Sea-Intelligence Maritime Analysis

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Sea-Intelligence Sunday Spotlight

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Executive Summary

Doubling of Transpacific demand volatility

The monthly swings in demand on the Transpacific trade is growing sharply, even more sharply than Asia-Europe, and has doubled in TEU terms from 2011 to 2019. This increases the need for adjustments to the number of services offered, as well as forcing carriers to blank sailings and make continued service changes.

Predicting Asia-USWC GRI success - II

We build multi-variate OLS regression models to predict GRI success on Asia-USWC, with explanatory power (R2) ranging from 26.8% to 68.9%, which is quite decent for real-life data. We recast the models on 2013-2017 data for a 2018 hindcast, and are able to predict 50-62.5% of implementation date increases within +/-100 USD/FFE.

Development in vessel delays in 2018

Average delays in 2018 were the highest across both metrics of vessel delays in the 2012 2018 period, with the average delay for LATE vessel arrivals at 3.98 days. With the lowest recorded schedule reliability and the highest number of blank sailings since 2015, delays are yet another way that service levels suffered in 2018.

Content

Weekly Indicators

4-10 Feb 2019

Port of Long Beach
December 2018 Container volumes
741,647 TEU
+6.4% Y/Y

Port of Barcelona
December 2018 Container volumes
291,198 TEU
+23.7% Y/Y

Port of Sydney
December 2018 Container volumes
233,993 TEU
+5.3% Y/Y

Port of Brisbane
December 2018 Container volumes
119,737 TEU
+4.4% Y/Y

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Editorial: EU BER set to expire in 2020

While it may seem like the liner shipping industry is already facing considerable challenges - from the impending 2020 IMO sulphur regulation, over a looming China-US trade war, weak long-term demand outlook for the main East-West trades, to a 10-year over-capacity streak that is still a few years from being absorbed - in April 2020, the current EU Block Exemption Regulation (BER) for liner consortia is set to expire. The BER is the EU antitrust framework under which Vessel Sharing Agreements (VSAs) and carrier alliances are regulated, and is one of a few cases where industry-specific rules apply.

This Friday, Sea-Intelligence was invited as a guest to an industry stakeholder roundtable hosted by OECD's International Transport Forum (ITF), where organisations representing the main industry stakeholders – Shipping Lines, Vessel Owners, Shippers, Freight Forwarders, Terminal Operators, Labour, Port Authorities, and EU national maritime authorities – were invited to present arguments in support or against a continuation of the BER, to representatives from the European Commission's Directorate-General for Competition (DG-Comp). The discussions were both very interesting and very passionate.

Competition regulators must start from a position that industries should not be afforded exemptions from normal anti-trust regulation, unless there are significant societal benefits to justify such industry protection, and that a block exemption would indeed support competition rather than hinder it. This is, quite obviously, the case that the representatives of the shipping lines are trying to make, arguing that VSAs and alliances allow for greater choice in liner services, and that shippers and consumers benefit, arguing that competition is often more intense inside a consortium than outside.

Even the most ardent opponents of the BER do not seem to want to get rid of VSAs and alliances altogether, but are calling for a new regulatory framework that would exert greater control over how shipping lines can share capacity, and not least on the information disclosure requirements of liner consortia. Should DG-comp decide to repeal the BER, it will not mean the end to VSAs and alliances, but it will make it more difficult and costlier for carriers to enter into VSAs, with considerably higher legal, reporting, and compliance costs, compared to the more flexible requirements allowed under the BER.

One very positive takeaway from the roundtable, was that there seemed to be a strong consensus across the industry stakeholders, that most of the challenges faced by the liner industry - that go far beyond just the question of the BER - would be more effectively addressed by better and more frequent communication, cooperation, and information and knowledge sharing across the diverse set of industry stakeholders. We, of course, wholeheartedly support this call for greater cooperation, and will support it as requested.

Doubling of Transpacific demand volatility

The monthly swings in demand on the Transpacific trade is growing sharply, even more sharply than Asia-Europe, and has doubled in TEU terms from 2011 to 2019. This increases the need for adjustments to the number of services offered, as well as forcing carriers to blank sailings and make continued service changes.

Container Trade Statistics (CTS) have recently released the December 2018 demand data. They show a global growth in container demand of 3.8% in 2018. This number can be interpreted in two ways.

On one hand, it is fairly well in line with the expectations set out prior to 2018. We had anticipated 3-5% growth in 2018, and hence this is almost at the midpoint of the forecasting interval.

More troubling is the fact that this number has been steadily declining throughout the year, with December only growing 2.1% year-on-year, a slight improvement on the 1,9% growth rate seen in November.

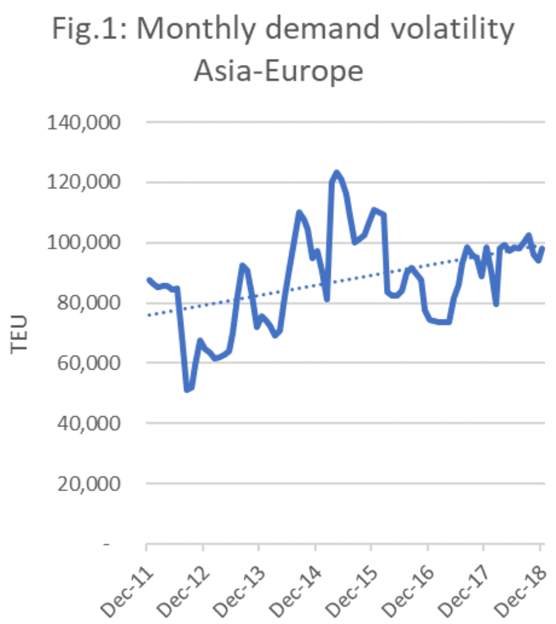
But this week we will not be looking at the growth rate development in itself. Instead we will be using the CTS data to analyse the monthly volatility in the demand for the Asia-Europe as well as Transpacific trades. This will be done for the period January 2011 to December 2018.

The objective is to ascertain whether the monthly fluctuations in demand are changing, and if so, what are the ramifications.

In this context, volatility is defined as the standard deviation of the monthly demand measured in TEU for each of the trade lanes. This is measured over a rolling 12-month period, and as the period is over 12 months, normal annual seasonality is by definition taken out of the equation.

The exception is Chinese New Year (CNY). Due to its shifting nature, it skews the changes seen in January and February between the years. Hence in order for the analysis to bring out the underlying structural changes, we have eliminated the CNY volatility effect. We have done this by simply calculating the full January plus February volumes, and assigning half of it to each of the two months. On one hand this lowers the overall volatility, however, on the other hand it ensures we only measure the structural monthly demand volatility, without the severe effects of the CNY.

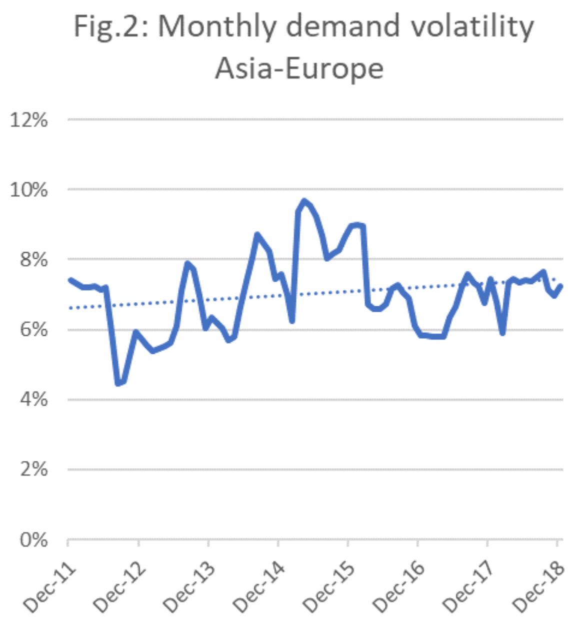
Asia-Europe



For the Asia-Europe trade, the development in monthly demand volatility is shown in figure 1. The dotted line is a trendline we have added to bring out the underlying development. The underlying trend is an increase in volatility from 78,000 TEU in 2011 to 100,000 TEU presently.

However, it should also be kept in mind that part of the growth in volatility is due to the growth in the total market size itself.

Therefore, we have also calculated the volatility measured as a percentage of the average monthly market size. The result of this calculation is shown in figure 2.



Looking at figure 2 we see that the linear trendline shows a very gradual increase, however it can be questioned whether a linear trendline is a correct interpretation. It can equally well be argued from the data in figure 2 that the volatility increase was seen in the period from 2011 to 2015, but it has since been reduced slightly and is now stable at a level around 7.5%.

As the Asia-Europe trade has some 28 weekly services across North Europe and the Mediterranean, this means that on average, the demand volatility is equal to approximately 2 weekly services. From a carrier perspective, this means that on average, there is a need to launch or cancel 2 services each month, in order to adjust the network to match demand developments.

Transpacific

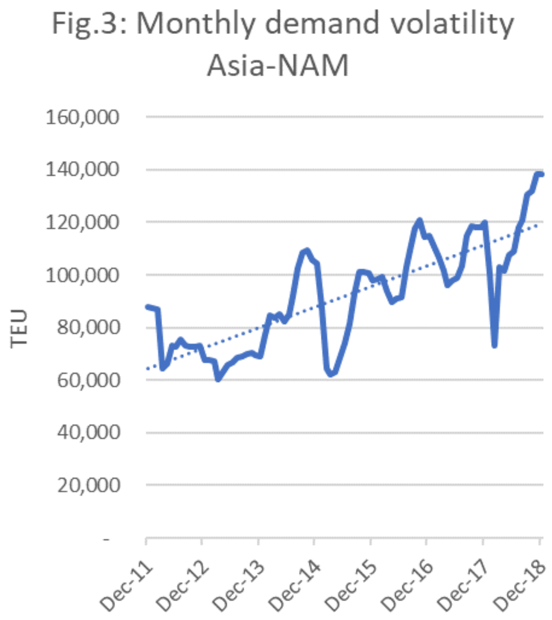
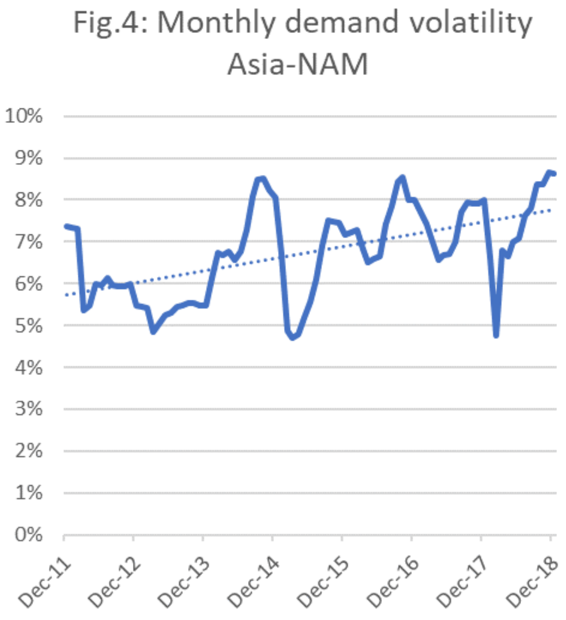


Figure 3 shows the development in demand volatility for the Transpacific trade. Once again, we have added a trendline to show the underlying development. It is clear that the demand volatility has been sharply increasing during the period, and in terms of the trend has risen from approximately 60,000 TEU to 120,000 TEU – basically a doubling of the monthly demand volatility.

Figure 4 shows the development in relative terms versus the average monthly demand.



In relative terms, this development is less severe, as part of the absolute increase has been due to the growth in the total market size. But unlike the Asia-Europe trade, it is also clear that the relative volatility has indeed been increasing during the period. From around 5.8% in 2011 to a level approaching 8% now.

With approximately 56 Transpacific services in operation across the USWC and USEC, this means that the volatility corresponds to the need to open or close 4½ services each month.

Conclusions

In itself, the demand volatility shows the challenge for the carriers in adjusting supply to match the natural demand developments. On one hand they need to design and operate a stable backbone network, to manage the demand flows across the hub-and-spoke network.

On the other hand, the average monthly fluctuations in demand requires ongoing capacity management, if capacity is to match demand.

The magnitude of the demand volatility explains why we should not expect the prevalence of blank sailings and service adjustments to abate, rather they are a natural consequence of the underlying demand volatility in these key trades.

Furthermore, we can also see how the Transpacific market is becoming steadily more volatile in terms of inter-month demand swings – in absolute terms this volatility has doubled in 7 years.

Shippers therefore need to take heed of this development, and develop their supply chain strategies around the fact, that blank sailings and service adjustments are here to stay, as they are the only way for the carriers to adapt supply to the underlying demand markets.

Predicting Asia-USWC GRI success - II

We build multi-variate OLS regression models to predict GRI success on Asia-USWC, with explanatory power (R2) ranging from 26.8% to 68.9%, which is quite good for real data. We recast the models for a 2018 hindcast, and are able to predict 50-62.5% of implementation date increases within +/-100 USD/FFE.

In issue 396 of the *Sunday Spotlight*, we built a long range of univariate Ordinary-least-squares (OLS) regression models, attempting to determine the success rate of General Rate Increases (GRIs) on the Asia-US West Coast trade lane. Our aim is to see if we can quantify the likelihood of a GRI success based on other observable market factors, such as the prevailing spot rates either at the time of GRI announcement or immediately before GRI implementation, the freight rate increase targeted by the carriers for GRI and the number of carriers supporting GRI, the length of time since the last GRI was implemented and the length of time from announcement to implementation of the GRI, and number of other factors and combinations of these factors.

We found that of the 24 different input variables, measured up against four different measures of GRI success, for three of the four measures of GRI success, 11-12 of the input variables were found to be statistically significant in partly explaining the GRI success, but the degree of explanation as measured by the Coefficient of Determination (R^2) was relatively low for each of the variables on a univariate level, ranging from 3.95% to 20.05% for the univariate models that were statistically significant at the 5% level.

In this issue of the Sunday Spotlight, we extend on the existing analysis in three ways. Firstly, we extend the range of univariate models with an additional 25 input variables that we did not consider in issue 396, primarily based on measures of blank sailings, deployed capacity growth rates, nominal fleet utilisation, and the success of the most recent GRI. Secondly, we combined the univariate models into considerably more complex multi-variate models, with the aim of increasing the explanatory power of a combined model. Thirdly, we will test the predictive capability of the best-fitting multivariate models for each of the four measures of GRI success, by refitting them to the 2013-2017 data, and test how well the models would have been at predicting the 2018 measures of GRI success, in what is commonly referred to as a "hindcast".

Methodology

This methodology section is largely unchanged from the one laid out in issue 396 of the Sunday Spotlight, and readers already familiar with this methodology can skip this section.

The data for this analysis is sourced primarily from Sea-Intelligence's proprietary Carrier Rate Announcements (CRA) database, where we each week track the future rate announcements published by the major carriers, across all major global trade lanes. In this analysis we focus exclusively on the rate increases announced for the Asia to US West Coast (Asia-USWC) trade, which will include announcements specifically for Asia-USWC, but also for the following trades:

- Asia, South Africa and Middle East-North America
- Asia/ISC-North America
- Asia-North America
- Asia-US
- Asia-US PNW
- Asia-US PSW

The other main source is the weekly Shanghai Containerized Freight Index (SCFI) to US West Coast, as published by the Shanghai Shipping Exchange.

We have elected to look just at the West Coast trade, rather than the combined Transpacific Eastbound trade, partly as the two destination coasts have a considerable freight rate differential, and thus would have to be treated independently, and partly as the US East Coast trade has been subject to a number of outside structural changes that would make it difficult to analyse longer time periods, especially the expansion of the Panama Canal in June 2016, but even more so the unnaturally high premiums paid for East Coast services during the labour dispute in the US West Coast ports in late 2014 and early 2015.

GRIs are usually announced at least a month in advance, with a specific date that the GRI will come into effect, i.e. the effective or implementation date. Multiple carriers may announce GRIs for the same date, and for different amounts of USD increases, or they may post GRIs for dates close to each other (e.g. carriers A, B, and C may post a GRI for June 1st, while carriers X, Y, and Z post a GRI for June 3rd). Carriers will usually post GRIs for either the start of the month or the middle of the month, with +90% of GRIs being posted for the 1st or 15th of a month. GRIs will usually be posted with a least a month in between, although there have been volatile periods where GRI's may be posted on a 14-day interval.

We have identified a total of 140 different Asia-USWC GRI effective dates in the January 2013 to December 2018 period, posted by 21 different major carriers, for a total of 484 different combinations of GRI effective date, announcing carrier, and GRI amount.

As we noted in some detail in the analysis in issue 394, GRI announcements are not always uniform across carriers, but rather there is considerable diversity across how the carriers post GRIs, as not only do the targeted increase amounts vary considerably across and within carriers, but the frequency of GRIs posting also varies considerably.

As in last week's analysis, we will not be looking at GRIs posted by individual carriers, but rather group the carrier GRIs into "industry GRIs". This does not imply an underlying coordination across carriers, but is merely intended to capture when there is an active GRI in the market.

This leaves us with a final total of 105 Industry GRIs in the 2013-2018 period. For more detail on the grouping into "Industry GRIs", we refer to the methodology section of last week's analysis.

As in the analysis in issue 394, we have used the broadest measure of GRI success as possible, so if we see the spot rate continue to increase into the second week after the GRI implementation date, then we have used the later spot rate to measure the GRI increase. Likewise, when comparing to the pre-implementation date spot rate, if the spot rates already started to increase in the week before the implementation date, we have used the spot rates in the week before that increase as the pre-implementation date baseline.

What defines a GRI success?

As in issue 396, we have defined four different measures of GRI success, depending on what is aimed to be captured.

As an example, we can imagine a GRI posted on February 3rd for a 500 USD/FFE increase on March 1st. At the time of announcement, the most recent SCFI reading is on February 1st, where the USWC SCFI was recorded at 1,993 USD/FFE.

If we then assume that the last SCFI reading before the GRI implementation date on February 21st is at 1,750 USD/FFE, while on the GRI implementation date spot rates rise 350 USD/FFE to 2,100 USD/FFE, we can the calculate at least four different measures of GRI success:

1) GIDI - GRI Implementation Date Increase: This measures the increase from immediately before and after the GRI implementation date, so in this example would be 350 USD/FFE.
2) GIDRS - GRI Implementation Date Relative Success: This compares the GRI Implementation date increase with the targeted increase, so in this example would be: 350 / 500 = 70%.
3) GADI - GRI Announcement Date Increase: This measures the spot rate increase from the announcement date to the spot rate after the GRI implementation date, so in this example would be 2,100 – 1,993 = 107 USD/FFE.
4) GADRS - GRI Announcement Date Relative Success: This compares the GRI Announcement date increase with the targeted increase, so in this example would be: 107 / 500 = 21.4%.

There no "correct" measure of GRI success, as it depends entirely on what you trying to capture, specifically if the spot rates increase over the implementation date of if they increase relative to the announcement date, and whether you wish to measure the straight increase, or compare it to the GRI increase target.

In this analysis we will attempt to build prediction models for all four measures of GRI success, and we will test and compare a long range of possible variables.

196 Univariate prediction models

In issue 396, we identified a total of 24 potentially relevant input variables, that could possibly explain (some of) the success of a GRI, and – importantly – could be quantified in a meaningful way. We refer our readers to issue 396 for a detailed explanation of these input variables and how they have been quantified. With four different measures of GRI success, we ended up with a total 96 univariate models to be tested.

In this issue we extend the list of potential input variables with an additional 25 variables that were not considered in issue 396, matched against the four measures of GRI success, give us a total of 196 univariate prediction models to test. As in issue 396, several of the variables are variations over the same core metric, but measured in different ways.

It is clear that some drivers of GRI success, like the extent of "carrier resolve" or "carrier commitment to the GRI" would be significant factors in determining GRI success, but there is no obvious way of quantifying and measuring such "intangible" factors (except through some weaker proxy measure), which also tells us that no model will be able to predict GRI successes perfectly, as there will be some intangible or "emotional" factors, that any quantitative model will only capture as noise.

The 25 "new" input variables are:

1) Asia-USWC Q Blank Sailings*: The number of blank sailings on the Asia-USWC trade lane for the quarter in which the GRI falls.
2) Transpac EB Q Blank Sailings*: Same 1) as above, but considering all blank sailings across the entire Transpacific Eastbound trade, as there is considerable correlation between the two coasts.
3) East-West Q Blank Sailings*: same as 1) above, but considering the total number of blank sailings across the three main east-West trades of Asia-Europe, Transpacific, and Transatlantic, as this may be a better measure of carrier commitment to capacity management at the time of the GRI.
4) Asia-USWC Q-1 Blank Sailings: Same as 1) above, but based on the blank sailings in quarter prior to the GRI implementation date, and thus possible to capture prior to the GRI.
5) Transpac EB Q-1 Blank Sailings: Same as 2) above, but based on the blank sailings in quarter prior to the GRI implementation date, and thus possible to capture prior to the GRI.
6) East-West Q-1 Blank Sailings: Same as 3) above, but based on the blank sailings in quarter prior to the GRI implementation date, and thus possible to capture prior to the GRI.
7) Q Capacity growth Y/Y*: The Y/Y Transpacific capacity growth in the quarter of the GRI implementation date.
8) Q Excess Capacity*: The excess nominal capacity on Transpacific Eastbound in the quarter of the GRI implementation, measured as the difference in nominal capacity deployed through the bottleneck, as

captured by Sea-Intelligence's TCO database, and the laden Transpacific Eastbound volumes for the same period, as captured by Container Trades Statistics (CTS).

9) Q Nominal Utilisation*: The nominal capacity utilisation on Transpacific Eastbound in the quarter of the GRI implementation, measured as the laden Transpacific Eastbound volumes, as captured by CTS, divided by the nominal capacity deployed through the bottleneck, as captured by Sea-Intelligence's TCO database.

10) Q-1 Capacity growth Y/Y: Same as 7) above, but based on figures for the quarter prior to the GRI implementation date, and thus possible to capture prior to the GRI.

11) Q-1 Excess Capacity: Same as 8) above, but based on figures for the quarter prior to the GRI implementation date, and thus possible to capture prior to the GRI.

12) Q-1 Nominal Utilisation: Same as 9) above, but based on figures for the quarter prior to the GRI implementation date, and thus possible to capture prior to the GRI.

13) M Capacity growth Y/Y: Same as 7) above, but measured for the **month** of the GRI implementation date.

14) M Excess Capacity: Same as 8) above, but measured for the **month** of the GRI implementation date.

15) M Nominal Utilisation: Same as 9) above, but measured for the **month** of the GRI implementation date.

16) M-Adj Capacity growth Y/Y: Same as 13) above, but the input month being adjusted to the latest before the GRI implementation month, for which both CTS demand data and TCO capacity data has been published at in the week prior to GRI implementation.

17) M-Adj Excess Capacity: Same as 14) above, but the input month being adjusted to the latest before the GRI implementation month, for which both CTS demand data and TCO capacity data has been published at in the week prior to GRI implementation.

18) M-Adj Nominal Utilisation: Same as 15) above, but the input month being adjusted to the latest before the GRI implementation month, for which both CTS demand data and TCO capacity data has been published at in the week prior to GRI implementation.

19) Last GRI effective date increase: The USD-value increase around GRI implementation date as recorded for the most recent GRI, prior to the GRI in question. Essentially, whether the

success of a GRI will impact the next-coming GRI, as was suggested in our analysis in issue 397 of the *Sunday Spotlight*.

20) Last GRI >0 USD: A Boolean flag (dummy variable) set to "True" if the most recent GRI recorded an implementation date increase of more than 0 USD/FFE.
21) Last GRI >100 USD: A Boolean flag (dummy variable) set to "True" if the most recent GRI recorded an implementation date increase of more than 100 USD/FFE.
22) Last GRI >200 USD: A Boolean flag (dummy variable) set to "True" if the most recent GRI recorded an implementation date increase of more than 200 USD/FFE.
23) Last GRI >300 USD: A Boolean flag (dummy variable) set to "True" if the most recent GRI recorded an implementation date increase of more than 300 USD/FFE.
24) Last GRI >400 USD: A Boolean flag (dummy variable) set to "True" if the most recent GRI recorded an implementation date increase of more than 400 USD/FFE.
25) Last GRI >500 USD: A Boolean flag (dummy variable) set to "True" if the most recent GRI recorded an implementation date increase of more than 500 USD/FFE.

All input variables marked with an asterisk are recorded for the month or quarter of the GRI, which makes them very difficult or impossible to capture ahead of the GRI, as the data may not yet have been recorded. We have still tested these variables, as they may be the actual drivers of GRI success, even if we cannot capture them before the GRI. By testing them, we can gauge if we should attempt to capture the effect of the variable through a proxy measures, usually lagging the variable relative to the

We add these 25 variables to the 24 tested in issue 396, and conduct a univariate OLS linear regression, to determine if the variable is statistically significant in explaining whether GRIs are successful, using our four different measures of GRI success listed above. For readers interested in the process and metrics involve in the univariate OLD regression analysis, can consult issue 396 for an example of how this is done.

Table B1 shows the results of these combined 196 regression models, with the four response variables listed in the columns, the 49 input variables listed in the rows, and each coloured cell showing the R^2 of each model, with the colour of the cell representing the statistical significance of said model, with red meaning that the model was not statistically significant at the 5% level, yellow meaning significant at the common 5% level, light green meaning significant at the strict 1%, and dark green meaning statistically significant at the very strict 0.1% level.

Table B1 -1 96 Univariate models	GIDI	GIDSR	GADI	GADSR
SCFI at time of announcement	3.95%	1.61%	12.48%	14.43%
SCFI right before implemetation	3.47%	1.94%	0.12%	0.01%
# of carriers supporting	8.46%	7.13%	9.38%	8.75%
Announcement days in advance	0.99%	1.54%	0.21%	0.44%
Days since last GRI	1.97%	8.80%	2.26%	4.41%
Median GRI Target	2.76%	1.73%	11.35%	8.91%
Minimum GRI Target	2.82%	0.62%	3.21%	2.11%
Maximum GRI Target	5.23%	0.00%	10.51%	10.74%
St.dev of GRI Targets	1.39%	0.28%	4.31%	6.08%
Median GRI Target / Ann. SCFI	5.38%	0.00%	19.12%	17.39%
Minimum GRI Target / Ann. SCFI	4.93%	0.07%	9.51%	8.35%
Maximum GRI Target / Ann. SCFI	8.68%	1.33%	19.22%	20.05%
Median GRI Target / Impl. SCFI	7.17%	0.11%	4.78%	4.56%
Minimum GRI Target / Impl. SCFI	5.71%	0.20%	1.54%	1.28%
Maximum GRI Target / Impl. SCFI	10.03%	1.79%	5.16%	6.02%
Total # carriers	0.32%	1.12%	3.14%	3.11%
Supporting/Total carriers	9.44%	5.82%	13.26%	11.94%
Schedule Reliability	0.05%	1.40%	0.05%	0.00%
Avg. delay of LATE vessels	0.12%	0.78%	0.05%	0.02%
Avg. delay of ALL vessels	0.03%	0.77%	0.01%	0.02%
Bunker Price	0.10%	2.80%	0.58%	0.27%
Bunker Adjusted SCFI	5.56%	5.42%	0.01%	0.10%
Market BAF	0.04%	1.17%	0.46%	0.86%
BAF Adjusted SCFI	4.18%	3.31%	0.30%	0.01%
Asia-USWC Q Blank Sailings	3.21%	6.40%	1.73%	3.21%
Transpac EB Q Blank Sailings	3.79%	7.92%	1.69%	3.46%
East-West Q Blank Sailings	4.78%	8.13%	5.32%	8.42%
Asia-USWC Q-1 Blank Sailings	0.76%	0.26%	4.38%	5.68%
Transpac EB Q-1 Blank Sailings	1.07%	0.51%	3.90%	5.11%
East-West Q-1 Blank Sailings	1.61%	1.01%	4.96%	6.50%
Q Capacity growth Y/Y	0.18%	1.14%	0.25%	0.50%
Q Excess Capacity	1.97%	1.37%	2.40%	2.35%
Q Nominal Utilisation	3.27%	1.37%	5.88%	6.70%
Q-1 Capacity growth Y/Y	1.01%	1.23%	0.93%	1.05%
Q-1 Excess Capacity	0.28%	0.38%	5.55%	5.79%
Q-1 Nominal Utilisation	0.09%	1.21%	1.66%	1.85%
M Capacity growth Y/Y	0.24%	1.02%	0.03%	0.00%
M Excess Capacity	6.76%	3.68%	7.28%	4.75%
M Nominal Utilisation	9.21%	4.24%	12.41%	9.33%
M-Adj Capacity growth Y/Y	0.76%	0.71%	0.12%	0.40%
M-Adj Excess Capacity	0.08%	0.00%	6.76%	8.22%
M-Adj Nominal Utilisation	0.06%	0.36%	3.15%	4.26%
Last GRI effective date increase	1.24%	0.42%	22.20%	16.83%
Last GRI >0 USD	0.43%	0.34%	11.47%	7.74%
Last GRI >100 USD	0.91%	0.42%	11.75%	8.07%
Last GRI >200 USD	2.05%	0.51%	14.39%	9.39%
Last GRI >300 USD	0.52%	0.32%	14.43%	10.14%
Last GRI >400 USD	0.42%	0.56%	10.50%	7.33%
Last GRI >500 USD	0.08%	0.13%	0.13%	0.00%

As in issue 396, table C1 tells us many interesting things about the quantifiable factors driving GRI success:

1) It is much more difficult to find input variables that are statistically significant in explaining the GRI Implementation Date Success Rate (GIDSR) than the three other measures. This suggests that the GRI success measured as dollar-value increase relative to time of implementation is more closely tied to these underlying variables, while the success rate relative to the GRI target becomes decoupled when compared to the time of implementation. Why this is not the case for the success rate compared to the time of announcement is not clear.

2) For the three other measures of GRI success, we find 16-28 input variables that at statistically significant at the widely accepted 5% level, which clearly shows that GRI success does not happen in a vacuum or as a result of a random events, but is to some

extent driven by measurable variables.

3) The SCFI at time of announcement is found to be relevant in terms of the success compared to time of announcement, but the SCFI level right before implementation is found NOT to be significant in explaining any of the four measures of GRI success, which somewhat contradicts earlier studies of the GRI success.

4) The number of carriers supporting a GRI is found to be statistically significant for all models of GRI success, so if carriers want to increase their success rate, this seems to be the easiest solution. The explanatory power actually increases marginally for 3 of 4 models when comparing the number of supporting carriers to the total number of carriers engaged in a trade, which further suggest that supporting a GRI becomes increasingly important as the number of carriers goes down.

5) The Median GRI target is found to only be statistically significant in explaining GRI success relative to time of announcement, but not relative to time of implementation.

6) While GRI targets and prevailing SCFI rates are generally not very strong in explaining the GRI success, when combining them, as a ratio of GRI target (either Median, Minimum, or Maximum) to SCFI spot rate, we find that they nearly all possible combinations of GRI target and spot rate become statistically significant in explaining 3 of 4 of the models of GRI success.

7) Schedule reliability, vessel delays, and most measures of Bunker oil prices, BAF, or Bunker/VAF-adjusted spot rates are not statistically significant in explaining GRI success, at least on a univariate level.

8) Of the 25 "new" input variables, only two – the excess capacity and nominal utilisation in the month of GRI implementation – are found to be statistically significant on a univariate level.

9) Most of the "new" variables are found to be statistically significant in explaining GRI success measured against the time of announcement, on a univariate level.

Multivariate regression models

With 9-28 variables being statically significant in explaining each of the of the four measures of GRI success, we now have a very solid ground to build more complex multi-variate regression models.

Unfortunately, choosing the input variables to be used in a multi-variate regression model is not just a question of "summing up" the input variables that are statistically significant on a univariate level, as there is bound to be considerable multi-covariance between the input variables, and one of the assumptions underpinning OLS multi-variate regression models is that input variables must be stochastically independent, and that multi-covariance should be kept under a significance threshold. That said, the process of identifying input variables should generally be based on univariate models.

Choosing and testing variables for inclusion in a multi-variate OLS regression model involves a complex process of iteration and assumptions testing, a process too complex to describe here, but can be found in most good textbooks on Econometric modelling and statistical hypothesis testing.

Having weeded through literally thousands of multi-variate combinations for each of the four measures of GRI success, we have chosen to select two models for each measure of GRI success:

1) A narrow model: A multi-variate model based on few input variables, but with a weaker explanatory power (R^2). All input variables are statistically significant at the 5% level in a univariate model, as well as being statistically significant on a multi-variate level at a 5% significance level (p-value). These models are more likely to be correct, but are less likely to explain a large part of the variation.
2) A wide model: A multi-variate model based on several input variables, but with a stronger explanatory power (R^2). All input variables are statistically significant at the 10% level in a univariate model, and most variables being statistically significant on a multi-variate level at a 5% significance level (p-value), and few allowed on a 10% significance levels. These models are more likely to be subject to overfitting and coefficient errors, but are more likely to explain a large part of the variation.

Essentially, the narrow models will tend to be more technically correct, but not very good at hitting a precise target, while the wide models are more likely to look good and precise, but are also more likely to get it completely wrong. The truth usually lies somewhere in-between.

GIDI Multi-variate models

We first look at the identified multi-variate OLS regression models for the GRI Implementation Date Increase (GIDI).

Table B2: SUMMARY OUTPUT - Narrow GIDI model

Regression Statistics					
Multiple R	51.77%				
R Square	26.80%				
Adjusted R Square	24.63%				
Standard Error	167.7367534				
Observations	105				
ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	1040514.727	346838.2423	12.32737226	0.00006%
Residual	101	2841697.463	28135.61845		
Total	104	3882212.19			
	Coefficients	*Standard Error*	*t Stat*	*P-value*	
Intercept	-906.3437707	260.3230771	-3.481611315	0.07%	
Supporting/Total carriers	672.2512726	194.2892311	3.460054212	0.08%	
M Nominal Utilisation	1331.275754	321.9195456	4.135430023	0.01%	
Bunker Adjusted SCFI	-0.159441305	0.047551957	-3.352991408	0.11%	

Table B2 shows the summary statistics for the Narrow GIDI regression model, which draws on three independent variables: Supporting/Total carriers, M Nominal Utilisation, and Bunker Adjusted SCFI. The model R^2 explains 26.8% of the variation in the GIDI response-variable, which is considerably better than the 10.0% of the best of the univariate models, but still leaves a lot of variability that has not been modelled. The overall model is significant at the very strict 0.0001% level, and all three independent variables have p-values that are significant on the strict 1% significance level, and nearly all are significant on the very strict 0.1% level.

Table B2: SUMMARY OUTPUT - Wide GIDI model

Regression Statistics					
Multiple R	63.92%				
R Square	40.85%				
Adjusted R Square	35.93%				
Standard Error	154.6551545				
Observations	105				
ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	8	1586063.376	198257.9219	8.288992587	0.00000%
Residual	96	2296148.815	23918.21682		
Total	104	3882212.19			
	Coefficients	*Standard Error*	*t Stat*	*P-value*	
Intercept	-973.1391521	675.9045348	-1.439758282	15.32%	
Supporting/Total carriers	814.6792962	192.0073787	4.242958274	0.01%	
M Excess Capacity	-0.000725057	0.000229469	-3.159713252	0.21%	
East-West Q-1 Blank Sailings	1.954894405	1.174006199	1.665148282	9.91%	
BAF Adjusted SCFI	-0.970280687	0.277087665	-3.501710137	0.07%	
SCFI right before implemetation	0.750327862	0.244503598	3.068780458	0.28%	
Q Nominal Utilisation	1241.486066	714.8754309	1.736646711	8.57%	
Asia-USWC Q-1 Blank Sailings	-7.711011185	2.490500236	-3.096169627	0.26%	
Minimum GRI Target	0.295013314	0.084572476	3.488289881	0.07%	

Table B3 shows the summary statistics for the Wide GIDI regression model, which draws on eight independent variables: Supporting/Total carriers, M Excess Capacity, East-West Q-1 Blank Sailings, BAF Adjusted SCFI, SCFI right before implementation, Q Nominal Utilisation, Asia-USWC Q-1 Blank Sailings, and Minimum GRI Target. The model explains a much higher 40.85% of the variation,

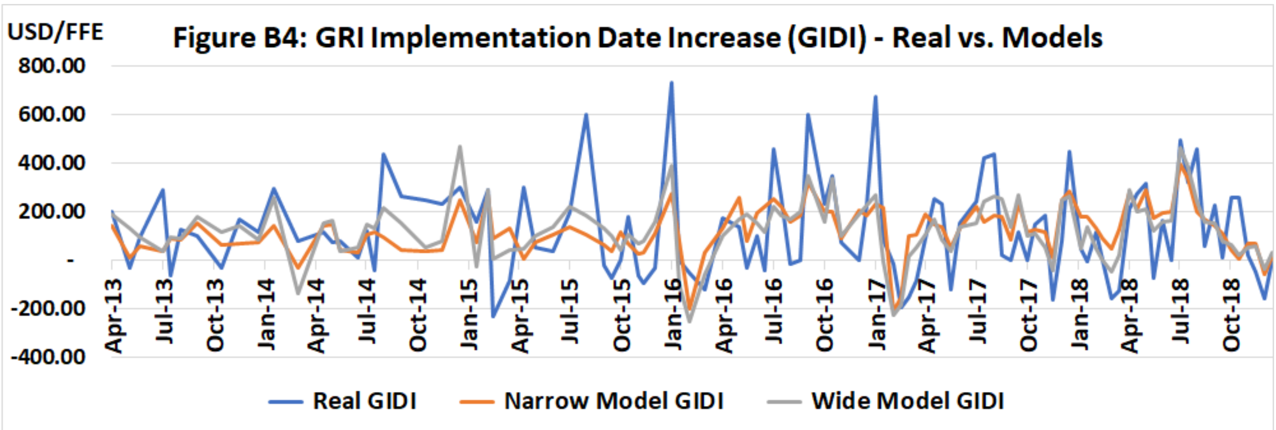


Figure B4: GRI Implementation Date Increase (GIDI) - Real vs. Models

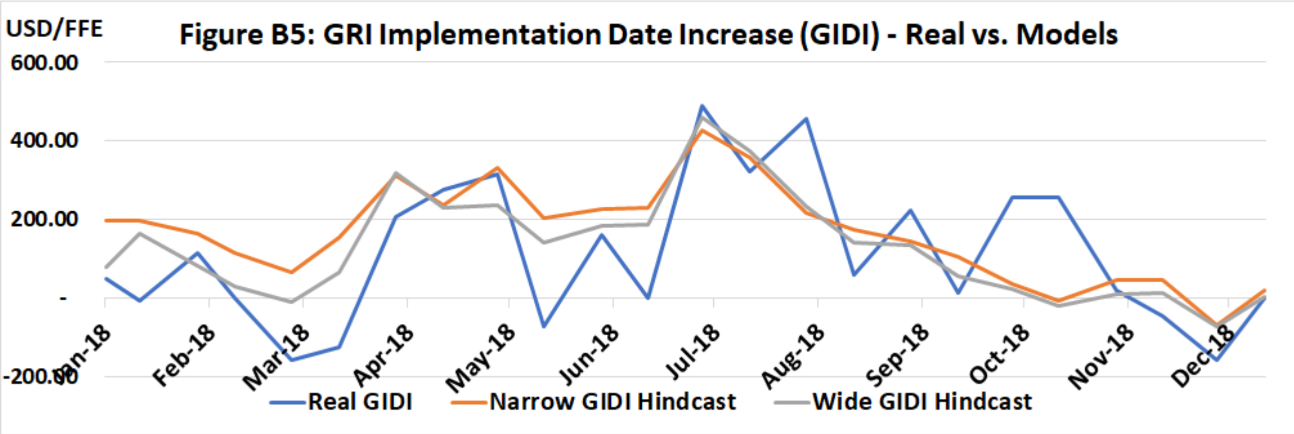


Figure B5: GRI Implementation Date Increase (GIDI) - Real vs. Models

and is significant at the very strict 0.0001% level. Six of the eight variables are significant at the 1% significance level, while the other two are significant at the 10% level.

Figure B4 ties the two models together, and we find that while the models do seem to track the general trend of the GRI Implementation Date Increases quite well, there are a handful of spikes that are simply not captured by either model.

While no model will be able to predict a real-world response variable perfectly, the true testament of a prediction model is its ability do just that, predict. In order test the predictive ability, we have recast the two GIDI models exclusively on 2013-2017, and then used the models to predict the GIDI in 2018. It is important to stress that the recast model is in no way fitted to the 2018 data, so this hindcast simulates exactly the outcome of the models, if they had been used throughout 2018.

Figure B5 show the outcome of this 2018 hindcast model, and we find that the model has been quite good at tracking the real GIDI in 2018. 50-62% of the 2018 GRIs were predicted within +/-100 USD/FFE of the real GIDI, while 67-83% of GRIs were predicted within +/-200 USD/FFE of the real GIDI, and 100% of GRI's were within +/-300 USD/FFE.

GIDSR Multi-variate models

Table B6: SUMMARY OUTPUT - Narrow GIDSR model

Regression Statistics					
Multiple R	58.87%				
R Square	34.66%				
Adjusted R Square	31.36%				
Standard Error	0.227332986				
Observations	105				
ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	5	2.714282185	0.542856437	10.50412976	0.00000%
Residual	99	5.116348379	0.051680287		
Total	104	7.830630564			
	Coefficients	*Standard Error*	*t Stat*	*P-value*	
Intercept	0.540079883	0.145035577	3.723775203	0.03%	
# of carriers supporting	0.040340431	0.012726013	3.169919146	0.20%	
Days since last GRI	0.007139328	0.002077238	3.43693273	0.09%	
Bunker Adjusted SCFI	-0.000202525	6.69786E-05	-3.023724632	0.32%	
Asia-USWC Q-1 Blank Sailings	-0.004702174	0.001466137	-3.207184907	0.18%	
M Excess Capacity	-1.0211E-06	2.6189E-07	-3.898953968	0.02%	

Table B6 shows the summary statistics for the Narrow GIDSR regression model, which draws on five independent variables: Number of carriers supporting, Days since last GRI, Bunker adjusted SCFI, Asia-USWC Q-1 blank sailings, and Excess capacity. The model accounts for 34.7% of the variation in the GIDSR response-variable, at a very strict significance level of 0.0001%. It is also considerably higher than the best univariate model at 8.8%. All four independent variables have p-values that are significant on the strict 1% significance level, while two are significant on the very strict 0.1% level.

Table B7: SUMMARY OUTPUT - Wide GIDSR model

Regression Statistics					
Multiple R	64.09%				
R Square	41.07%				
Adjusted R Square	34.80%				
Standard Error	0.221566801				
Observations	105				
ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	10	3.21599692	0.321599692	6.550979639	0.00001%
Residual	94	4.614633645	0.049091847		
Total	104	7.830630564			
	Coefficients	*Standard Error*	*t Stat*	*P-value*	
Intercept	-1.174434993	0.796271409	-1.474917948	14.36%	
SCFI at time of announcement	-0.000497578	9.49015E-05	-5.243095889	0.00%	
Asia-USWC Q-1 Blank Sailings	-0.011165356	0.002554033	-4.371657512	0.00%	
Days since last GRI	0.011392799	0.002334491	4.880206462	0.00%	
Avg. delay of ALL vessels	0.101492277	0.026638422	3.809995794	0.02%	
Bunker Price	0.001252677	0.000293346	4.270301836	0.00%	
Transpac EB Q-1 Blank Sailings	-0.009734391	0.004237142	-2.297395241	2.38%	
East-West Q-1 Blank Sailings	0.00593316	0.002739803	2.165542096	3.29%	
Q Excess Capacity	-3.83207E-07	1.39439E-07	-2.748209221	0.72%	
Q-1 Nominal Utilisation	2.35304516	0.966459768	2.434705756	1.68%	
Last GRI >0 USD	-0.120481595	0.051392802	-2.344328209	2.12%	

Table B7 shows the summary statistics for the Wide GIDSR regression model, drawing on 10 variables as listed on the left-most column in the third section of the summary output. The model has a moderately higher R^2 at 41.1% and is significant at the very strict 0.0001% level. Furthermore, four of the independent variables have p-values that are significant at the 0.001% level, while a further two are significant at the 1% level, and the remaining four are significant at the commonly-used 5% level.

As we can see in figure B8, both models seem to track the general trend of the GRI Implementation date Success Rate quite well, although there are a few spikes that have not been captured by either model, especially the ones in August 2015 and September 2016 where GIDSR jumped to 100%. No prediction model can successfully anticipate these spikes as they are, relatively speaking, more of an anomaly than the norm.

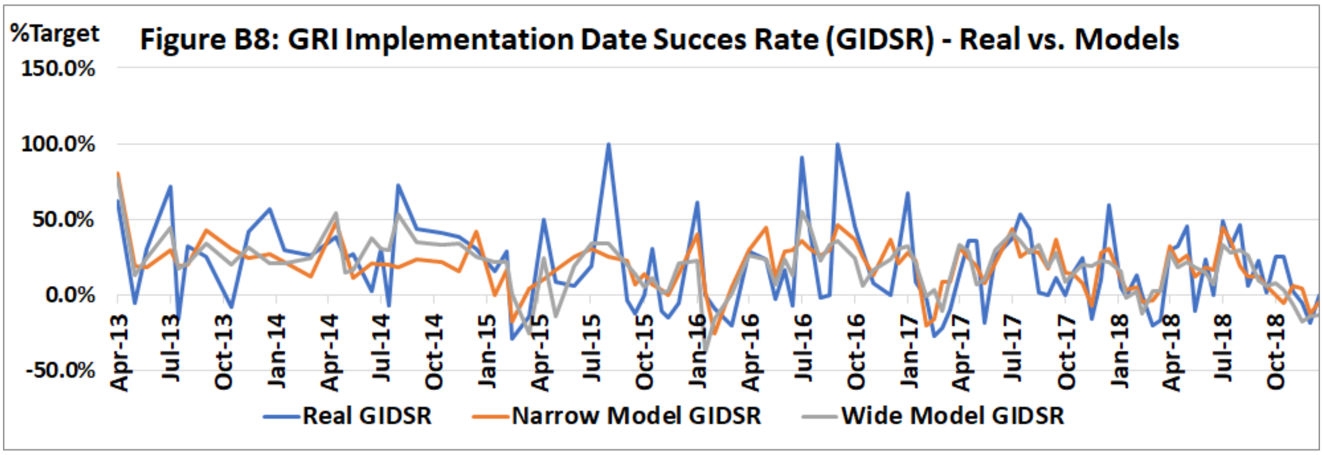


Figure B8: GRI Implementation Date Succes Rate (GIDSR) - Real vs. Models

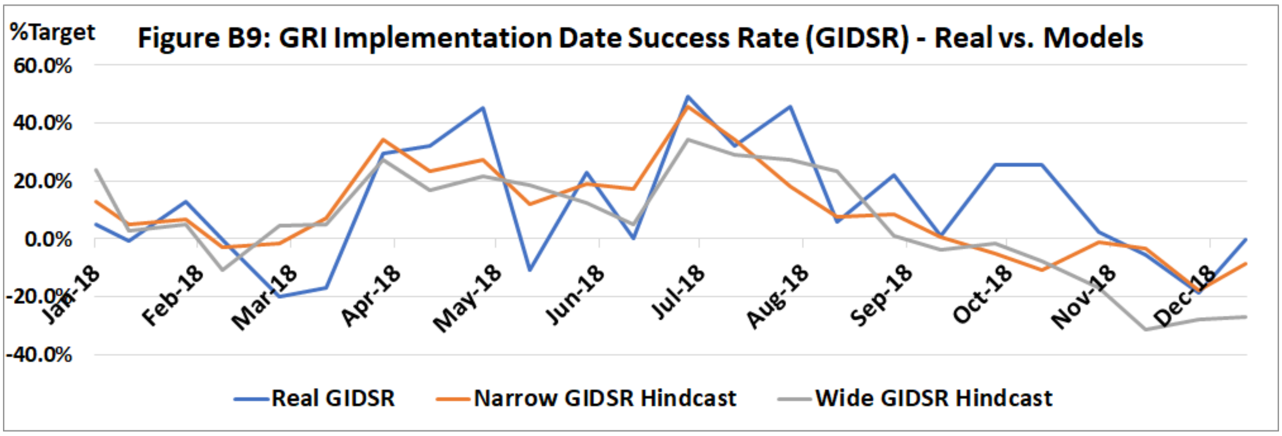


Figure B9: GRI Implementation Date Success Rate (GIDSR) - Real vs. Models

As with the GIDI models, we have recast the GIDSR models exclusively on the data from 2013-2017, and then used the models to predict the GIDSR in 2018. Figure B9 show the outcome of this 2018 hindcast, and we find that the model has generally been quite good at tracking the real GIDSR in 2018 as 29-63% of the 2018 GRI success rates were predicted within +/-10%, while 63-79% were predicted within +/-20%, and 92-96% were within +/-30%.

GADI Multi-variate models

Table B10: SUMMARY OUTPUT - Narrow GADI model

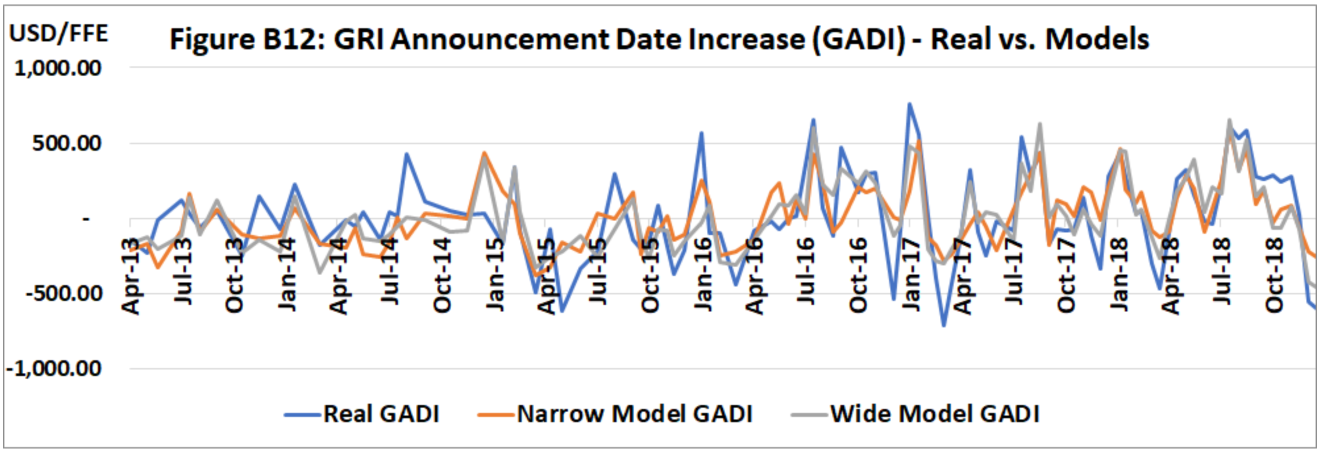
Regression Statistics					
Multiple R	68.01%				
R Square	46.26%				
Adjusted R Square	44.11%				
Standard Error	222.8974026				
Observations	105				
ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	4276829.037	1069207.259	21.5204765	0.00000%
Residual	100	4968325.211	49683.25211		
Total	104	9245154.248			
	Coefficients	*Standard Error*	*t Stat*	*P-value*	
Intercept	-399.3001373	76.06187217	-5.249675375	0.00%	
Last GRI effective date increase	0.593436233	0.115038269	5.158598436	0.00%	
Median GRI Target / Ann. SCFI	449.3771444	99.28500876	4.526132898	0.00%	
Supporting/Total carriers	1006.628638	261.1613582	3.854431775	0.02%	
Transpac EB Q-1 Blank Sailings	-2.175927355	1.073860284	-2.02626672	4.54%	

Table B10 shows the summary statistics for the Narrow regression model on GRI Announcement Date Increase (GADI), based on four independent variables: Last GRI effective date increase, Median GRI target/Ann. SCFI, Supporting/Total carriers, and Transpac EB Q-1 blank sailings. The model R^2 explains 46.3% of the total variation in the GADI response-variable and is very highly significant, even at the very strict 0.0001% level. Three of the four variables have p-values that are significant at the strict 0.1% significance level, while the fourth is significant at the commonly-used 5% level.

Table B11: SUMMARY OUTPUT - Wide GADI model

Regression Statistics					
Multiple R	78.96%				
R Square	62.35%				
Adjusted R Square	59.21%				
Standard Error	190.4191385				
Observations	105				
ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	8	5764247.209	720530.9011	19.87153513	0.00000%
Residual	96	3480907.039	36259.44832		
Total	104	9245154.248			
	Coefficients	*Standard Error*	*t Stat*	*P-value*	
Intercept	582.3408063	196.6585464	2.961177213	0.39%	
SCFI at time of announcement	-0.3554138	0.079404233	-4.476005732	0.00%	
Median GRI Target / Impl. SCFI	-1147.906929	233.578069	-4.914446521	0.00%	
Supporting/Total carriers	1116.895652	240.5899158	4.64232114	0.00%	
Median GRI Target	0.579372051	0.153336235	3.778441868	0.03%	
Minimum GRI Target / Ann. SCFI	777.9431393	189.1757759	4.11227672	0.01%	
East-West Q-1 Blank Sailings	-1.640585447	0.582640668	-2.815775721	0.59%	
M Excess Capacity	-0.000784659	0.00022287	-3.520702669	0.07%	
Last GRI effective date increase	0.326894751	0.113042187	2.891794288	0.47%	

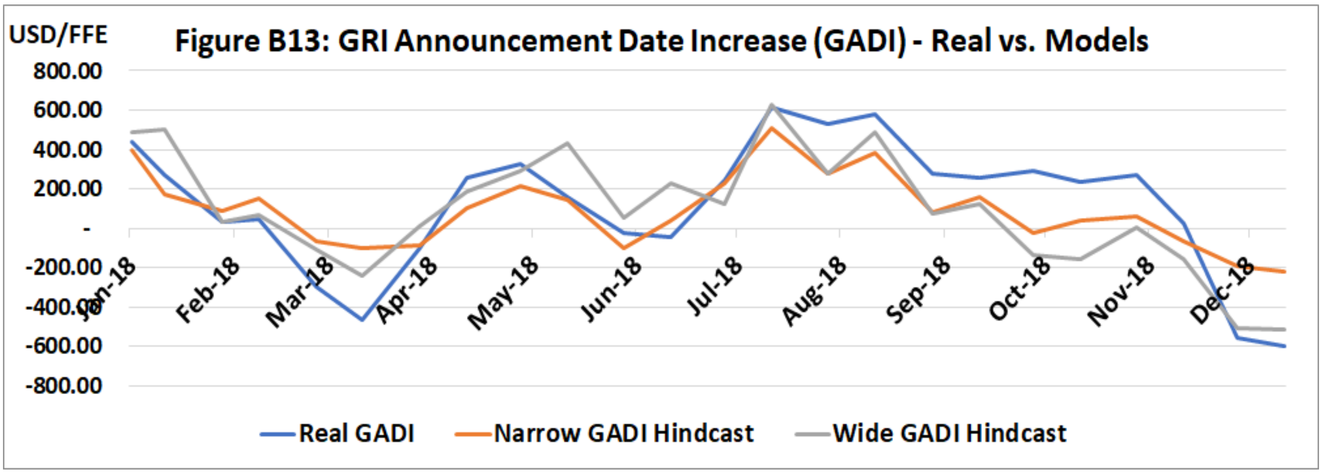
Table B11 shows the summary statistics for the Wide GADI regression model, drawing on eight independent variables:



SCFI at time of announcement, Median GRI target/Impl. SCFI, Supporting/Total carriers, Median GRI target, Minimum GRI target/Ann. SCFI, East-West Q-1 blank sailings, M Excess capacity, and Last GRI effective date increase. The model has a high explanatory power of 62.4%, and is significant at a very strict 0.0001% level. Six independent variables have p-values which are significant at the very strict 0.1%, while the remaining two are significant at the strict 1% level.

Figure B12, ties the two models together, and we can see that both the models seem to track the general trend of the GRI Announcement Date Increase relatively well, although there are a handful of spikes that are not captured by either model.

Figure B13 shows the hindcast used to predict the GADI in 2018, and we can see that the model has tracked the real GADI relatively well, with 33-42% of the GRI announcement date rate increases predicted within +/-100 USD/FFE of the real GADI, while 67-71% of GRIs were predicted within +/-200 USD/FFE of the real GADI, and 83-92% of GRI's were within +/-300 USD/FFE.



GADSR Multi-variate models

Table B14: SUMMARY OUTPUT - Narrow GADSR model

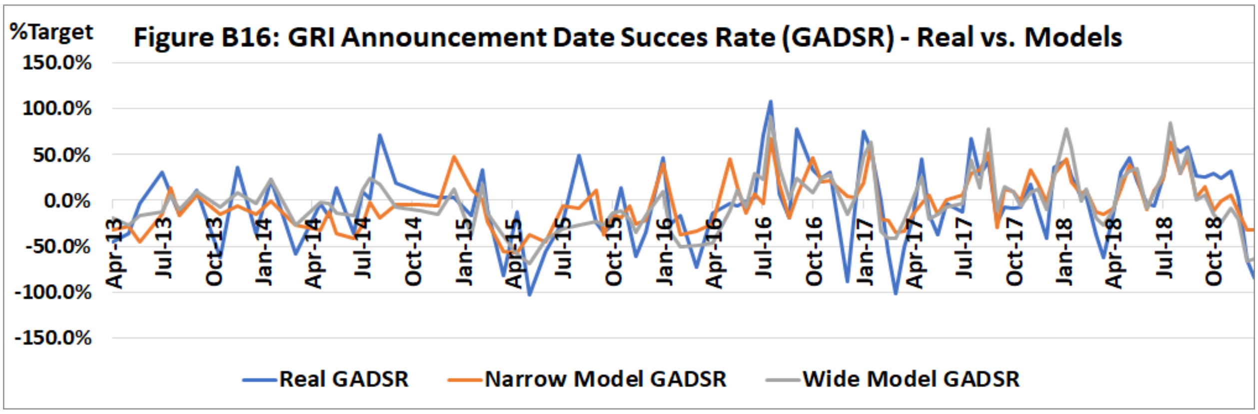
Regression Statistics					
Multiple R	64.99%				
R Square	42.24%				
Adjusted R Square	39.93%				
Standard Error	0.32044791				
Observations	105				
ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	7.50880695	1.877201737	18.28083629	0.00000%
Residual	100	10.26868633	0.102686863		
Total	104	17.77749328			
	Coefficients	*Standard Error*	*t Stat*	*P-value*	
Intercept	-0.538204059	0.107123926	-5.024125591	0.00%	
Supporting/Total carriers	1.27125002	0.376894698	3.372958092	0.11%	
Maximum GRI Target / Ann. SCFI	0.491431449	0.110400142	4.451366115	0.00%	
Last GRI effective date increase	0.000714349	0.000164557	4.341031571	0.00%	
Asia-USWC Q-1 Blank Sailings	-0.00446798	0.002043006	-2.186963665	3.11%	

Table B14 shows the summary output for the Narrow regression model for predicting GRI Announcement Date Relative Success (GADRS), drawing on four independent variables: Supporting/Total carriers, Maximum GRI target/Ann. SCFI, Last GRI effective date increase, Asia-USWC Q-1 blank sailings. The model has an R-squared of 42.2% and is significant at the very strict 0.0001% level. Furthermore, two independent variables have p-values that are significant at the very strict 0.01% level, on is significant at the strict 1% level, and the last variable is significant at the commonly-used 5% level.

Table B15: SUMMARY OUTPUT - Wide GADSR model

Regression Statistics					
Multiple R	76.29%				
R Square	58.20%				
Adjusted R Square	54.72%				
Standard Error	0.278222105				
Observations	105				
ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	8	10.34636946	1.293296182	16.70762546	0.000000000%
Residual	96	7.43112382	0.07740754		
Total	104	17.77749328			
	Coefficients	*Standard Error*	*t Stat*	*P-value*	
Intercept	0.426064049	0.272338115	1.564467204	12.10%	
SCFI at time of announcement	-0.000439772	0.000103238	-4.259801471	0.00%	
Median GRI Target / Ann. SCFI	1.923658241	0.362722563	5.303387323	0.00%	
Supporting/Total carriers	0.972768587	0.364559632	2.668338734	0.89%	
Median GRI Target / Impl. SCFI	-1.487079618	0.341963004	-4.348656433	0.00%	
Asia-USWC Q-1 Blank Sailings	-0.004028819	0.001787462	-2.253932737	2.65%	
M Excess Capacity	-9.24005E-07	3.47409E-07	-2.659702875	0.92%	
Bunker Price	0.000989945	0.000301515	3.283237055	0.14%	
Q-1 Capacity growth Y/Y	-1.251640523	0.671540061	-1.863835973	6.54%	

Table B15 shows the summary statistics for the Wide GADSR model, which draws on eight independent variables: SCFI at time of announcement, Median GRI target/Ann. SCFI, Supporting/Total carriers, Median GRI target/Impl. SCFI, Asia-USWC Q-1 blank sailings, M Excess capacity, Bunker price, and Q-1 Capacity growth Y/Y. The model R^2 explains 58.2% of the variation in the GADSR response-variable and as with the previous models, is significant at the very strict 0.0001% significance level. Three independent variables have p-values that are significant at the very strict 0.01% significance level, while nearly all are significant at the strict 1% confidence level.



In figure B16, we can see that the two prediction models track the general trend of the GRI Announcement Date Success Rate quite well, especially since two of the three biggest peaks in July 2016 and January 2017 were predicted by both models with relatively close accuracy. There are however a few spikes that are not tracked by any of the two models.

Figure B17 shows the hindcast used to predict the GADSR in 2018. While the model has tracked the real GADSR well, it is not quite as well as the GIDSR model, as just 33-38% of the GRI announcement date success rates were predicted within +/-10% of GADSR, while 42-54% were predicted within +/-20% of GADSR, and 63-83% were predicted within +/-30%.

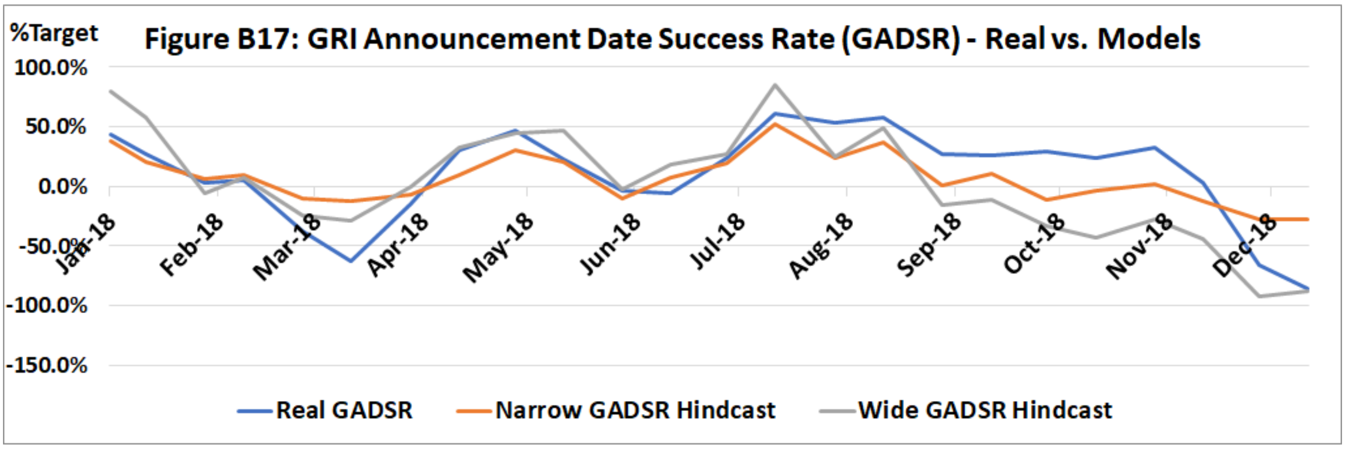
Conclusion

In this analysis we have attempted to build univariate and multi-variate OLS regression models to predict four different measures of GRI success on the Asia-US West Coast trade lane.

We identified a total of 49 independent variables that were both likely to partially explain the different measures of GRI success while being meaningfully quantifiable. Of the four measures of GRI success, GRI Announcement Date Success Rate (GADSR) was found to have the largest set of input variables that are statistically significant on a univariate level, with 28 input variables being significant on a 5% level, with the most powerful univariate model (Maximum GRI Target / SCFI at time of announcement) having an R^2 of 20.1%.

Meanwhile, the GRI Announcement Date Increase (GADI) measure had the strongest univariate model (the implementation date increase of the previous GRI), with an R^2 of 22.2%.

We also find that predicting GRI success relative to GRI Implementation Date is



harder than compared to GRI Announcement Date on a univariate level, as the measure of GRI Implementation Date Increase (GIDI) only had 16 of the 49 variables being statistically significant at the 5% level, while the strongest model had an R^2 of just 10.0%. Predicting GRI Implementation Date Success Rate (GIDSR) on a univariate level is even tougher, with just 9 of 49 input variables being univariately significant on a 5% level, and the strongest univariate model having an R^2 of just 8.8%.

We also build a pair of multi-variate OLS regression models for each of the four measures of GRI Success. The multi-variate models are considerably stronger in their explanatory power, with the narrow 3-variable model for GIDI having an R^2 of 26.8%, while a wider 8-variable model provides for an R^2 of 68.9%. For GIDSR the narrow 5-varibale model had an R^2 of 34.7%, while the wider 10-variable model had an R^2 of 55.6%.

The GRI success measures against Announcement Date show less spread between the narrow and wide models, with the narrow 4-variable GADI model recording an R^2 of 46.26%, and the wide 8-variable GADI model an R^2 of 62.4%. For GADSR, the 4-variable narrow model had an R^2 of 42.3%, while the wide 8-variable model recorded an R^2 of 58.2%.

Finally, we tested the multi-variate models' ability to actually predict GRI success, through a recasting of the models on just 2013-2017 data, and performing a hindcast on the 2018 GRIs. We find all of the models to be moderately successful in predicting GRI success, with the narrow GIDI model predicting 50% of 2018 within a range of +/- 100 USD/FFE, and the wide model hitting 62.5% of 2018 GRIs within +/- 100 USD/FFE. For GIDSR, the narrow model was within +/-10% of the actual success rate for 62.5% of 2018 GRIs, while the wide model was less accurate, only hitting 29.2% of 2018 GRIs within +/-10% of the actual success rate.

For GRI success measures against GRI Announcement Date, the narrow GADI model hit 33.3% of 2018 GRIs within +/- 100 USD/FFE of the actual GRI increase, while the wide model hit 41.7% of 2018 GRIs within +/- 100 USD/FFE. For GADSR, the narrow model predicted 37.5% of 2018 GRIs within +/-10% of the actual success rate, while the wide model hit 33.3% within +/-10%.

It may now seem as we have fully exhausted the topic if predicting Asia-US West Coast GRIS, as we are left with a set of 8 multi-variate models that do a pretty decent job at predicting GRIs, as R^2 measures of 26-69% is pretty good when dealing with unruly, real-life data. That said, there are still four important ways that we can expand on the analysis:

1) Can we fine-tune the models to improve their predictive power, while not sacrificing statistical significance? We warmly welcome reader suggestion for additional variables we should test for possible inclusion.
2) Some of the models rely on input variables that are not readily available at the time of the GRI, e.g. all utilisation figures based on CTS data have a 2-month time lag. Can we find suitable proxy or time-lagged variables to substitute with, without sacrificing too much explanatory power and statistical significance?
3) What is the real-life value of these models? Would our "model shipper" from our analysis in issue 395 of the *Sunday Spotlight* be able to employ these models to determine GRIs that are likely to be successful, and thus save significant costs by shifting cargo away from these GRI weeks?
4) Can we use this model to somewhat accurately predict the upcoming March 1st Transpacific GRI is likely to be successful?

We will return to these four questions in a later issue of the *Sunday Spotlight.*

Development in vessel delays in 2018

Average delays in 2018 were the highest across both metrics of vessel delays in the 2012 2018 period, with the average delay for LATE vessel arrivals at 3.98 days. With the lowest recorded schedule reliability and the highest number of blank sailings since 2015, delays are another way that service levels suffered in 2018.

In *Issue 397* of the *Sunday Spotlight*, we reviewed Schedule Reliability in 2018; looking at it from a global and a trade lane perspective, while also looking across the individual carriers and carrier alliances. The very poor results would not have surprised regular readers of our monthly Global Liner Performance (GLP) report.

8 of the 12 months in 2018 saw lower global schedule reliability than recorded in corresponding months in any year before 2018, with the 2018 annual average global schedule reliability of 70.8% the lowest ever recorded since SeaIntelligence launched the measurement of schedule reliability in mid-2011. Furthermore, none of the top-15 carriers or the three carrier alliances recorded a Y/Y improvement in schedule reliability, while just one of the six major East/West trade lanes, Asia-North Europe, recorded a Y/Y improvement in schedule reliability, albeit of just 0.3 percentage points.

In this issue of the *Sunday Spotlight*, we delve further into our analysis of liner shipping service levels, by looking at the average delays. What we are interested in seeing is the development over time in how late the vessels have been on average. This analysis will also be broken down into same four sections as the schedule reliability analysis, i.e. global, carrier, alliance, and trade lane.

Methodology

The data for this analysis is sourced entirely from Sea-Intelligence's industry-leading Global Liner Performance (GLP) database, where each month we benchmark the schedule reliability of more than 60 named carriers across 34 different trade lanes, based on more than 12,000 monthly vessel arrivals.

According to our methodology, "on-time" is defined as actual vessel arrival within plus or minus one calendar day of the scheduled arrival.

For the purpose of this analysis, we will be focusing on two additional metrics of liner shipping service levels, as covered by the GLP database.

- Average delay for **LATE vessel** arrivals: this is the average delay (in number of days) for only those vessels that were recorded as being late i.e. if a vessel was late, how late was it on average.
- Average delay for **ALL vessel** arrivals: this is the average delay (in number of days) for ALL vessel arrivals, regardless of whether they are early, on-time, or late. This figure can also be negative if there is a higher frequency of vessels being early.

It should be noted that since not all carriers publish scheduled or actual arrivals by the hour, choosing to instead publish by calendar day, we are limited in our methodology of the GLP report and our database, and can only measure vessel delays in whole calendar days.

Figures

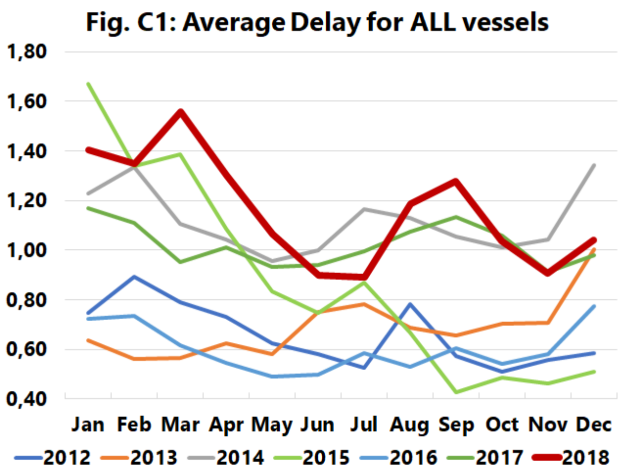
Figures C1 and C2 of the **global section** show the monthly developments in the average delays for all (C1) and late (C2) vessel arrivals for the 2013-2018 period.

Figures C3 and C4 of the **carrier section** show the yearly developments in the average delays for all (C3) and late (C4) vessel arrivals for the top-15 carriers for the 2013-2018 period, as well as the Y/Y comparison with 2017. We have elected not to include niche carriers, as with a limited number of vessel arrivals, their vessel delays will be considerably more volatile, and it would therefore be hard to extract meaningful information of trends and developments over time.

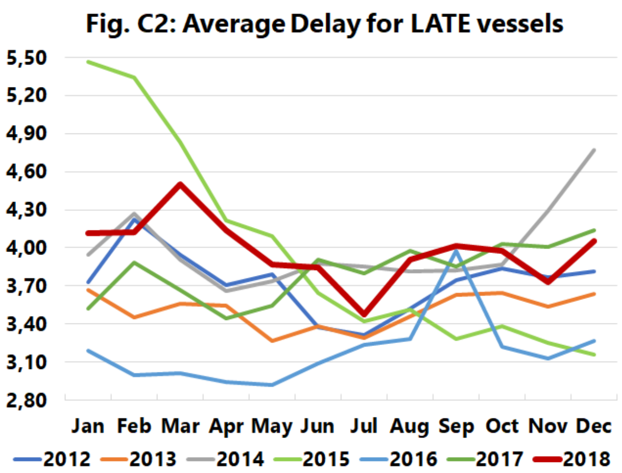
Figures C5 and C6 of the **alliance section** show the monthly developments in the average delays for all (C5) and late (C6) vessel arrivals from March 2015 to December 2018. Please note that we have elected to start this section in March 2015 as it was the first full month with the major carrier alliance networks dominating the main East-West trades.

Lastly, in the **trade lane** section, figures C7 to C12 cover the six major East/West trade lanes and show the monthly developments in vessel delays in each metric from January 2012 to December 2018.

Global average vessel arrival delays



The average delay for ALL vessel arrivals was recorded at 1.16 days in 2018, the highest across the analysed year, and 0.14 days higher than the average of 2017. If we look at the average delays of ALL vessel arrivals on a monthly level compared to previous years, in 2018 the delays were the highest in 6 out of the 12 months of the year, with the February-May 2018 period consistently seeing the highest recorded average delays in the analysed period.



The picture is quite different when we look at the average delay of LATE vessel arrivals, as 2018 only recorded a single moth, September, where delays were longer than corresponding months in previous years. Much of this is due to the 2014-2015 labour dispute in the US West Coast ports, which led to massive congestion, which in turn delayed nearly ALL vessel arrivals into the US West coast by 2-3 weeks from October 2014 to April 2015. With an annual average delay of LATE vessel arrivals of 3.98 days, the 2018 delays were the joint-highest with 2014; a year that also felt the brunt of the labour dispute in the last few months. Compared to 2017, the average delays of LATE vessel arrivals increased by 0.17 days Y/Y, which is not high by any means, but has more to do with the fact that we recorded the highest Y/Y increase of 0.62 days in 2017.

Average vessel arrival delays by carrier

Please note that both figures C3 and C4 are sorted in ascending order from the lowest to the highest delays in 2018, with the colour grading in the Y/Y column going from green to red in order of increasing delays.

Fig. C3: Average Delay for ALL vessel arrivals

Top-15 Carrier	2013	2014	2015	2016	2017	2018	Y/Y
MSC	0.82	1.12	1.03	0.54	0.81	0.80	-0.01
Hamburg Süd	0.56	0.72	0.77	0.48	0.82	0.92	0.10
Maersk Line	0.47	0.69	0.71	0.58	0.96	0.92	-0.04
Wan Hai	0.63	1.06	0.73	0.40	0.73	0.95	0.22
HMM	0.67	1.47	0.90	0.66	0.85	1.03	0.18
ZIM	0.98	1.42	0.90	0.55	0.92	1.08	0.16
APL	0.61	1.31	0.76	0.63	0.92	1.08	0.15
CMA CGM	0.69	1.03	0.79	0.60	0.96	1.13	0.17
Evergreen	0.67	1.12	0.78	0.60	0.87	1.17	0.30
OOCL	0.82	1.46	0.86	0.61	0.89	1.20	0.30
COSCO	0.61	1.11	0.88	0.59	0.92	1.21	0.29
Hapag-Lloyd	0.76	1.20	0.90	0.58	1.01	1.26	0.25
ONE						1.30	N/A
PIL	0.74	1.23	0.88	0.54	1.12	1.36	0.24
Yang Ming	0.49	1.06	1.03	0.64	1.14	1.64	0.50

In 2018, MSC had the lowest average delays for ALL vessel arrivals of the top-15 carriers, of 0.80 days, which was almost identical to their respective average delays in 2017, of 0.81 days. Hamburg Süd, Maersk Line, and Wan Hai were the next three carriers in line, all with average delays of less than 1.00 days. On the other end of the scale, we have all three members of THE Alliance along with PIL, with Yang Ming recording the highest average delays for ALL vessel arrivals of 1.64 days, followed by PIL, ONE, and Hapag-Lloyd with delays of 1.36, 1.30, and 1.26 days, respectively.

Compared to 2017, both Maersk Line and MSC saw their delays decease by -0.04 and -0.01 days, respectively, while Yang Ming recorded the highest Y/Y increase in delays, of 0.50 days.

It should however be noted that average delay for ALL vessel arrivals is not a perfect measure, as a carrier can theoretically have average delays for ALL vessel arrivals close to zero if their vessel arrivals were in equals parts very late and very early, and to a similar frequency. All things considered, this measure is still a good indicator of a general level of lateness of vessels.

The measure in table C4, average delay of LATE vessel arrivals, looks only at the vessel arrivals that were recorded as arriving late relative to the scheduled arrival date, and ignores any vessel arrivals that arrived on time or early.

Fig. C4: Average Delay for LATE vessel arrivals

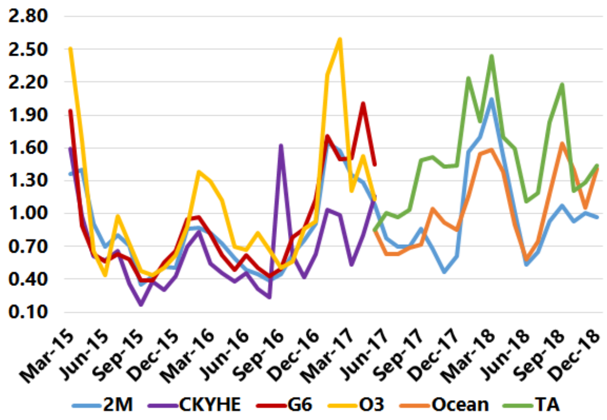
Top-15 Carrier	2013	2014	2015	2016	2017	2018	Y/Y
Wan Hai	3.15	3.57	3.50	2.77	3.01	3.39	0.38
HMM	3.17	4.18	3.74	2.93	3.02	3.44	0.42
Hamburg Süd	3.18	3.49	4.12	3.00	3.39	3.54	0.15
MSC	3.56	3.95	4.05	2.90	3.44	3.55	0.11
APL	3.16	4.08	3.67	2.89	3.33	3.66	0.33
Evergreen	3.57	3.98	4.06	3.42	3.58	3.75	0.17
COSCO	3.23	3.85	4.17	3.29	3.64	3.77	0.14
ONE						3.78	N/A
OOCL	3.23	4.04	3.69	2.91	3.38	3.80	0.42
Hapag-Lloyd	3.36	4.05	3.97	2.99	3.63	3.85	0.22
ZIM	3.65	4.10	4.05	3.15	3.52	3.85	0.33
Maersk Line	3.37	3.59	3.70	3.07	3.73	3.88	0.15
CMA CGM	3.37	3.89	3.89	3.21	3.80	3.96	0.16
Yang Ming	2.83	3.52	4.36	3.34	3.58	3.97	0.39
PIL	3.48	3.86	4.34	3.05	3.91	3.98	0.07

None of the top-15 carriers saw an improvement (decrease) in delays for LATE vessel arrivals. Wan Hai had the lowest average delays for LATE vessel arrivals in 2018, of 3.39 days, despite recording the third-highest Y/Y increase in the delays of 0.38 days. Wan Hai was followed by HMM, Hamburg Süd, and MSC with delays of 3.44, 3.54, and 3.55 days, respectively. On the other end of the scale we find PIL with average delays for LATE vessel arrivals of 3.98 days, followed by Yang Ming and CMA CGM with 3.97 and 3.96 days, respectively.

On a Y/Y level, both HMM and OOCL recorded the highest increase in the average delays for LATE vessel arrivals of 0.42 days, followed by Yang Ming with 0.39 days and Wan Hai with 0.38 days.

Average vessel arrival delays by alliance

Fig. C5: Average Delay for ALL vessels

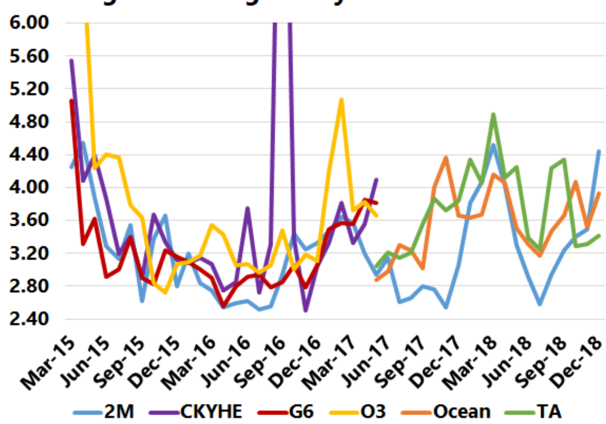


THE Alliance has had the highest delays for ALL vessel arrivals in all months since its inception, except for in May 2017 and October 2018. Compared to the next highest delay in each month, the delays faced by THE Alliance were on average 0.41 days higher per month across the entire May 2017 to December 2018 period. The average delay for ALL vessel arrivals for THE Alliance in 2018 were 1.67 days, compared to 1.22 days for Ocean Alliance, and 1.16 days for 2M.

That said, the difference in the average delays between THE Alliance and Ocean Alliance was down to just 0.03 days (1.44 days vs 1.41 days) in December 2018, while 2M recorded delays that were considerably lower at 0.96 days.

On a Y/Y level, all three carrier alliances recorded an increase in the average delay for ALL vessel arrivals, with THE Alliance recording the highest increase, of 0.49 days, followed by Ocean Alliance with an increase of 0.41 days, and 2M with the lowest increase in average delays of 0.18 days.

Fig. C6: Average Delay for LATE vessels



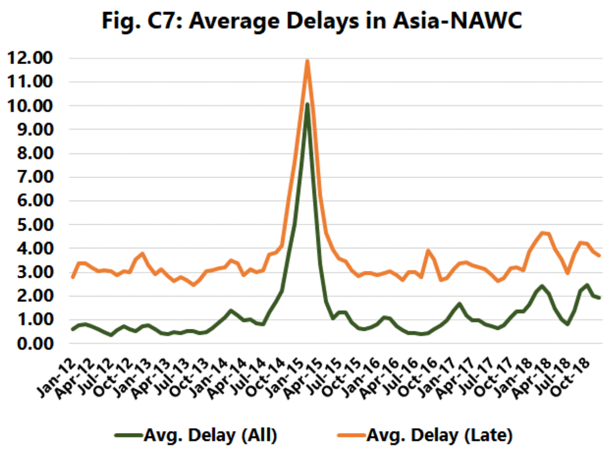
Please note that the chart is cut at 6.00 days in order to not lose definition at the lower end, with the Ocean Three peak coming in March and April 2015 of 6.74 and 6.84 days, respectively, likely caused by the US West Coast labour dispute and the launch of the Ocean Three alliance, both happening in these months. The CKYHE peak came in September 2016 of 10.87 days, and was primarily caused by the bankruptcy Hanjin, a CKYHE alliance member.

In 2018, THE Alliance had the highest average delays for LATE vessel arrivals, of 3.91 days, followed by Ocean Alliance with delays of 3.68 days, and 2M with delays of 3.56 days. It is however interesting to note, that despite having the lowest delays across 2018, 2M saw the greatest Y/Y increase, of 0.53 days, followed by THE Alliance with an increase of 0.51 days, and Ocean Alliance recording the smallest Y/Y increase of 0.32 days.

Between June 2015 and December 2018 period, THE Alliance had the highest average delays for LATE vessel arrivals in 11 months, while Ocean Alliance had the highest delays in 6 months, and 2M only had the highest delays twice; once in February 2018, and the other time in December 2018.

Additionally, in December 2018, the picture is the opposite from earlier in the year, with 2M recording the highest delays, followed by Ocean Alliance, with THE Alliance recording the lowest delays by a little over 1.00 calendar day when compared to 2M.

Average vessel arrival delays by trade lane

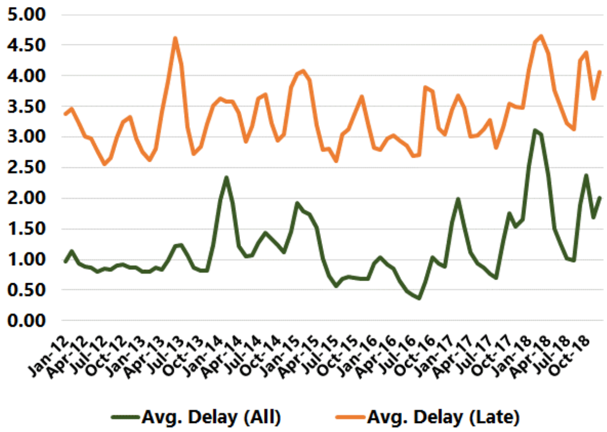


Disregarding the sharp increase in both metrics of delays in late 2014 and early 2015 due to the US West Coast labour dispute, the average delays for ALL vessel arrivals have largely been in the 0.5 days to 2.0 days range, while the average delays for LATE vessel arrivals on the other hand have largely been within 2.5 days to 3.5 days across the entire analysed period. Both measures are seen to increase in volatility from mid-2017.

The trend in the average delay for ALL vessel arrivals has changed over the analysed period. In 2012-2013, the average delays for ALL vessel arrivals were within 0.40 to 0.80 days. From July 2015 to August 2016 there was a decreasing trend in the delays, dropping from 1.32 days to 0.40 days. Since then however, there has been an increasing trend in the average delays for ALL vessel arrivals, reaching a peak of 2.42 days in March 2018 and 2.47 days in October 2018.

Across 2018, the average delays for ALL vessel arrivals were 1.81 days, a sharp increase over the 1.09 days delay recorded in 2017. The average delays for LATE vessel arrivals also increased Y/Y, from 3.10 days in 2017 to 3.99 days in 2018. Both metrics were the highest outside of 2015 where the US West Coast labour dispute caused massive delays.

Fig. C8: Average Delays in Asia-NAEC



On the Asia-North America East Coast trade lane, the average delays for ALL vessel arrivals in 2018 was 1.98 days, 0.67 days higher than in 2017, while the average delay for LATE vessel arrivals was 3.97 days, compared to the 3.30 days delay recorded in 2017.

Between January 2012 and April 2013, the average delays for ALL vessel arrivals was in and around the 0.90-day mark, before recording a substantial increase to the then-peak of 2.33 days in February 2014. Much like on the Asia-North America West Coast trade lane, the average delay for ALL vessel arrivals had a decreasing trend between 2015 and mid-2016, which changed into an increasing trend with considerable volatility, reaching peak delays of 3.04 days in March 2018.

The average delays for ALL vessel arrivals on the other hand have largely stayed within a range of 2.5 to 4.0 days, reaching peaks of 4.61 days and 4.65 days in June 2013 and March 2018, respectively, while dropping to the lowest point of 2.61 days in July 2015.

Fig. C9: Average Delays in Asia-NEUR

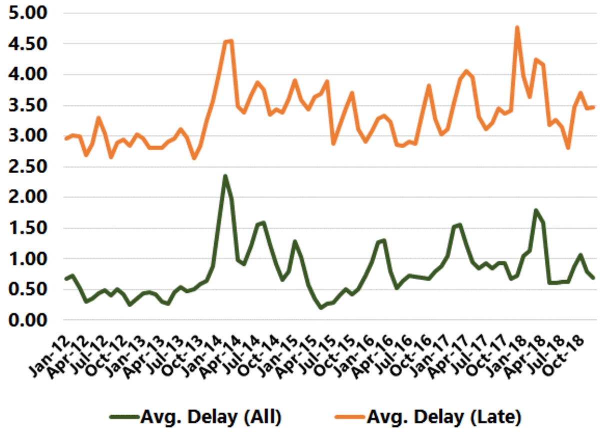
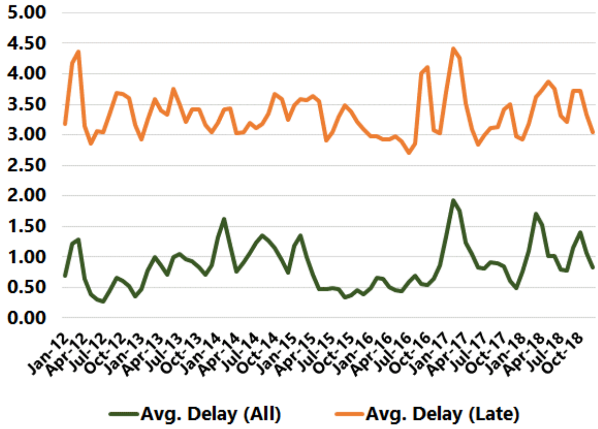


Fig. C10: Average Delays in Asia-MED



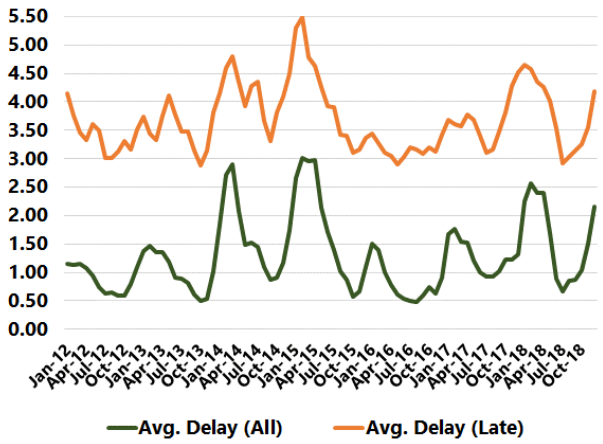
The average delays for ALL vessel arrivals on the Asia-North Europe trade lane have been the lowest from January 2012 to September 2013, hovering around the 0.50-day mark. There was a sharp increase in February 2014 to 2.35 days, followed by a decreasing trend all the way down to 0.42 days in October 2015. Since then, there haven't been any significant upwards or downwards swings in vessel delays, staying under 1.00 days since May 2018, although with considerably more volatility than what was seen before February 2014.

Furthermore, Asia-North Europe was the only trade lane to see a Y/Y improvement in delays, as average delays for ALL vessel arrivals improved from 1.01 days in 2017 to 0.95 days in 2018, while the average delays for LATE vessel arrivals improved from 3.60 days in 2017 to 3.54 days in 2018.

Volatility in vessel delays on the Asia-Mediterranean trade lane was relatively lower than the other analysed trade lanes, with the average delay for LATE vessel arrivals remaining largely between 3.00 and 3.70 days until December 2015. There was relative volatility between May 2016 and May 2017, with the two peaks, of 4.12 and 4.41 coming in October 2016 and February 2017, respectively. The average delay for ALL vessel arrivals on the other hand have had an increasing trend until February 2014, reaching a peak of 1.62 days. Following that, between May 2015 and November 2016, average delays for ALL vessel arrivals remained under 0.70 days, but have since seen a sharp increase in volatility.

In 2018, the average delay for ALL vessel arrivals was 1.09 days, only marginally higher Y/Y. The same can be said of the average delay for LATE vessel arrivals, which, at 3.45 days in 2018, was only 0.04 days higher compared to 2017.

Fig. C11: Average Delays in TATL WB

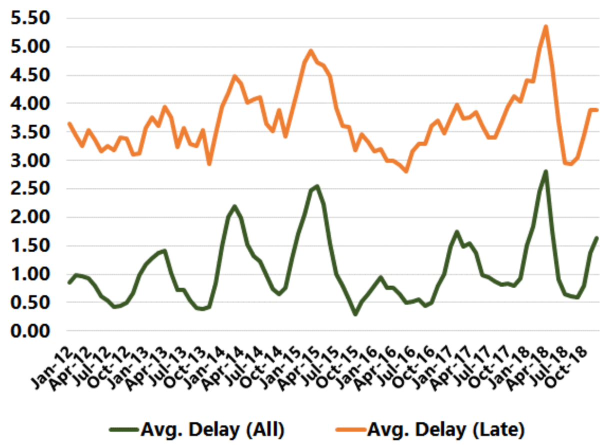


It is quite normal for average delays for ALL vessel arrivals to follow a seasonal pattern, with high delays during the winter months, and low delays in the summer months, as schedule reliability generally increases during the peak season and drops during the winter. This seasonality is much more evident on the Transatlantic trades, as inclement weather in the Atlantic causes even more widespread delays, which is why, in figure C11, we can see that peak delays for ALL vessel arrivals have come during the winter.

While the average delay for LATE vessel arrivals does not follow the same degree of seasonality, as this metric only captures the lateness of LATE vessels, and not the frequency of the vessels that were late. We can see an increasing trend in the delays until February 2015 where it peaked at 5.48 days. It is entirely possible that this was a result of the US West Coast labour dispute, partly as 2-3 of the 32-37 Transatlantic services over the period have been deployed into US West Coast ports via the Panama Canal, and partly as a lot of vessels were rerouted to the US East Coast instead, which would have added to the congestion in these ports.

In 2018, the average delay for ALL vessel arrivals was recorded at 1.60 days, which was 0.32 days higher than the 1.28 days delay recorded in 2017. On the other hand, the average delay for LATE vessel arrivals increased by a much smaller margin, from 3.68 days in 2017 to 3.79 days in 2018.

Fig. C12: Average Delays in TATL EB



The average delays of ALL vessel arrivals on the Transatlantic Eastbound trade lane also follow a similar seasonal pattern, with low delays in the summer and high delays in the winter. The average delays for ALL vessel arrivals in 2018 was 1.41 days, which was not only 0.26 days higher on a Y/Y level but was also the highest annual average in the analysed period. The average delays for ALL vessel arrivals also increased Y/Y, from 3.77 in 2017 to 3.97 days in 2018. Furthermore, the 2018 figure was the second-highest in the analysed period (highest: 4.08 in 2015).

Conclusion

Global average delays for ALL vessel arrivals were recorded at 1.16 days in 2018, the highest in the 2012-2018 period. The global average delays for LATE vessel arrivals were 3.98 days in 2018, the joint-highest with 2014. On a monthly level, average delays for ALL vessel arrivals were the highest in 6 months in 2018, while the average delay for LATE vessel arrivals were the highest in 5 months of 2018.

Furthermore, only 2 of the Top-15 carriers recorded a Y/Y improvement in the delay for ALL vessel arrivals, while none of them recorded a Y/Y improvement in the average delay for LATE vessel arrivals in 2018. Similarly, none of the three carrier alliances recorded a Y/Y improvement in either metric of delays, not did five of the six main East-West trades lanes, with only the Asia-North Europe trade lane recorded a marginal Y/Y improvement in both metrics of vessel delays.

Carrier Service Changes

Update: ZIM and 2M announce new cooperation on the Asia-Mediterranean and Transpacific trades

In issue 395 of the Sunday Spotlight, we announced the following service change: ZIM and 2M have announced a new cooperation on the Asia-Mediterranean and Transpacific trades, starting from March 2019. Although this collaboration is still subject to regulatory approval, some of the planned changes have already been revealed by the carriers.

UPDATE: ZIM's service schedules indicate that the regulatory approval has already been granted for the cooperation on the Transpacific trade, as the carrier's schedules reveal the first sailings with ZIM on board the services.

TP8/Orient/PS4/ZP8: this service connects Asia to North America West Coast, and it is currently operated by Maersk Line and MSC. In addition, HMM charters slots on the service, and brands it "PS4". ZIM will join the service as a slot charterer from March 2019, and brand it "ZP8". There are currently seven vessels deployed on the TP8/Orient/PS4-service, with an average vessel capacity of 11,500 TEU.

The port rotation of the TP8/Orient/PS4/ZP8-service will be as follows *(9 port calls)*:

Xingang – Qingdao – Shanghai – Busan – Yokohama – Prince Rupert – Los Angeles* – Oakland* – Xingang.

The first vessel with ZIM on board the service will be "Maersk Altair", which is due to depart from Xingang on March 6th.

*Remark: According to ZIM's service schedule, the carrier will not be on board for the port calls at Los Angeles and Oakland.

TP9/Maple/ZP9: this Asia-North America West Coast service is currently operated by 2M. ZIM will join the service as an operator from March 2019, and brand it "ZP9". There are currently seven vessels deployed on the TP9/Maple-service, with an average vessel capacity of 7,200 TEU. From March 2019, ZIM is expected to operate four of these seven vessels, while 2M will be operating the remaining three. The average vessel capacity in the new setup will increase to 8,300 TEU.

The port rotation of the TP9/Maple/ZP9-service will remain unchanged, and will be as follows *(11 port calls)*:

Kaohsiung – Xiamen – Yantian – Ningbo – Shanghai – Busan – Vancouver – Seattle – Yokohama – Busan – Kaohsiung.

The first vessel with ZIM on board the service as an operator will be "Anna Maersk", which is due to depart from Kaohsiung on March 3rd.

For the Asia-Mediterranean trade, ZIM is expected to be chartering slots from March 2019 on the AE12/Phoenix/PS3 and AE15/Tiger/SERA3-services (Sunday Spotlight, issue 395), but has not yet disclosed the respective service schedules. Once the schedules are updated or more information is released, we will communicate these in one of the upcoming issues of the Sunday Spotlight.

Matson to revise the port rotation of South Pacific Express-service

Matson will revise the port rotation of its fortnightly South Pacific Express (SPX)-service, which connects Hawaii to the Pacific Islands, by adding a port call at the port of Christmas Islands. The SPX-service is operated by Matson. There are currently two vessels deployed on the service, with an average vessel capacity of 600 TEU.

The revised port rotation of the SPX-service will be as follows (7 port calls):

Honolulu – Papeete – Pago Pago – Apia – Nukualofa – **Christmas Islands Port** – Honolulu.

The first vessel with the new port rotation will be "Liloa II", which is due to depart from Honolulu on March 26th.

Milaha to charter slots on Mediterranean-Black Sea service

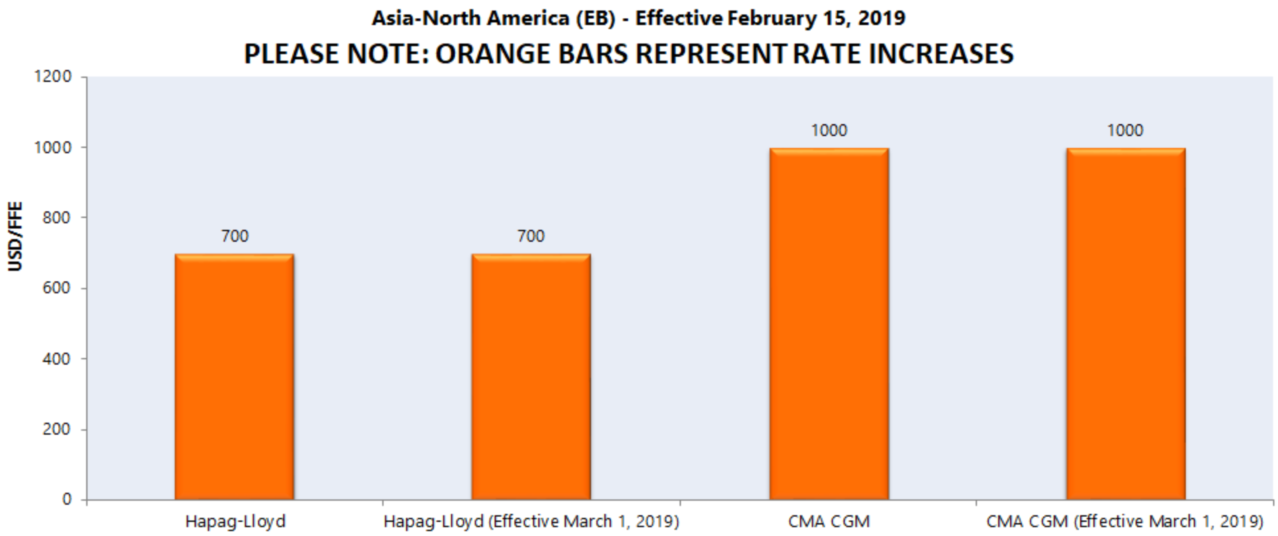
Qatar-based Milaha will charter slots on the BSX-service, which connects the Mediterranean to Black Sea. The service is operated by Hapag-Lloyd and Arkas Line, and both carriers brand it "BSX". Milaha will join the service as a slot charterer, and brand it "BSX". There are two vessels deployed on the BSX-service, with an average vessel capacity of 1,700 TEU.

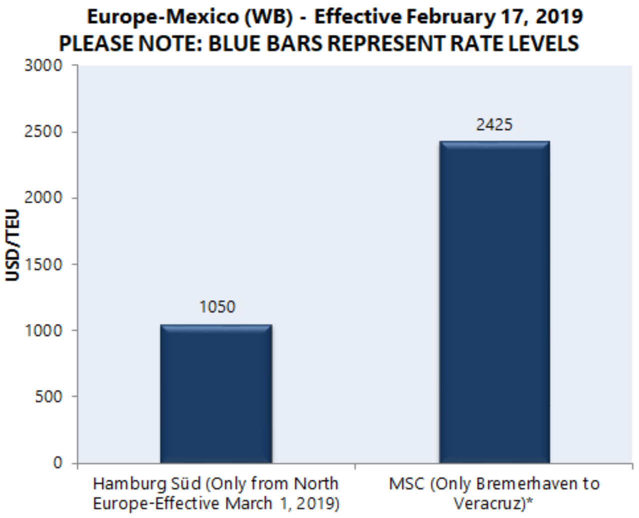
The port rotation of the BSX-service is as follows *(5 port calls)*:

Piraeus – Istanbul – Poti – Novorossiysk – Piraeus.

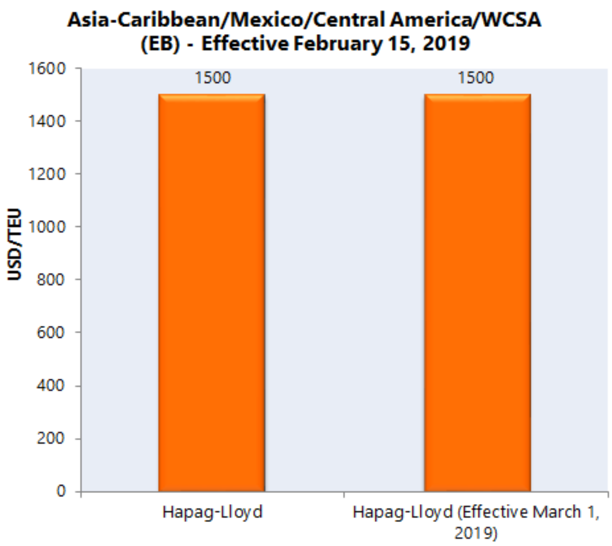
The first vessel with Milaha on board the service is to be announced.

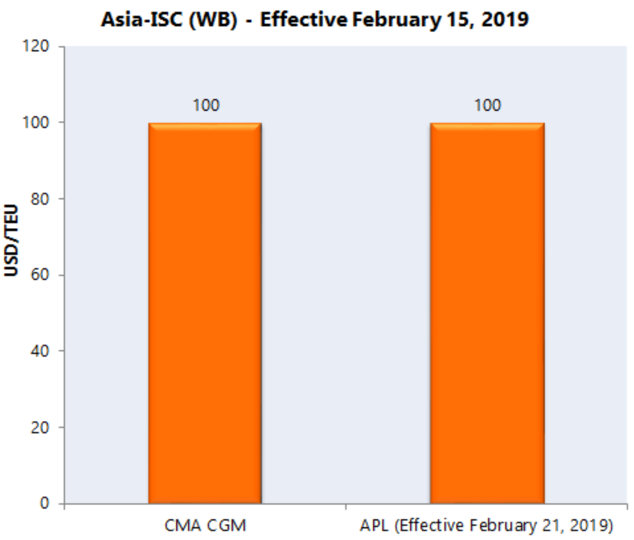
Carrier Rate Announcements

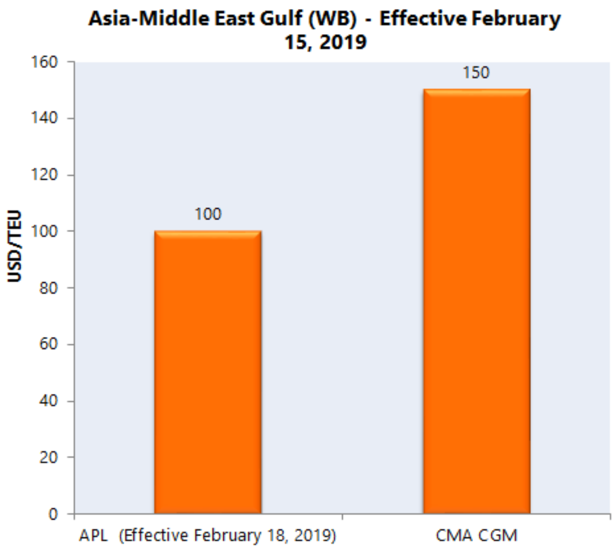


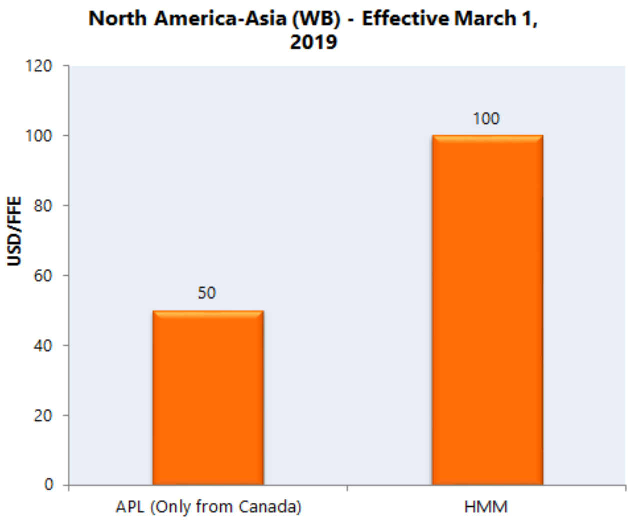


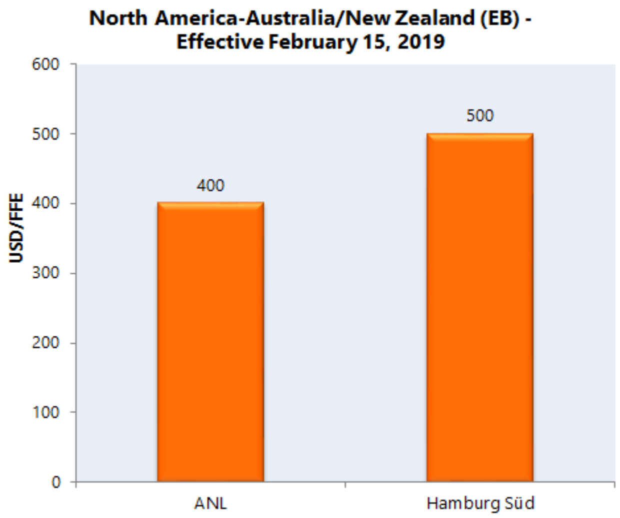
*MSC: 4 rate levels

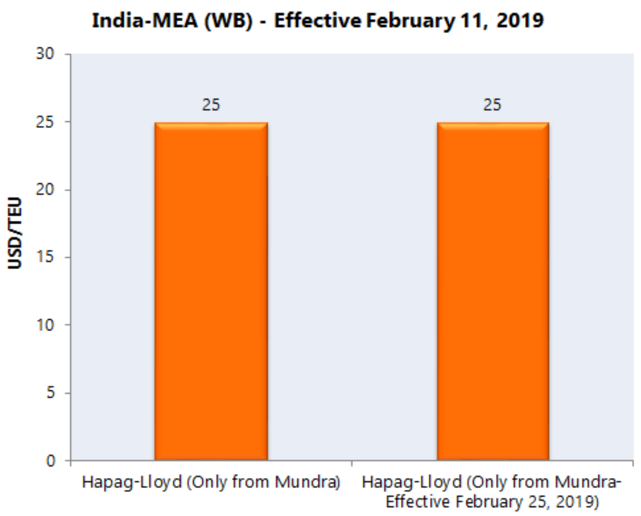


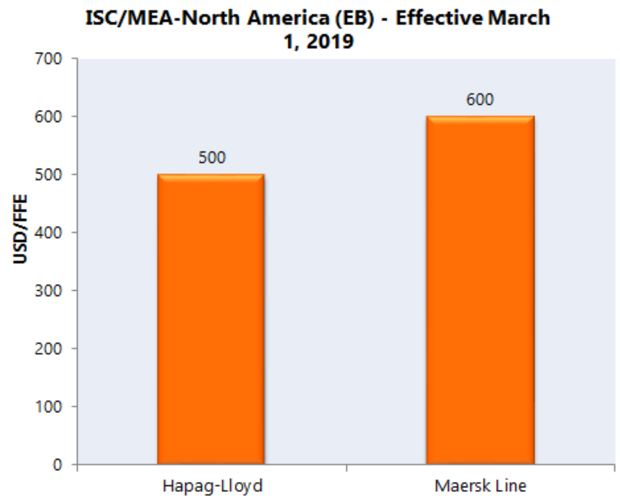












Trade lane	Carrier	Rate increase	Effective date
Asia-Red Sea (WB)	CMA CGM	100 USD/TEU	February 15, 2019
Asia-West Africa (WB)	CMA CGM	500 USD/TEU	March 1, 2019
Asia-East Africa (WB)	CMA CGM	200 USD/TEU	March 1, 2019
Asia-South Africa (WB)	CMA CGM	200 USD/TEU	March 1, 2019
North America-MEA/ISC (WB)	Maersk Line	250 USD/FFE	March 1, 2019
Trade lane	**Carrier**	**Rate level**	**Effective date**
Mediterranean-North America (WB)	MSC	1625 USD/FFE	February 17, 2019
Europe-Central America/Caribbean (WB)	MSC	1800 EUR/TEU	February 17, 2019
North Europe-North America (WB)	MSC	2250 USD/FFE	February 17, 2019
North Europe - Asia (EB)	Maersk Line	480 USD/TEU	March 1, 2019
ISC/MEA-Mediterranean (WB)	Hapag-Lloyd	1088 USD/TEU	March 1, 2019
ISC/MEA-North Europe (WB)	Hapag-Lloyd	1213 USD/TEU	March 1, 2019
North Europe-MEA/ISC (EB)	Hamburg Süd	1000 USD/TEU	March 1, 2019

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