

## A Study of Myanmar Seafarers' Impact on National Economy

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**Abstract** : Shortage of trained seafarers is an issue, which many ship-owners are facing and, according to recent studies, the shortfall of both officers and rating will worsen in the next few years. The key role of seafarers is of fundamental importance in international trade, as they are the ones responsible for safely manning and operating ships. In developing countries, they also perform a strategic aspect in terms of contribution to GDP, mainly by earning foreign currency and increasing national consumption of goods and services. Myanmar is still considered a developing country with an economy, which has only recently started growing steady. It is also one of the major seafarers supplying nations and the contribution, which seafarers have on the national GDP may be particularly significant in comparison to other countries. This study aims at investigating seafarers' impact towards the Myanmar national economy. The paper describes the status of Myanmar seafarers, and the seafarers' current and forecasted impact towards the Myanmar economy through a regression model. The study concludes with recommendations to make Myanmar seafarers more competitive internationally and increase their economic contribution nationally.

**Key words** : Myanmar Seafarers, Economic Contribution, Myanmar GDP, Regression Model, Forecasted Economic Impact

### 1. Introduction

Shipping is responsible for carrying about 80% of world trade by volume and about 70% by value (UNCTAD, 2015). Ships of any type and any size are manned by seafarers from different nationalities but, today, shortage of supply of seafarers in the shipping industry has become a hot topic (Ryoo et al., 2008).

Freight rates in shipping are rather depressed due to an oversupply of vessels and an increased trend (particularly in the container segment) to build and operate bigger ships (Clarkson, 2016). This implies that supply of seafarers is still very necessary for major maritime nations such as South Korea, China, Japan and Germany to mention just a few.

Nevertheless, according to a study conducted by BIMCO/ISF in 2005 estimated a shortage of 10,000 officers (equal to the 2% of the total workforce) and forecasted that the shortage of officers may reach 27,000 or 6% of the total workforce (BIMCO/ISF, 2005).

In contrast, according to the Korean Ministry of Ocean and Fisheries the total supply of world seafarers was about 1.37 million (Officers: 624,000 and ratings: 747,000) in 2010 (Ministry of Oceans & Fisheries, 2013). This statistics shows that there are 184,000 more seafarers compared to

the previous research study findings published by BIMCO/ISF in 2005. Although there has been an increase in the supply of seafarers, the world's fleet has also increased in size, indicating that there is still a global shortage of seafarers (Barro and Han, 2012). The study conducted by BIMCO/ISF about the prospects of seafarers' global supply and demand pointed out that in 2020 it is forecasted a shortage of 8,000 officers and 30,000 ratings (BIMCO/ISF, 2005). Therefore, due to the increase in vessels' size and, new ships' deliveries and the international standards for seafarers' labor regulations getting stricter, the demand for qualified officers and ratings is growing as never before (BIMCO/ISF, 2005).

For these reasons, seafarers supplying nations, and particularly developing nations, should recognize the key role's seafarers are playing and will most likely play in the future in the shipping industry as well as in the country's economy. Firstly, seafarers actively contribute to the GDP by earning foreign currency which is of vital importance for national consumptions by means of re-spending. Secondly, they may contribute even further by setting own maritime-related companies given their seagoing experience and create additional wealth and employment in the country (Kim and Jung, 2008). There are several studies which investigated the impact of the whole maritime sector over

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the national economy in the U.K. (Oxford Economics, 2015) or impact of ports' in the development of a nation (Dwarakish and Salim, 2015). However, there are very limited studies on the seafarers' impact over a national economy (Oxford Economics, 2011), and especially of a developing country.

This study intends to fill this gap and aims at investigating the contribution of Myanmar seafarers towards the national economy which has only recently opened to internationalization. The paper identifies the current and forecast the future status of Myanmar seafarers, investigates what is their contribution to Myanmar GDP and provides some recommendations on how make Myanmar seafarers' more competitive in the international market and further increase their contribution to the national economy.

## 2. Current Contribution of Myanmar Seafarers to the National Economy

For a full understanding of a national economy development based on sea-related industries, it is necessary to analyze how international seafarers contribute to the national economy, and understand their roles as key resources in the maritime industry (Jo, 2011). For example, a study conducted by the Cardiff University showed that seafarers can have a huge impact on shore-based maritime jobs. In particular the report indicated that seafaring experience is regarded as the most cost-effective way to get qualified workers force into marine-related industries. (Cardiff University of Wales, 1996). In this sense, Myanmar seafarers are a precious contributor to the national economy but might also be the ones who will help building up a shore-based maritime industry, deemed as a fundamental area to help the country's transport policies to be successfully implemented.

The Myanmar government is in fact drawing a lot of attention on the country's transport policy; the transport sector has lacked of overall integrated transport policy. To address this need, Myanmar Transport Master Plan (MYT) has been drafted by JICA (Japan International Cooperation Agency) in 2014. The vision of MYT is stated as "to develop an efficient, modern, safe, and environmentally-friendly transportation system in a coordinated and sustainable manner that embraces all

transport modes for the benefit of the country and people of Myanmar"(JICA, 2014). This policy makes Myanmar seafarers' role even more important as soon as the country will modernize its infrastructure and the transport policies finally reach a higher degree of integration.

Myanmar seafarers are very competitive internationally and detailed statistics of the status of officers and ratings' wages were collected for the year 2014 as shown in table 1.

Table 1 Myanmar seafarer's wage status(2014)

(Unit: USD \$)

No	Ma nni ng Co.	Officers			Ratings		
		C/O 1/E	2/O 2/E	3/O 3/E	BSN 1OLR C/CK	AB OLR CK	OS WPR S/Boy
1	A	6,800	3,700	2,800	1,500	1,250	900
2	B	5,900	3,600	2,650	1,400	1,250	850
3	C	5,800	3,600	2,700	1,400	1,200	850
4	D	6,000	3,650	2,500	1,450	1,200	850
5	E	6,000	3,900	2,800	1,550	1,250	850
6	F	5,900	3,600	2,650	1,500	1,200	800
7	G	5,800	3,550	2,550	1,400	1,200	800
8	H	5,900	3,800	2,700	1,500	1,250	850
9	I	5,700	3,500	2,500	1,300	1,100	800
10	J	5,700	3,500	2,500	1,300	1,100	800
11	K	5,900	3,500	2,600	1,550	1,250	850
12	L	5,700	3,550	2,500	1,450	1,200	800
13	M	5,600	3,400	2,450	1,350	1,150	800
14	N	5,900	3,700	2,600	1,450	1,150	800
15	O	5,500	3,500	2,550	1,350	1,100	750

Source : Seaman employment control division (SECD)

In order to analyze the contribution of Myanmar seafarers' towards the national economy, a dataset of onboard seafarers is analyzed. Onboard seafarers are the ones employed by shipping companies and earn foreign currency. There are many other seafarers with a SIRB (Seafarer's identification and record book) but not employed on board and hence will not be considered in the study.

Table 2 shows Myanmar seafarers' wages differentiating between onboard seafarers and departure seafarers. In 2014, onboard seafarers were 21,856 (Officer 10,085, Rating 11,771) whilst departed seafarers were 3,918 (Officer 1,819, Rating 2,099). The yearly average salary for officers was USD 48,320 whilst for ratings was USD 13,773. An officers' average monthly wage is USD 4,027 whilst it is of USD 1,148 for ratings. On an annual basis, officers' wage is USD 48,320 whilst it is of USD 13,773 for ratings.

According to 2014 data, Myanmar GDP per capita is USD 1,244<sup>1)</sup>. Therefore, officers earned approximately 38

1) <http://data.un.org/CountryProfile.aspx?crName=myanmar>

times more than the GDP per capita, and ratings earned approximately 11 times more. Seafarers' income is much higher than an average income in Myanmar (Seafarers' average annual income is USD 31,046 or about 24 times the GDP per capita).

Table 2 On board myanmar seafarers' wage and GDP ratio (2014)

	Onboard (Seafarers)	Departure (Seafarers)	Average salary (USD)	Total (USD)
Officer	10,085	1,819	48,320	575,233,493
Rating	11,771	2,099	13,773	191,031,542
Total	21,856	3,918	31,047	766,265,036
2014 Myanmar GDP (Million USD)		64,330	Total Salary/ GDP	1.19%

Source : Author's calculation

Table 3 describes the Myanmar's registered seafarers wage for 2014 and the economic contribution to the national economy. In details the table shows the registered seafarers (both officers and ratings), the average salary and the total, expressed in USD. In this case, registered seafarers do not represent the number of working seafarers but it is to provide an indication about the potential contribution towards the GDP. With an expected shortage of trained seafarers in the near future, and given the current economic indicators of Myanmar, should the entire registered seafarers able to get employed the contribution of seafarers in comparison with the GDP would reach an astonishing 3.1%.

Table 3 Myanmar's registered seafarers' wage and GDP ratio (2014)

	Registered (seafarers)	Average Salary (USD)	Total(USD)
Officer	20,230	48,320	977,513,600
Rating	73,854	13,773	1,017,191,142
Total	94,084	31,047	1,994,704,742
2014 Myanmar GDP (Million USD)		64,330	Total Salary/ GDP
			3.1%

Source : Author's calculation

### 3. Methodology

The forecast of Myanmar seafarers has been calculated, in a first stage, according to three different methodologies: compound annual growth rate (CAGR), regression model and times series (exponential smoothing method). However,

due to difficulties in collecting Myanmar seafarers' statistics for longer period, there is a statistical limitation. The collected data is from 2002 to 2014. Among the three different methodologies for estimating the number of seafarers from year 2015 to year 2034, the regression model provided the better estimate as it showed the minimum residual. For this reason, the estimation of the number of seafarers supplied by Myanmar follows a regression model approach.

Linear regression model is a very widely used statistics technique for estimating future trends from an existing dataset (Shin Y. J. et al., 2015). One of the main advantages of utilizing a liner regression model is the possibility to forecast a predicting model and therefore, supporting policy decisions. In this paper, for instance, Myanmar Government may be able to address effective policies aimed at further educating and training seafarers as they will most likely represent an increasing percentage of the country's economy in the coming years. In the formula presented below, Y represents the dependent variable whose values (specifically the number of on board seafarers) are to be estimated. X represents the independent variable from which the prediction is done, with the value of variable X in t period.  $\epsilon_t$  is the error term, or the error in estimating the value of a Y based on a given value of X. The equation utilized for predicting the  $Y_t$  value is defined as follow:

$$Y_t = \alpha + \beta X_t + \epsilon_t$$

$Y_t$  = Total number of onboard seafarers in a given year

$X_t$  = Index of a year

$\epsilon_t$  = N (0,1)

$\forall_t, t= 1,2,3,.....13$

The estimated number of on board seafarers are of great importance in the study in order to calculate the future contribution Myanmar seafarers are likely to have to the national economy. The results are presented in the next section, in figure 1 and table 5.

#### 4. Forecasted Contribution of Myanmar Seafarers to the National Economy

This section describes the issued number of SIRB (Seafarer's identification and record book) compared to the number of employed seafarers (on board) from year 2002 to year 2015. The dataset is taken as a basis to forecast the estimated number of seafarers from year 2015 to year 2034 by a regression model (Park et al., 2012). Table 4 shows the yearly comparison of the number of issued seafarers' and seafarers' employment on foreign vessel from year 2002-2003 to year 2014-2015.

Table 4 Yearly comparison of the total number of registered seafarers' and seafarers' employed on foreign vessel

	Year	Issued SIRB Book	On Board
1	2002-2003	55,360	11,852
2	2003-2004	59,098	12,230
3	2004-2005	61,687	14,775
4	2005-2006	63,862	16,262
5	2006-2007	64,968	17,628
6	2007-2008	66,326	20,232
7	2008-2009	68,182	21,699
8	2009-2010	69,959	22,642
9	2010-2011	73,646	24,483
10	2011-2012	79,904	26,264
11	2012-2013	90,492	29,043
12	2013-2014	96,706	31,225
13	2014-2015	98,958	Estimated 32,000

Source : Author's survey from myanmar seaman employment control division (SECD) statistics under department of maritime administration (DMA), myanmar

Fig 1 illustrates the estimated number of Myanmar seafarers from 2015 to 2034 whilst table 5 shows in details the estimated number of seafarers and it is further highlighted how on board seafarers are categorized according to number of officers, ratings and the total.

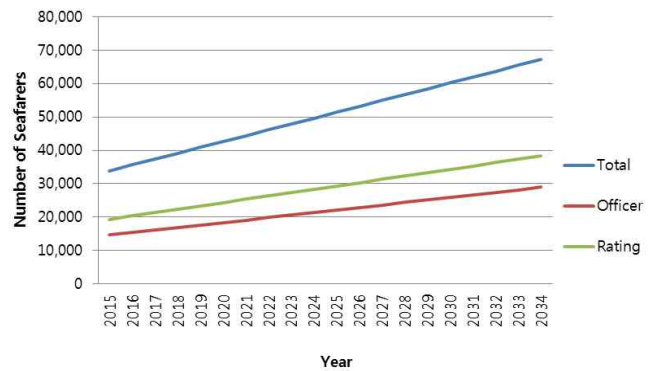


Fig. 1 Forecasted number of myanmar seafarers from year 2014 to year 2034.

Source : Author's calculation

Table 5 Estimated number of seafarers by 2034

(Unit: Person)

Year	On Board		
	Total	Officer	Rating
2015	33,871	14,565	19,306
2016	35,628	15,320	20,308
2017	37,385	16,076	21,309
2018	39,141	16,831	22,310
2019	40,898	17,586	23,312
2020	42,655	18,342	24,313
2021	44,412	19,097	25,315
2022	46,169	19,853	26,316
2023	47,926	20,608	27,318
2024	49,682	21,363	28,319
2025	51,439	22,119	29,320
2026	53,196	22,874	30,322
2027	54,953	23,630	31,323
2028	56,710	24,385	32,325
2029	58,467	25,141	33,326
2030	60,224	25,896	34,328
2031	61,980	26,651	35,329
2032	63,737	27,407	36,330
2033	65,494	28,162	37,332
2034	67,251	28,918	38,333

Source : Author's calculation

Table 6, 7 and 8 illustrate the estimated on board seafarers wage from year 2015 to year 2034. The table indicates respectively the forecasted number of seafarers (further sub-divided into officers and ratings) under 3 different scenarios with a 3%, 5% and 7% wage increase. Figures have been calculated based on 2014 average wage, for officers of 48,320 US\$ and for ratings 13,773 US\$.

Table 6 Estimated On Board Seafarers Wage with 3% Increase

(Unit: Million USD \$)

Year	Departure	Officer	Rating	3% Increase		
				Total	Officer	Rating
2015	33,871	15,644	18,227	1,037.2	778.6	258.6
2016	35,628	16,455	19,173	1,123.7	843.5	280.1
2017	37,385	17,267	20,118	1,214.5	911.7	302.8
2018	39,141	18,078	21,063	1,309.7	983.1	326.5
2019	40,898	18,889	22,009	1,409.5	1,058.1	351.4
2020	42,655	19,701	22,954	1,514.2	1,136.7	377.5
2021	44,412	20,512	23,900	1,623.8	1,219.0	404.8
2022	46,169	21,324	24,845	1,738.7	1,305.2	433.5
2023	47,926	22,135	25,791	1,859.0	1,395.5	463.5
2024	49,682	22,946	26,736	1,985.0	1,490.1	494.9
2025	51,439	23,758	27,681	2,116.8	1,589.1	527.7
2026	53,196	22,874	30,322	2,171.3	1,575.9	595.4
2027	54,953	23,630	31,323	2,310.3	1,676.8	633.5
2028	56,710	24,385	32,325	2,455.7	1,782.3	673.4
2029	58,467	25,141	33,326	2,607.7	1,892.6	715.1
2030	60,224	25,896	34,328	2,766.7	2,008.0	758.7
2031	61,980	26,651	35,329	2,932.8	2,128.5	804.3
2032	63,737	27,407	36,330	3,106.4	2,254.5	851.9
2033	65,494	28,162	37,332	3,287.8	2,386.1	901.6
2034	67,251	28,918	38,333	3,477.3	2,523.7	953.6

Source Author's Calculation

Table 8 Estimated On Board Seafarers Wage with 7% Increase

(Unit: Million USD \$)

	Departure	Officer	Rating	7% Increase		
				Total	Officer	Rating
2015	33,871	15,644	18,227	1,077.4	808.8	268.6
2016	35,628	16,455	19,173	1,212.7	910.3	302.3
2017	37,385	17,267	20,118	1,361.5	1,022.1	339.4
2018	39,141	18,078	21,063	1,525.3	1,145.0	380.3
2019	40,898	18,889	22,009	1,705.3	1,280.1	425.2
2020	42,655	19,701	22,954	1,903.1	1,428.6	474.5
2021	44,412	20,512	23,900	2,120.1	1,591.6	528.6
2022	46,169	21,324	24,845	2,358.3	1,770.3	588.0
2023	47,926	22,135	25,791	2,619.4	1,966.4	653.1
2024	49,682	22,946	26,736	2,905.5	2,181.1	724.4
2025	51,439	23,758	27,681	3,218.8	2,416.3	802.5
2026	53,196	22,874	30,322	3,429.9	2,489.3	940.6
2027	54,953	23,630	31,323	3,791.2	2,751.6	1,039.6
2028	56,710	24,385	32,325	4,186.2	3,038.2	1,148.0
2029	58,467	25,141	33,326	4,618.1	3,351.7	1,266.4
2030	60,224	25,896	34,328	5,089.8	3,694.0	1,395.8
2031	61,980	26,651	35,329	5,604.9	4,067.8	1,537.0
2032	63,737	27,407	36,330	6,167.3	4,476.1	1,691.2
2033	65,494	28,162	37,332	6,780.8	4,921.3	1,859.5
2034	67,251	28,918	38,333	7,450.2	5,407.2	2,043.0

Source Author's Calculation

Table 7 Estimated On Board Seafarers Wage with 5% Increase

(Unit: Million USD \$)

Year	Departure	Officer	Rating	5% Increase		
				Total	Officer	Rating
2015	33,871	15,644	18,227	1,057.3	793.7	263.6
2016	35,628	16,455	19,173	1,167.7	876.6	291.1
2017	37,385	17,267	20,118	1,286.6	965.8	320.8
2018	39,141	18,078	21,063	1,414.4	1,061.8	352.6
2019	40,898	18,889	22,009	1,551.8	1,164.9	386.9
2020	42,655	19,701	22,954	1,699.4	1,275.7	423.7
2021	44,412	20,512	23,900	1,857.8	1,394.6	463.2
2022	46,169	21,324	24,845	2,027.9	1,522.3	505.6
2023	47,926	22,135	25,791	2,210.3	1,659.3	551.1
2024	49,682	22,946	26,736	2,405.9	1,806.1	599.8
2025	51,439	23,758	27,681	2,615.5	1,963.4	652.1
2026	53,196	22,874	30,322	2,734.9	1,984.9	750.0
2027	54,953	23,630	31,323	2,966.5	2,153.0	813.5
2028	56,710	24,385	32,325	3,214.4	2,332.9	881.5
2029	58,467	25,141	33,326	3,479.7	2,525.5	954.2
2030	60,224	25,896	34,328	3,763.5	2,731.4	1,032.1
2031	61,980	26,651	35,329	4,066.9	2,951.6	1,115.3
2032	63,737	27,407	36,330	4,391.3	3,187.1	1,204.2
2033	65,494	28,162	37,332	4,737.9	3,438.6	1,299.3
2034	67,251	28,918	38,333	5,108.3	3,707.5	1,400.8

Source Author's Calculation

Table 9 shows the potential impact of Myanmar seafarers over the national economy for the year 2015–2034. The Myanmar GDP has been growing steady in the last years and has seen an average annual increase of 13.96% from year 1998 to year 2014. The same optimistic assumption has been taken for the estimation of annual GDP growth and it has been compared with three case scenario of wages increasing respectively by 3%, 5% and 7%. Obviously the wage/GDP ratio is decreasing due to a higher rate increase of GDP compared to wages. However, this example is still showing how significant the impact of Myanmar seafarers could be over the national economy.

Table 9 Forecasted Myanmar Seafarers' Wage/GDP Ratio

	GDP (Million USD)	Total Wage 3% Increase/ GDP Ratio	Total Wage 5% Increase/ GDP Ratio	Total Wage 7% Increase/ GDP Ratio
2015	65,291	1.5886%	1.6194%	1.6502%
2016	74,406	1.5102%	1.5694%	1.6298%
2017	84,793	1.4323%	1.5173%	1.6057%
2018	96,630	1.3554%	1.4637%	1.5785%
2019	110,119	1.2800%	1.4092%	1.5486%
2020	125,492	1.2066%	1.3542%	1.5165%

2021	143,011	1.1354%	1.2991%	1.4825%
2022	162,975	1.0669%	1.2443%	1.4470%
2023	185,726	1.0009%	1.1901%	1.4104%
2024	211,653	0.9379%	1.1367%	1.3728%
2025	241,200	0.8776%	1.0844%	1.3345%
2026	274,872	0.7899%	0.9950%	1.2478%
2027	313,244	0.7375%	0.9470%	1.2103%
2028	356,973	0.6879%	0.9005%	1.1727%
2029	406,806	0.6410%	0.8554%	1.1352%
2030	463,596	0.5968%	0.8118%	1.0979%
2031	528,314	0.5551%	0.7698%	1.0609%
2032	602,067	0.5160%	0.7294%	1.0244%
2033	686,116	0.4792%	0.6905%	0.9883%
2034	781,897	0.4447%	0.6533%	0.9528%

Source : Author's Calculation

The calculation shows the importance of Myanmar seafarers for the national economy. The current economic contribution of Myanmar seafarers towards the national economy is very significant but by implementing the national transport policies their role may extend even further (by the creation of shore-based maritime jobs) and their impact to the GDP could further increase in the mid and long-term. In addition, it must to be stressed that the study focuses only of on board seafarers which are the ones employed on foreign shipping companies and do have an impact on the national economy; nevertheless, the current situation suggest that only a minor percentage of seafarers holding a SIRB is employed on board foreign vessels. As the Myanmar government is to implement the transport policy, the current and forecasted impact that Myanmar seafarers have on the national GDP should not be neither underestimated nor forgotten.

## 5. Conclusion

Myanmar is still a developing nation yet one of the most important supplying sources of seafarers. Several studies show that there is a shortage of seafarers and shipping companies will increasingly look at the employment of foreign seafarers, including Myanmar. The key role played by Myanmar seafarers reflects the impact they do have on the national economy; seafarers earn foreign currency which support national consumption and it is currently representing a large share of GDP. The paper has also intended forecasting with a simple linear regression methodology the impact that those seafarers will have in the next years. A few assumptions were made, as a steady growth of GDP and an increasing number of seafarers will be working onboard under three different scenario of

wages' increasing rate. According to the data analyzed, Myanmar seafarers will continue to play a very important part as contributors of national GDP yet there are still some areas to be improved with the implementation of new policies. For example, one of the major issues is that currently only a minor part of Myanmar seafarers holding a sea license are employed. Particularly, there is the necessity to expand the job opportunities and the employment rate of Myanmar seafarers through specific policies whose objective is to enhance their skills, reputation and competitiveness. Myanmar government should encourage the private sector, maritime universities and governmental agencies to cooperate with each other and promote actively Myanmar seafarers on board training. This is in line with what Myo suggested in his study (Myo, 1999). In addition, they should also be able to fully understand the current needs of the market, trying to educate and train seafarers in the most effective way as possible by investing pro-actively and pragmatically resources in infrastructure, equipment and specific training courses. Statistics have shown that seafarers do have a huge impact over the national economy but the economic contribution could be even bigger in magnitude and the Myanmar government should fully understand how strategic this sector is for the nation. By successfully implementing the transport policies and by investing in education centers, Myanmar may hugely benefit from higher employment rates for seafarers and in the short-terms increased economic contribution to the national GDP. In the long-run, there may be more professional seafarers setting up shore-based maritime related activities with a further boost in the impact they do have over the national economy.

The study could be further expanded; this paper has only focused on the impact over the national economy of Myanmar seafarers employed on board foreign shipping companies and it may be interesting to compare the same sector with other countries; for example it may be significant to analyze what is the impact of seafarers in a another supplying nation and compare the results obtained in terms of employment rate and impact on the national economy.

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