

The Effect of Inflation on Hull Repair Costs

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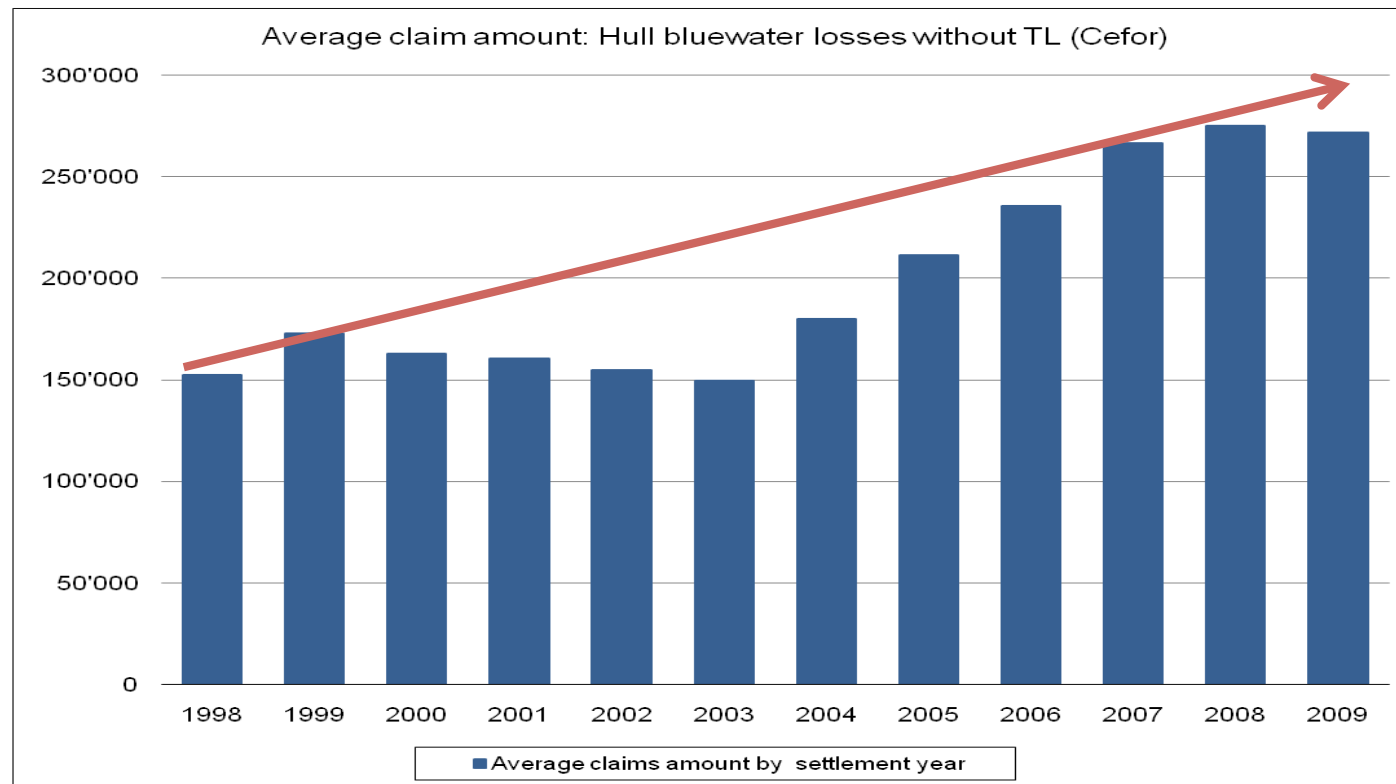
- Claim inflation
- Why it is important to study claim inflation?
- Fact & Figures analysis on claim inflation:
 - F&F inflation study: Additive model
 - F&F inflation study: Multiplicative model
- Conclusions

What is claim inflation?

Claims inflation

Change in cost of settling claims: the future cost level will be different from the cost in the past

Series of yearly Ultimate payment per claim (Cefor Annual Report 2009, recalculated by settlement year):excl. total losses - ocean hull



Illustrative Example

Grounding of a Cargo vessel in 2004:

Items	2004	2009	5 years inflation	Series used
Steel plates	274'662	456'108	66.1%	World steel price series
Work	787'789	1'056'453	34.1%	South East Asia wage index
Other materials and fix costs	918'617	1'014'228	10.4%	Flat inflation, 2% year
Yard Profit	410'732	338'076	-17.7%	World equity index
Total Loss USD	2'391'800	2'864'865	19.8%	

2 scenarios:

- What happens if the loss is estimated in 2004 but the vessel repaired in 2009 (i.e. claim paid in 2009)?
- What happens if the premium charged in 2009 is equal to the premium charged in 2004?

Why is important to study claim inflation?

What area?	Where inflation counts?	How we use inflation assumptions?	Risk of misestimating or ignoring inflation?
Reserving	Estimate of future claims payments for claims outstanding	Is past inflation a good indicator of the current/future inflation?	Invalid evaluation of claims liability in Balance sheet
Pricing	Estimate of next policy year expected loss	Use inflation assumptions to express claims in the value terms of the next policy year	The Premium is too low to cover the claims liability
Capital Modelling	Estimate of Premium and Claims Reserves uncertainty to calculate the level of capital required	Inflation is a key driver of the level of volatility of Premium and Reserves	Insufficient financial resources to fully meet the insurer's obligations

Focus :Hull Bluewater repair cost inflation

- The claims payments reimburse for loss of goods and services which are purchased on the open market. Therefore the loss costs are affected by external economic variables.
- F&F aims to describe historical repair cost inflation using a combination of economic indicators.
- We need to answer the following questions:
 1. Which are the drivers of the claim inflation?
 2. Which economic indicators best represents the drivers?
 3. How much weight is associated with each driver?

Repair costs: cost drivers

Tangible components

- Material components
 - raw material: Steel
 - spare parts: Crankshaft, Piston...
- Labour cost: Wage of specialized workers/ crew overtime / superintendent
- Removal costs: oil price

Intangible components

- Demand of repair services
 - Shipyard space
 - Premium price
- Geographical shift
- Currency exchange
- Profit targets of the yards
- Increase of standards

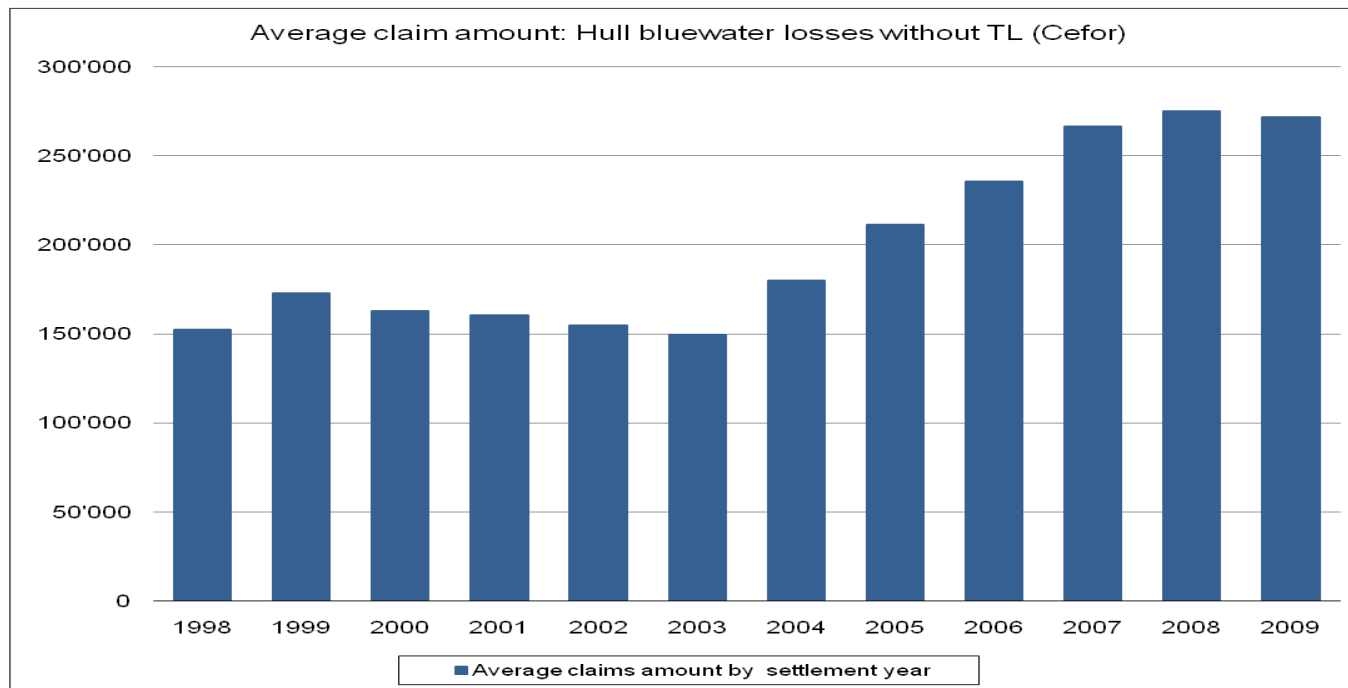
Insurance-driven components

- Changes in deductible

Sticky Inflation

For certain commodities, when price goes down it goes down slowly, as if it is sticking to the existing price level, but when they go up, they are free to touch new highs. (example- wages). This phenomena is called sticky inflation. However for certain commodities (e.g. crude oil) the sticky nature is not observed.

Series of yearly Ultimate payment per claim (Cefor Annual Report 2009, recalculated by settlement year):excl. total losses - ocean hull



F&F inflation study: Additive model

Example of Additive model:

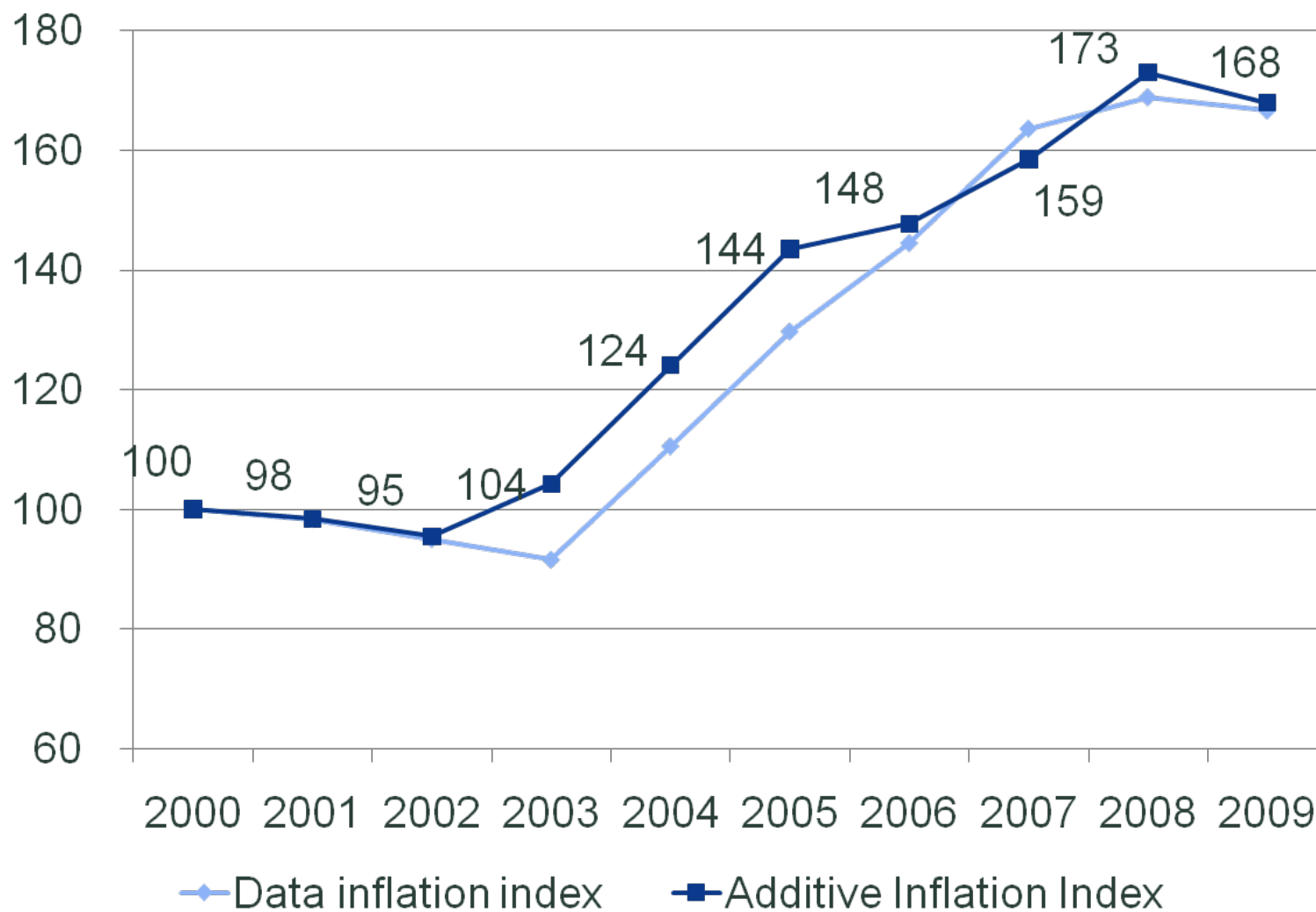
- Inflation = 35% * Wage + 50% * Steel + 15% * Equity
- Wage index and Steel price as Material components
- Equity index as Intangible Component

Economic Indicators	Weights
Wage index mix	35%
China	4%
Japan	9%
South Korea	17%
Europe (27)	5%
Steel Price	50%
Equity index	15%



Year	Additive model inflation
2000	2.3%
2001	-1.6%
2002	-3.0%
2003	9.2%
2004	19.0%
2005	15.6%
2006	2.9%
2007	7.3%
2008	9.1%
2009	-2.9%

F&F inflation study: Additive model

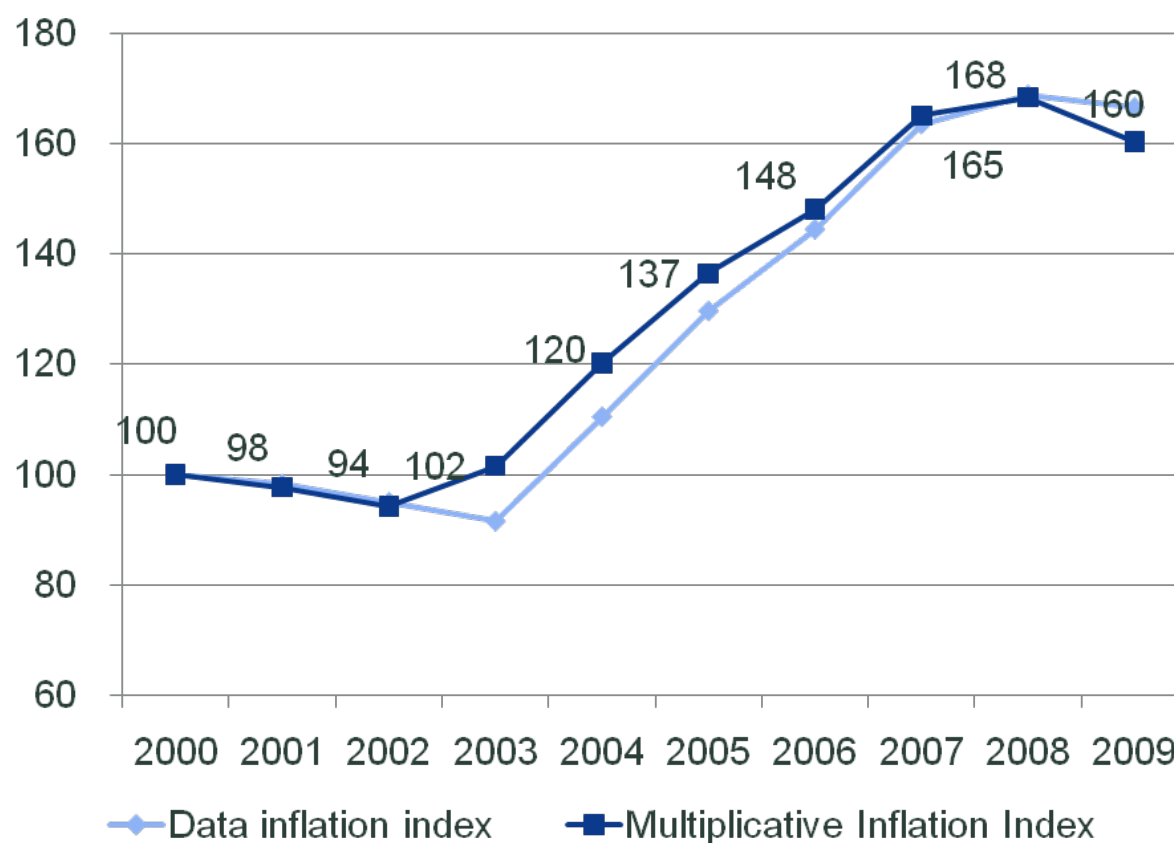


Data inflation derived from the series of yearly Ultimate payment per claim (Cefor Annual Report 2009, recalculated by settlement year): excl. total losses - ocean hull

F&F inflation study: Multiplicative model

Example of Multiplicative Model

- Inflation = $A * \text{Equity}^B * \text{Steel}^C$
- A, B and C have been estimated with statistical techniques
- 4.9% annual average inflation is modified by movements in Equity index and Steel price



Data inflation from the series of yearly Ultimate payment per claim (Cefor Annual Report 2009, recalculated by settlement year): excl. total losses - ocean hull

12 TO 15 SEPTEMBER

Year	Multiplicative model inflation
2000	7.3%
2001	-2.3%
2002	-3.5%
2003	7.7%
2004	18.4%
2005	13.5%
2006	8.5%
2007	11.5%
2008	2.0%
2009	-4.8%

- Claims inflation exists
- It is important to study claims inflation
- F&F has produced two alternative models that describe Hull bluewater repair costs through a combination of economic variables:
 - The alternative models represent reality very well: the goodness of fit has been tested by comparing the model output with the claims inflation (series of yearly Ultimate payment per claim recalculated by settlement year, Cefor Annual Report 2009).
 - The alternative models are two valid examples of how to construct inflation series
- More details on the models will be published on the IUMI website