



# Naval Postgraduate School

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

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## 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

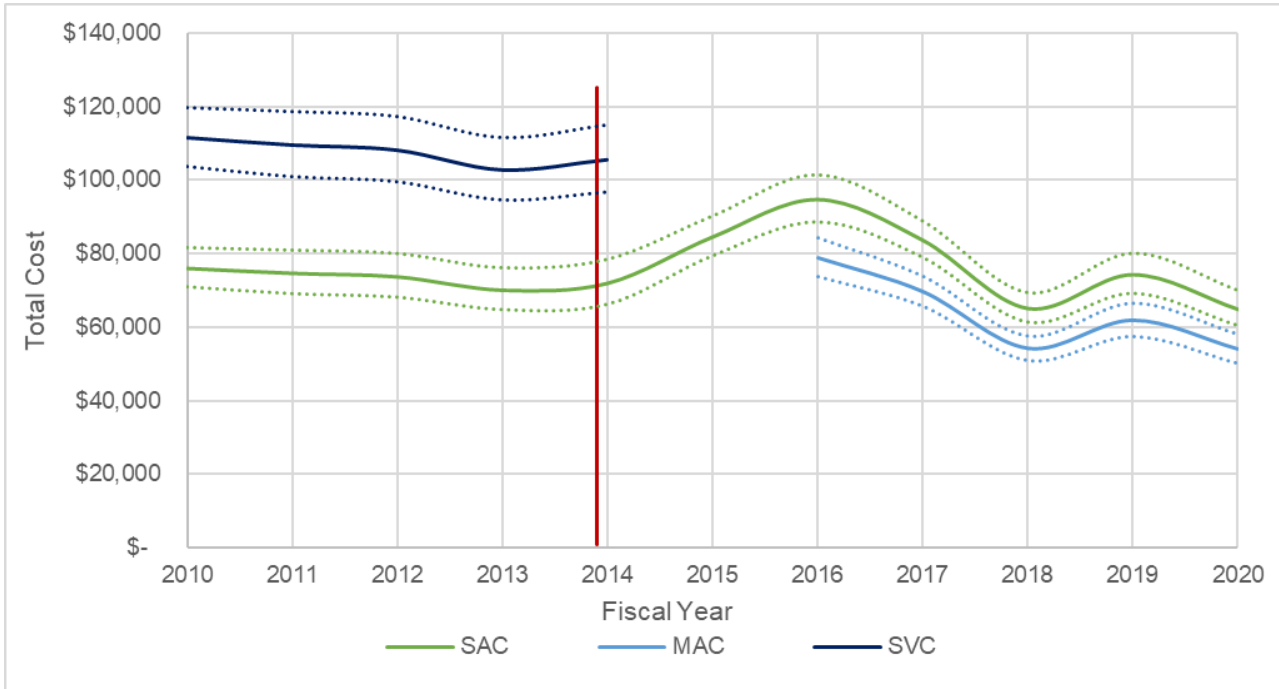
*Benchmarks:*  
1) Anchorage  
2) DDG  
3) SAC



# 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% 10 days → + 115%
ELIN Count	23	70 → + 200% 100 → + 570%

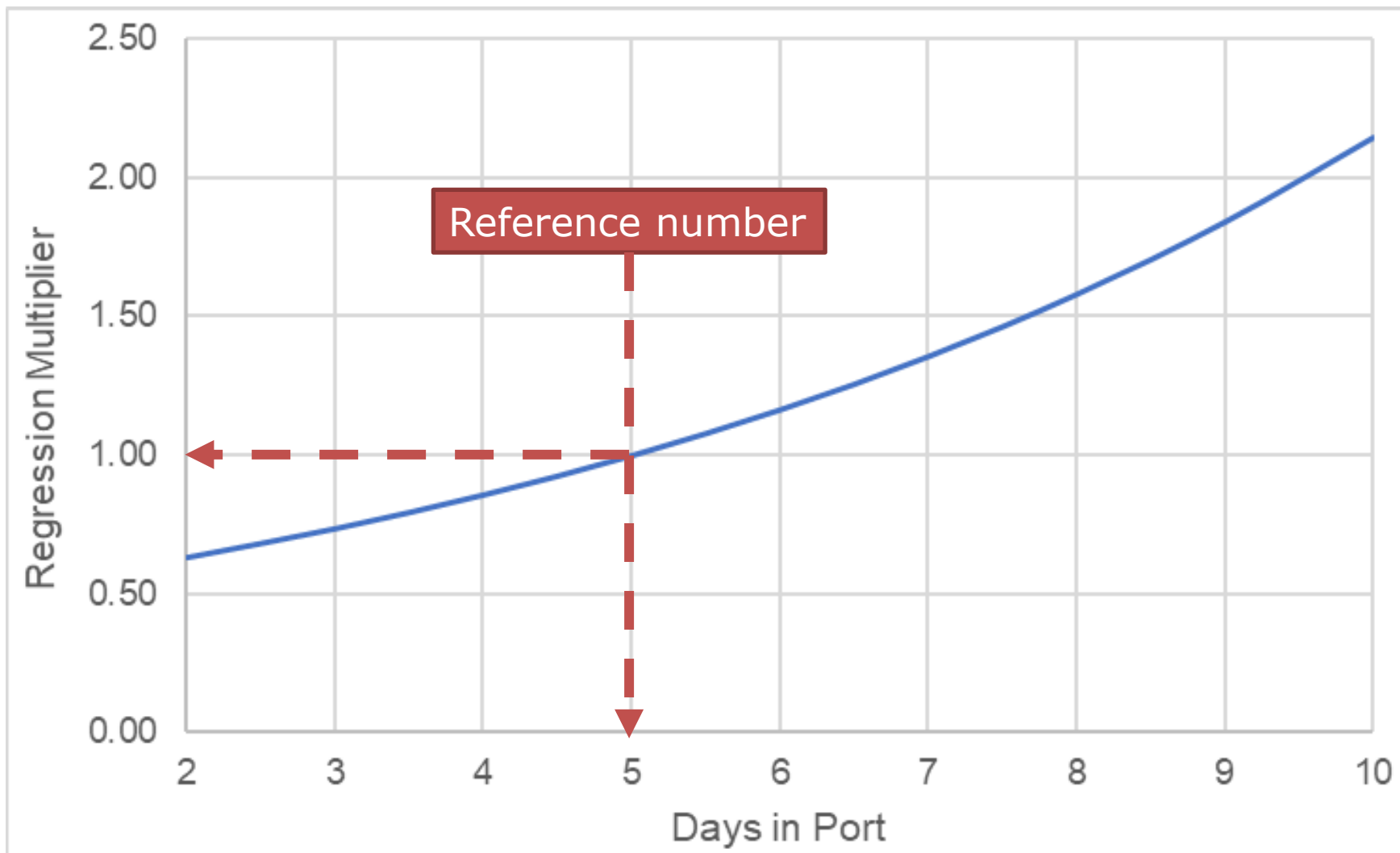
- *Ship type and port had statistically significant effects in most instances.*
- *Crude oil price also had a statistically significant effect however, it was very small (> 5% for the full range).*



# Global Cost Model Breakdown (I)

## *Days in Port*

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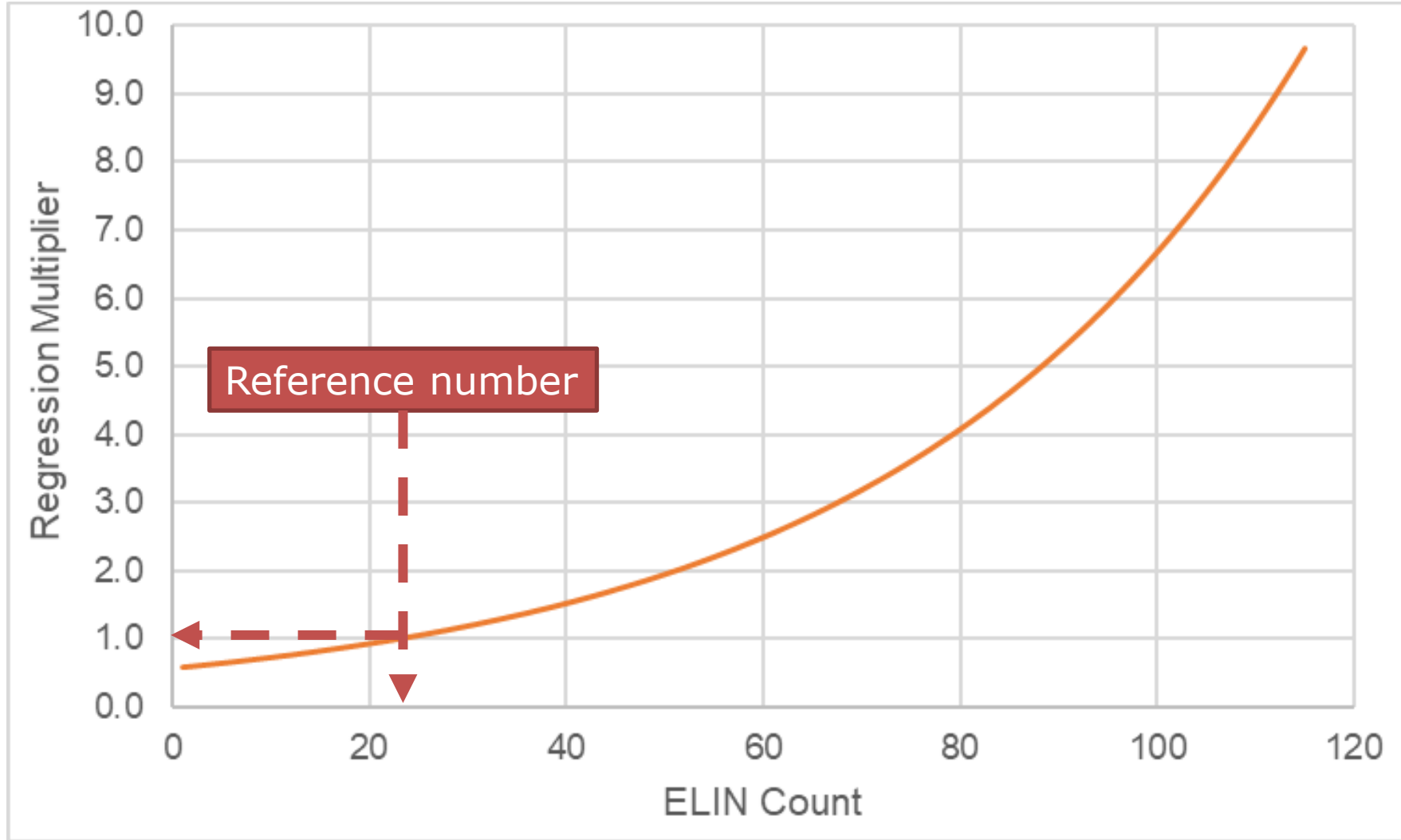




# Global Cost Model Breakdown (II)

## *Exhibit Line-Item Number*

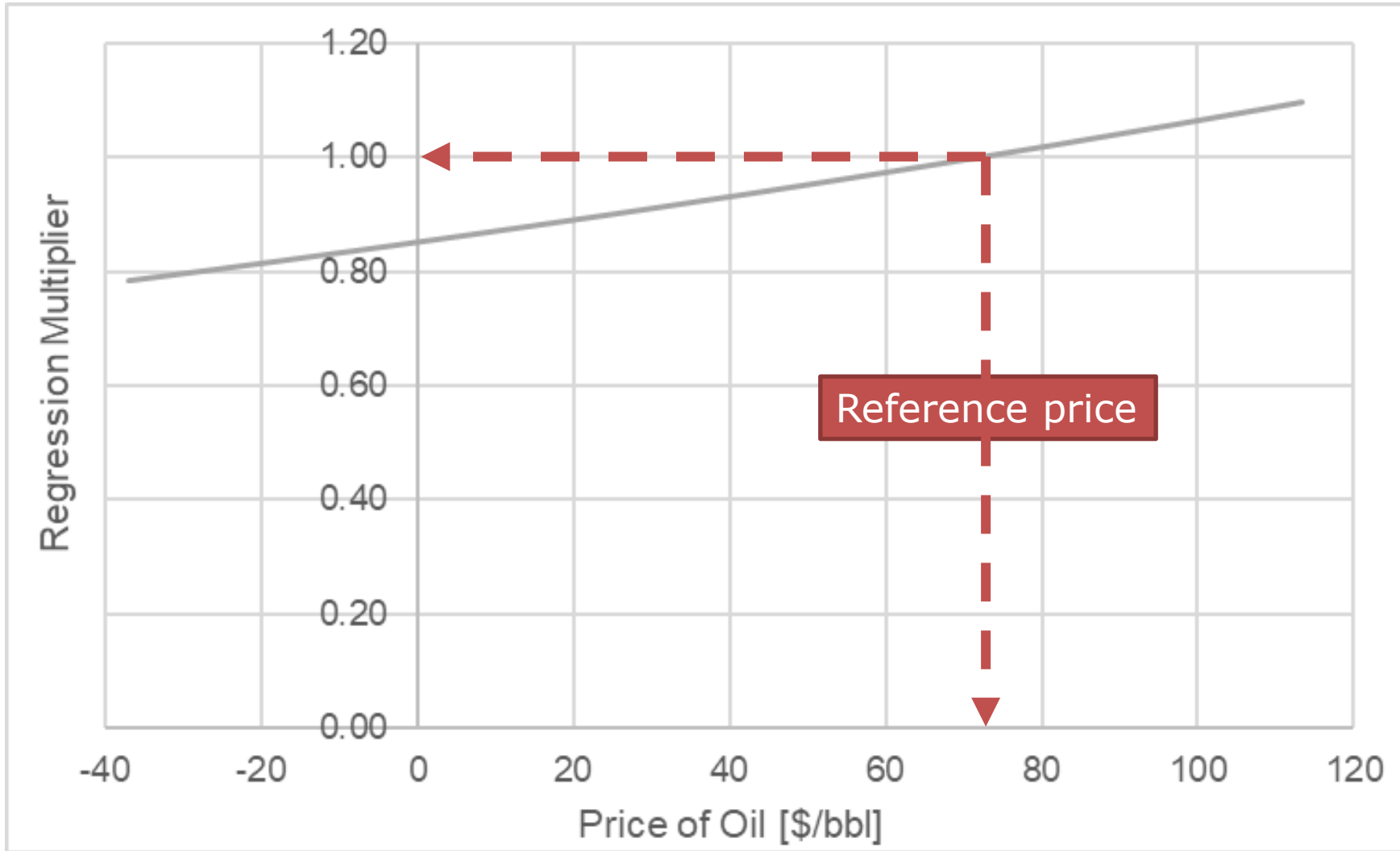
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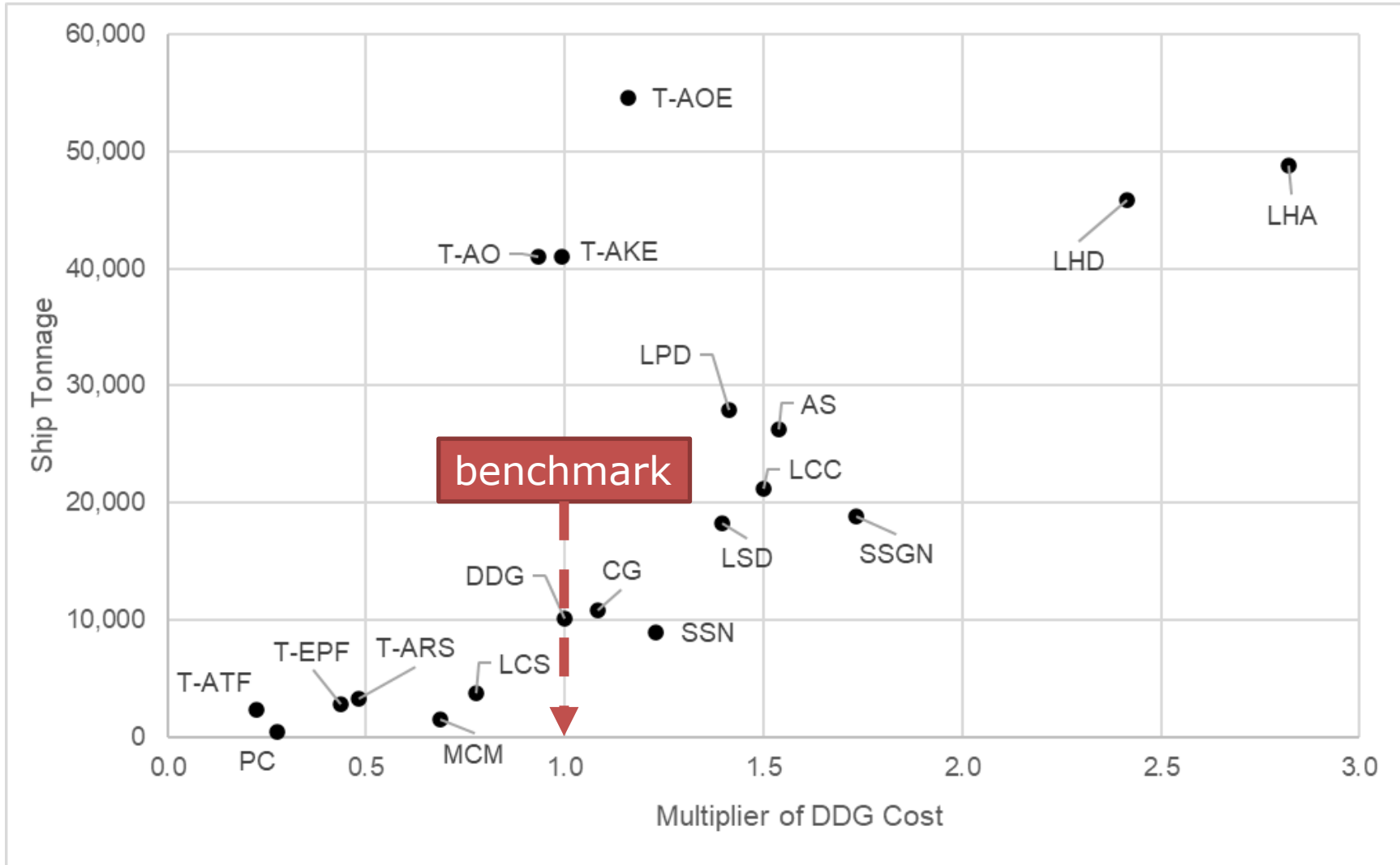
# Global Cost Model Breakdown (III)

## *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

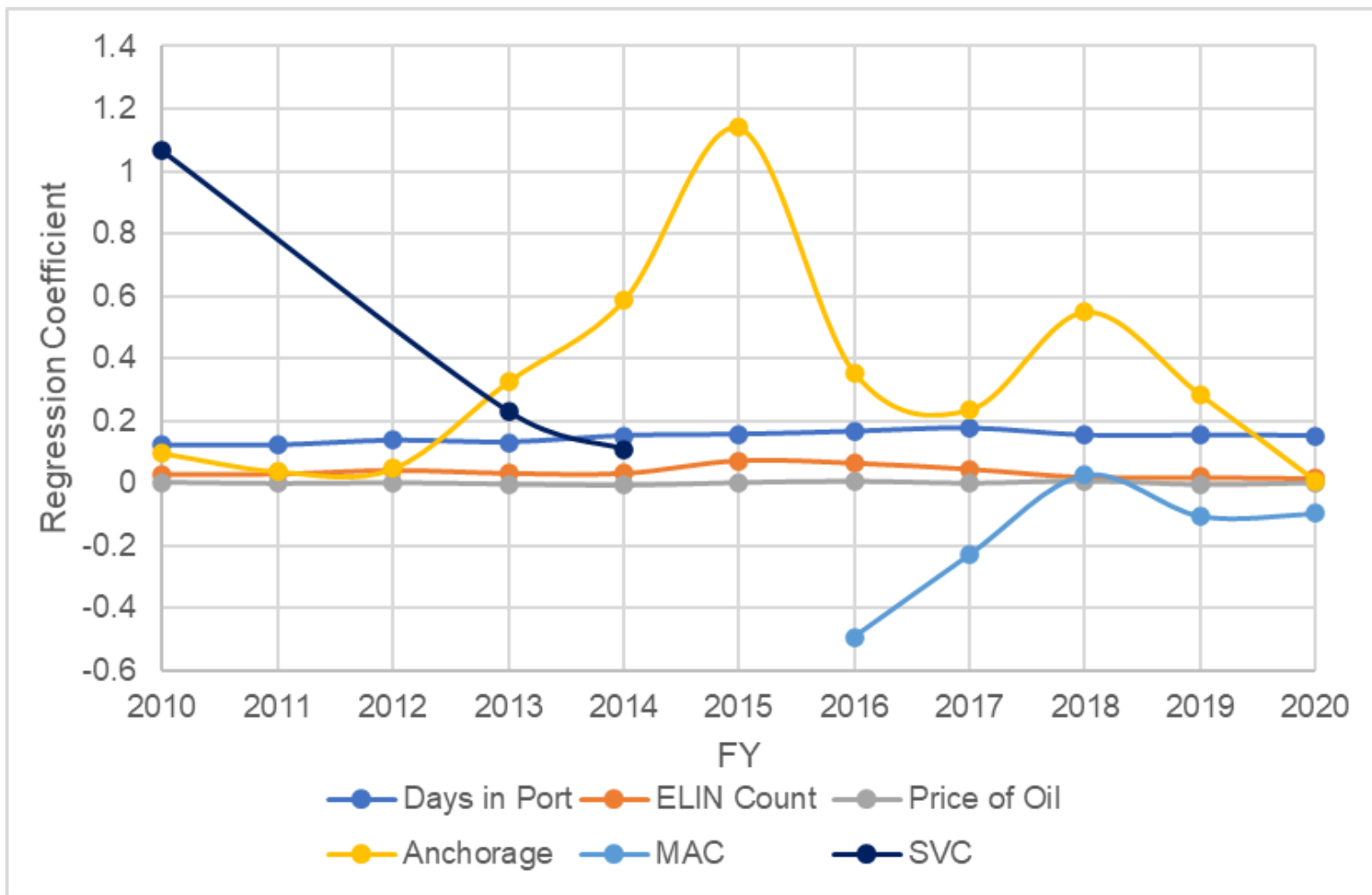
*Benchmarks:*  
1) Anchorage  
2) DDG  
3) SAC



# Factor Regression Coefficients in FY Cost Models

*(Negative values correspond to decrease in cost)*

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



## Conclusions

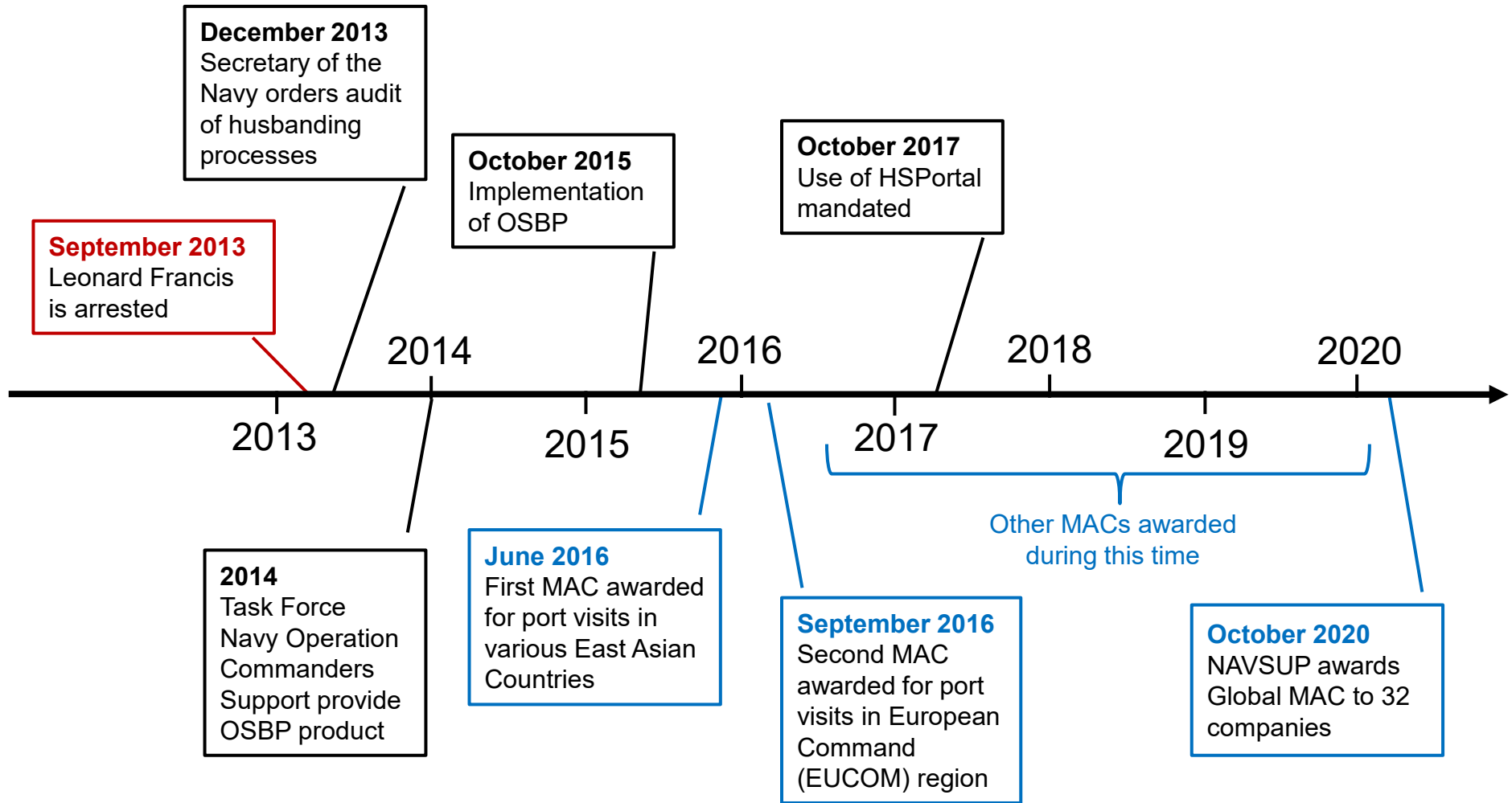
- Global cost model provides valuable insight on costly aspects of port visits
  - Modeling each FY separately shows:
    - Dynamic impact of contract changes
    - Dynamic cost of anchorage relative to pier side
- Impact of OSBP:
  - Initially => increased cost of port visits
  - Recent years => no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



# SUPPLEMENTAL SLIDES



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# FY Cost Model vs Global Cost Model

## Total Port Visit Cost over Time

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