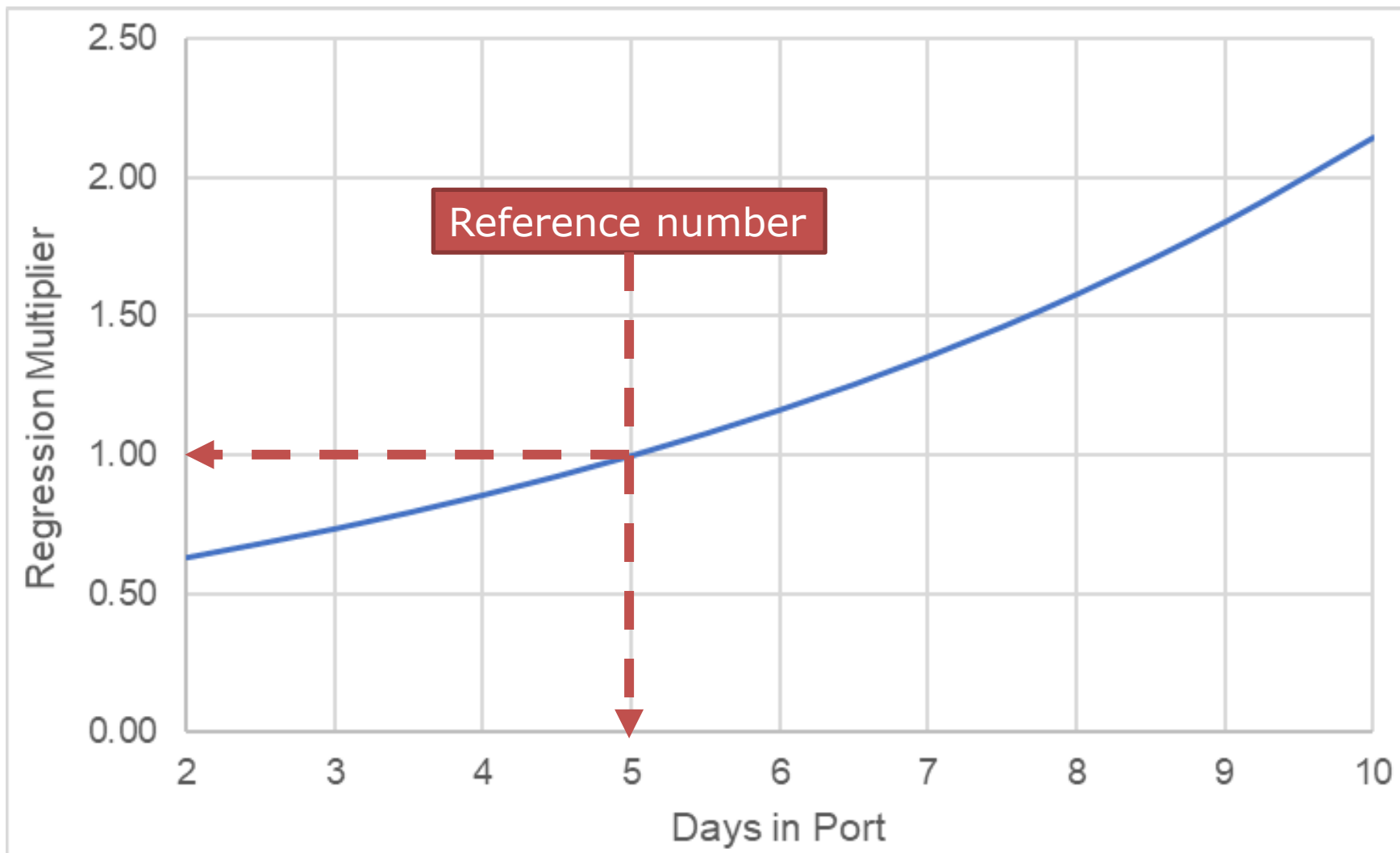




# Global Cost Model Breakdown (I)

## *Days in Port*

Assessing Policy Changes on the Cost of HSP Services

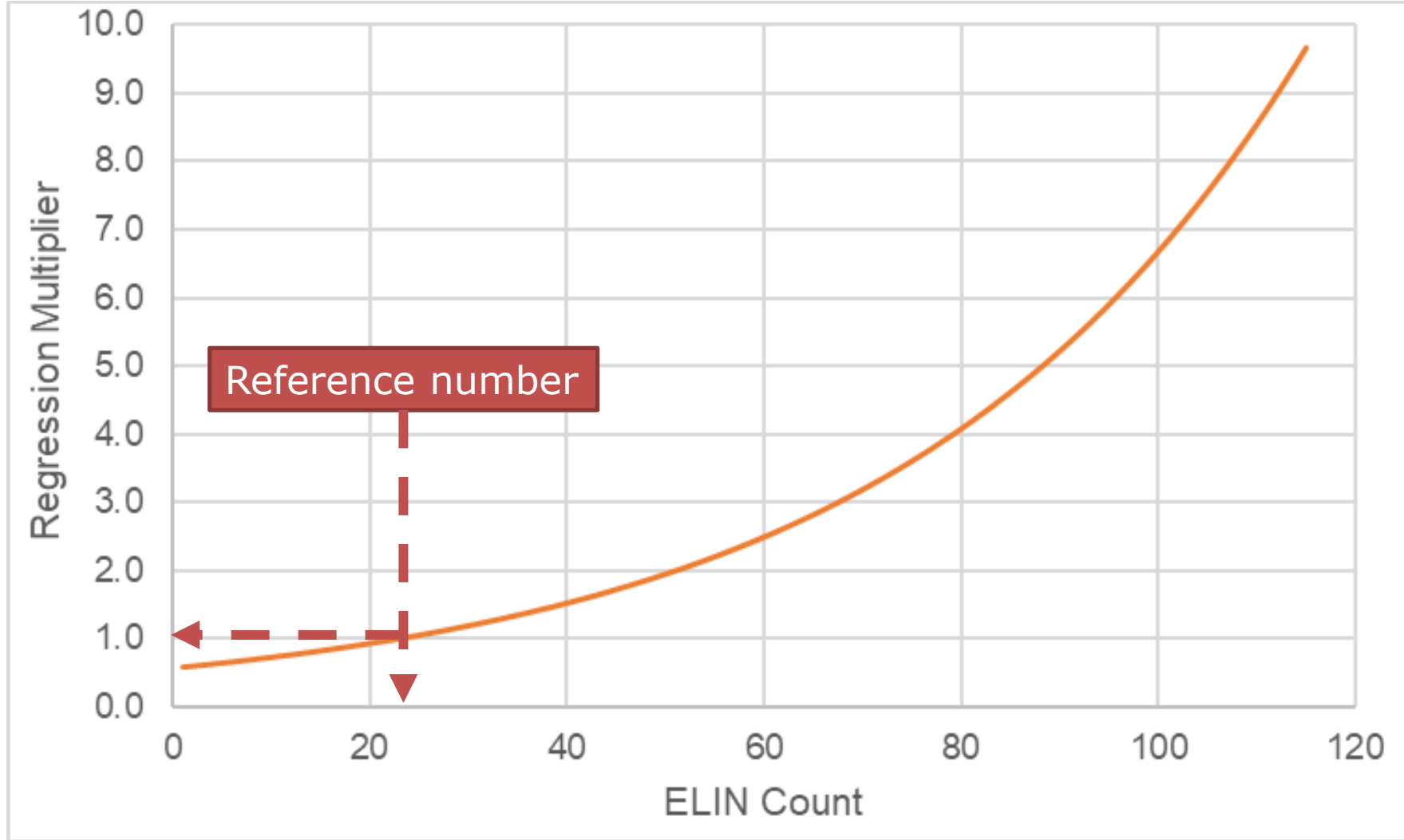




# Global Cost Model Breakdown (II)

## *Exhibit Line-Item Number*

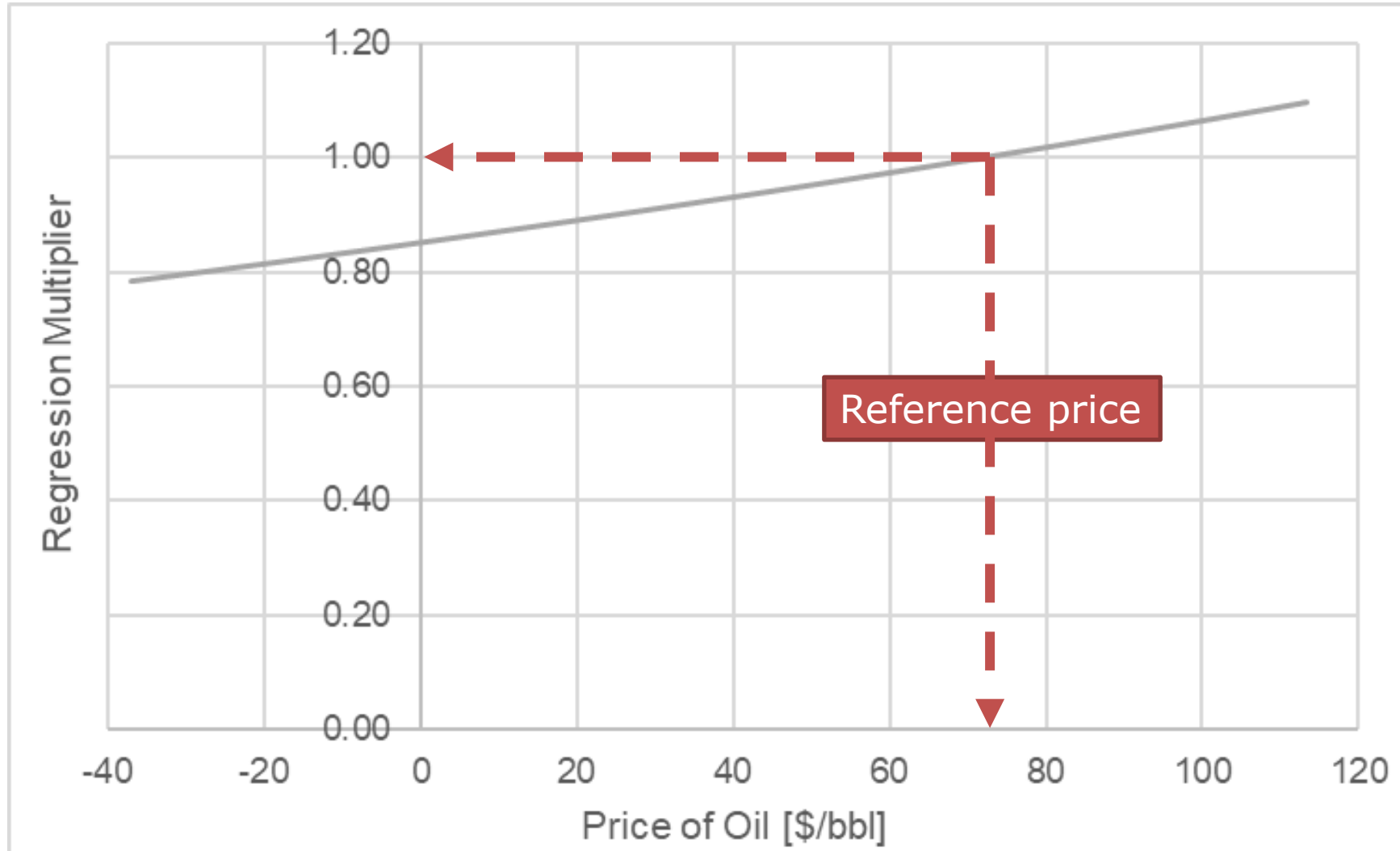
Assessing Policy Changes on the Cost of HSP Services





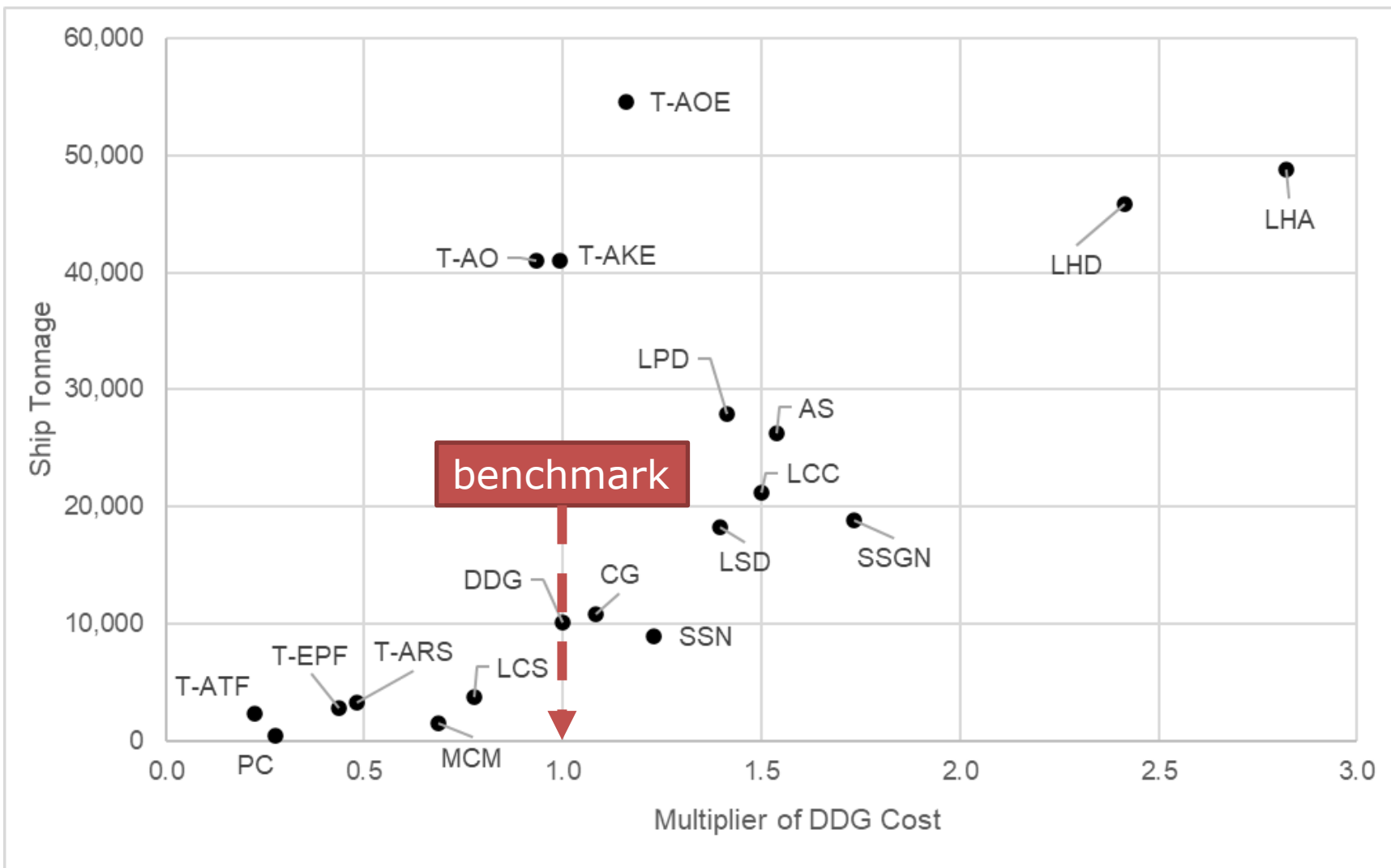
# Global Cost Model Breakdown (III)

## *Price of Oil*





# Regression Multiplier vs. Ship Tonnage





# FY Cost Model Design

Cost of port visit  
in each FY

Exhibit Line-Item Number (ELIN)  
Days in Port  
~~Fiscal Year~~  
Crude Oil Price

Type of mooring  
Ship Type  
Contract Type

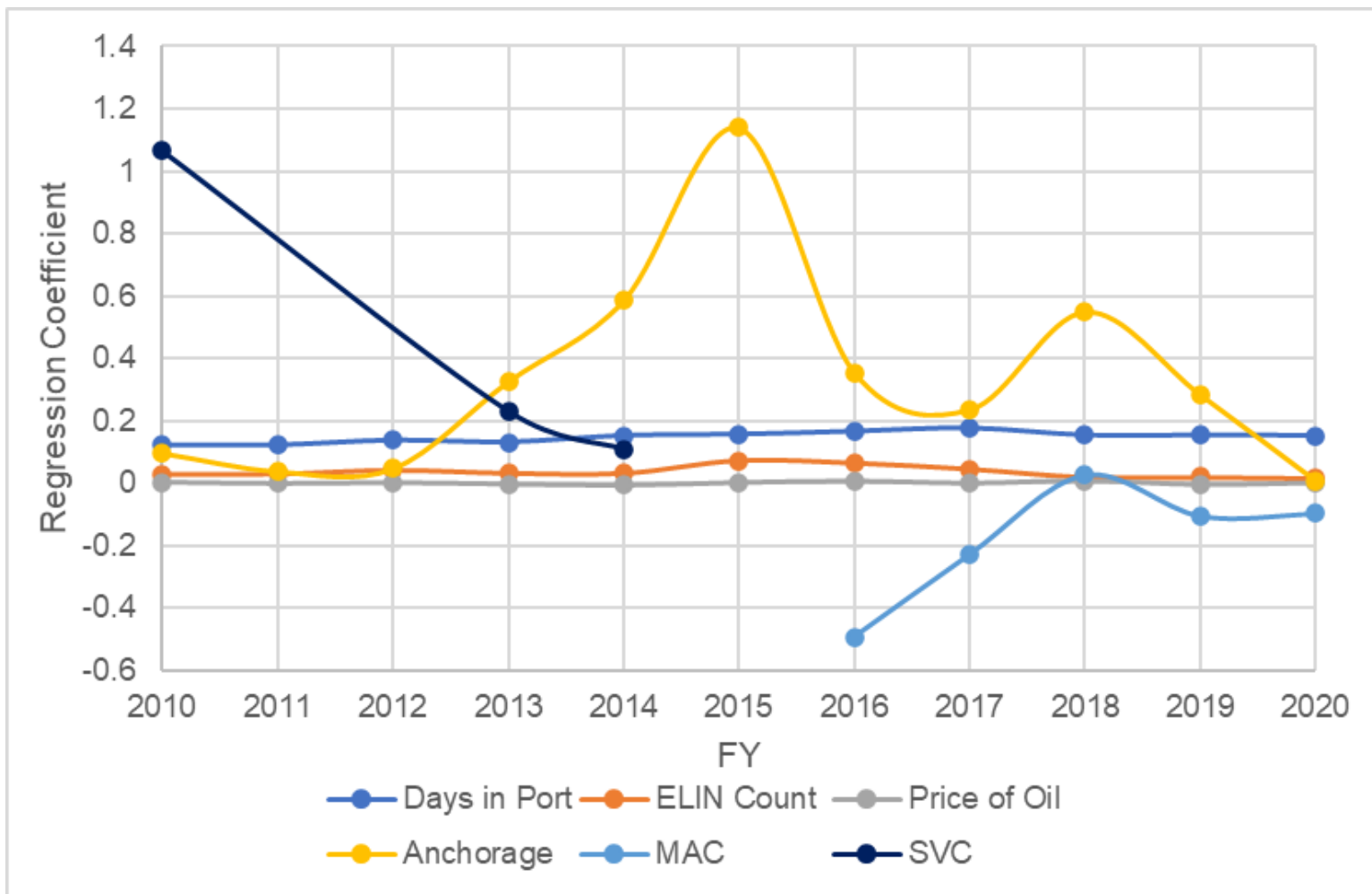
*Benchmarks:*  
1) Anchorage  
2) DDG  
3) SAC



# Factor Regression Coefficients in FY Cost Models

*(Negative values correspond to decrease in cost)*

Assessing Policy Changes on the Cost of HSP Services



*References*  
Days: 5  
ELIN: 23  
Oil: \$72/bbls  
  
Mooring: Pier side  
Contract: SAC



## Conclusions

- Global cost model provides valuable insight on costly aspects of port visits
  - Modeling each FY separately shows:
    - Dynamic impact of contract changes
    - Dynamic cost of anchorage relative to pier side
- Impact of OSBP:
  - Initially => increased cost of port visits
  - Recent years => no significant impact
- Impact of MAC:
  - Cost of husbanding services has decreased since implementation

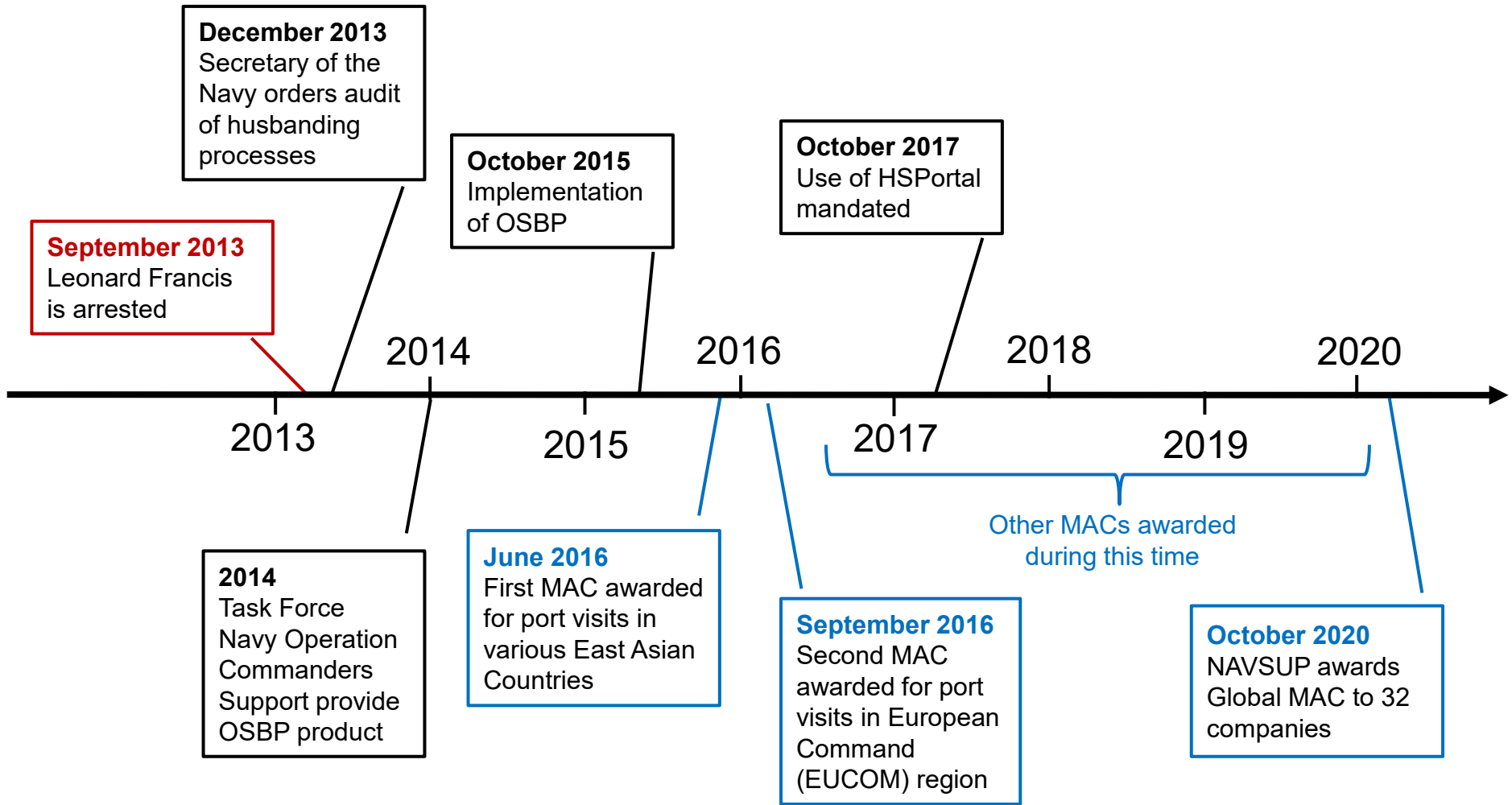


# SUPPLEMENTAL SLIDES





# Assessing Policy Changes on the Cost of HSP Services





# FY Cost Model vs Global Cost Model

## Total Port Visit Cost over Time

Assessing Policy Changes on the Cost of HSP Services

