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# CHAPTER 1

## Shortage and labor productivity on the global seafaring market

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**Résumé:** *Impliqués dans un secteur à dimension internationale et recrutés sur des navires battant pavillon étranger (ou contrôlés par des intérêts étrangers), les marins s'inscrivent dans un marché du travail très largement ouvert sur le monde. Ce chapitre revient sur les principales tendances ayant marqué le marché du travail des gens de mer au cours des dernières décennies (évolutions technologiques, libre immatriculation des navires, etc.) et pouvant expliquer la structure actuelle du marché. Il propose également quelques justifications aux disparités de salaires observées sur ce marché.*



*Les études statistiques (BIMCO/ISF, Drewry, etc.) soulignent à la fois la part croissante des travailleurs en provenance d'Asie et d'Europe de l'Est et l'existence d'une pénurie de travailleurs, notamment aux postes d'officiers. Cependant, le salaire moyen des gens de mer ne reflète que partiellement cette tension sur le marché du travail tant les disparités salariales sont importantes. Le niveau de qualification des équipages semble ainsi plus pertinent pour expliquer ces disparités salariales que le nombre de travailleurs présents sur le marché au regard de la demande de marins. Le salaire ne reflète pas pour autant parfaitement la productivité du travail car il dépend de nombreux autres facteurs tels que le niveau de vie dans le pays d'origine des marins, la taille des navires ou encore les stratégies de réduction des coûts proposées par les compagnies de gestion de la flotte et des équipages. Ainsi, bien qu'international, le marché du travail des gens de mer apparaît très segmenté et en proie à de nombreuses pratiques de discrimination. En ce sens, il ne saurait être qualifié de global et de totalement intégré.*



## Introduction

The key role of seafarers in shipping activities is well known. Increasing flows of cargo have to be delivered from origin to destination rapidly and safely, thus requiring high skilled workers. Maritime industry is international and so is the seafaring market. Seafarers represent a unique occupational group. They can be employed on vessels under various flags, owned and operated by people from different countries. In that sense, the seafarer labor market is much more open than any other economic sector in the world.

This chapter examines the seafaring market, its composition and the main trends that have influenced the market during the last century (section 1). We pay a particular attention to the well-known seafaring shortage (section 2), which is far from being illustrated by the evolution of international wages, showing that this shortage is perhaps over-estimated and may concern only part of the market and not the whole of it. The relationship between labor costs and productivity is discussed to illustrate the role of technical change and economies of scale in the apparent productivity of labor (section 3).

## 1. Trends and structure of the Global Labor Market for Seafarers

Many authors have studied labor market imbalances and the evolution of maritime labor system. Alderton et al. (2002)<sup>1</sup> underline the impact of the «Flags of Convenience» (FoC) on the seafarer's working life. They show that the working conditions for seafarers from developing countries working aboard FoC vessels have worsened. Cottam and Roe (2004)<sup>2</sup> analyzed the restructuring of maritime transport that has deeply transformed the fleets of the Central and Eastern European countries at the end of the eighties. Wu (2004, 2005, 2006)<sup>3</sup> and Rodriguez-Martos (2006)<sup>4</sup> investigate the issue of crews nationalities. Wu (2005) focuses on the integration of

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1) Alderton T, Winchester N. (2002), Globalization and de-regulation in the maritime industry, *Maritime Policy & Management*, 26(1), p. 35–43.

2) Cottam H, Roe M. (2004), The impact of transitional changes on maritime transport in Central and Eastern Europe, *Maritime Policy and Management*, 31(4), p. 287–308.

3) Wu B. (2004), Participation in the global labour market: experience and responses of Chinese seafarers, *Maritime Policy and Management*, 31(1), p. 69–82.

Wu B, Lai K-H, Cheng TC-E. (2006), Emergence of 'new professionalism' among Chinese seafarers: empirical evidence and policy implications, *Maritime, Policy and Management*, 33(1), p. 35–48.

Wu B, Winchester N. (2005), Crew study of seafarers: a methodological approach to the global labour market for seafarers, *Marine Policy*, 29(4), p.323–30.

4) Rodriguez-Martos R. (2006), The composition of the crews of the vessels entering Barcelona harbour. Barcelona: Universidad Politecnica de Cataluna.

Chinese seafarers in the international labor market. Two types of seafarer employment are reported: seafarers within state-owned enterprises (SOE) and the so-called 'non-state-owned' (NSO) seafarers, who work both on the domestic and global labor market. Wu (2005) stresses the rising flow of workers shifting from SOE to NSO employment and thus, the increasing recruitment of Chinese seafarers on foreign fleets.

The seafaring market has undergone many changes from technological evolution and economic globalization during the 20th century. The transformation of maritime business into and internationalized activities began after the end of Second World War with the birth of open registry<sup>5</sup>. In parallel, national and regional legal systems (the Port State Control; PSC) were established in order to provide a general framework for the development of the maritime activity. The main objective of international regulations is to seek solutions to the detection of substandard vessels in order to prevent any risk of pollution and to ensure safety on board. Labor issues, though very sensitive to economic globalization, are not the primary target of the regulation (Leggate McLaughlin, 2012<sup>6</sup>).

The twentieth century was a turbulent time for the shipping industry. Largely labor-intensive and nation-focused at the beginning of the century, this sector became increasingly capitalistic to the detriment of human factors<sup>7</sup>. In addition, the steady recession in the world economy in the early eighties has generated a decline in the world seaborne trade. In 1980, the volume of total world seaborne trade fell by 2.8 per cent (UNCTAD, 1981<sup>8</sup>), the first decrease recorded since 1975. The steady fall in oil consumption and imports also largely contributed to the decline in world seaborne trade. In 1981, the volume of oil imports by the OECD countries fell by 10 per cent. This was due to the combined effects of recession, energy saving policies and the operation of several oil pipelines.

Following the crisis of the 1980s, shipowners either abandoned the maritime business or opted for flagging their vessels in Open Registries. They are frequently used as a tool by shipowners to outsource labor and circumvent safety regulations. By doing so, companies want to keep the cost of shipping goods as low as possible. In 1998, the global fleet became majority-flagged in open registries for the first time, with 51.3% of vessels around the globe flying the flag of an open registry. According to

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5) The «open register system» refers to the flag registry of states that accept the registration of ships owned by nationals from other states with no restrictions.

6) Leggate McLaughlin H. (2012), *Seafarers and seafaring*, in *The Blackwell Companion to Maritime Economics*, First Edition. Edited by Wayne K. Talley. p. 321–332.

7) In the 1960s, container ships have replaced conventional liners and general-cargo ships on many routes.

8) UNCTAD (1981), «*Review of maritime transport 2014*», United Nation Publication.

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UNCTAD (2014<sup>9</sup>), nearly 73% of the world fleet is foreign-flagged. When shipowners decide to «flag out», they can obtain lower labor costs and reduce the living, working and safety standards on board. This race for the lowest operational cost is now central to shipping economics and has led to the development of agencies specialized in the management of vessels and crews (Leggate McLaughlin, 2012). These changes in transportation management have had important implications on the seafaring market.

Another decisive event has been the privatization of the East European and Russian fleets at the end of the 1980s. Fleets of Eastern countries responded differently to the collapse of the former USSR. Romanian and Georgian fleets, made up with very old and non-efficient vessels, went bankrupt. Others (e.g. fleets from former Yugoslavia, Poland or former East Germany) have experienced serious difficulties. Some Eastern fleets (Ukrainian, Russian) had to find a way to both refinance and restructure themselves. As a result, many seamen originating from Eastern countries found their jobs on vessels flagged or operated by other countries.

In order to contain the downward trend in the supply of officers from developed countries, many European governments have created a tonnage tax legislation<sup>10</sup>. However, it seems that the tax has been successful in attracting tonnage but much less so in attracting large numbers of vessels (Leggate McLaughlin, 2012). European governments are therefore striving to draw the link tighter between the flag and the tonnage tax. All these technological, political and economic factors explain much of the current characteristics of the seafaring market.

Many international organizations and consultants provide data about global supply and demand of merchant seafarers: Drewry shipping consultants (Drewry), European Communities Shipowners Association (ECSA), the Baltic and International Maritime Council (BIMCO), the International Labor Organization (ILO), etc.<sup>11</sup>. The BIMCO/ISF study<sup>12</sup> is probably the most comprehensive and the most cited one. It estimated the worldwide supply of seafarers in 2010 to be 1,371,000 (624,000 officers and 747,000 ratings), whereas the worldwide demand was 1,384,000 (637,000 officers and 747,000 ratings). The shortage of officers is further discussed in the next section. However, it is worth noting that the supply of labor force is highly concentrated in a few countries: 81% of the crews originate mainly from three regions of the world:

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9) UNCTAD (2014), «*Review of maritime transport 2014*», United Nation Publication.

10) The tonnage tax provides an attractive tax regime aiming at encouraging shipping companies to base their shipping operations in their own country.

11) The methodology differs between studies, they are therefor not directly comparable.

12) Baltic and International Maritime Council & International Shipping Federation (2010), BIMCO/ISF manpower 2010 update: the worldwide demand for and supply of seafarers, main report (London: BIMCO/ISF).

East Europe, Far East Asia and Southeast Asia (Silos et al., 2012<sup>15</sup>). One third of the total workforce is from Far East and Southeast Asia (29.5 % of the officers and 36,7% of the ratings). Two nationalities are particularly represented in the seafaring labor market: Filipino and Chinese. Filipinos, representing the largest nationality group in the industry, have a long tradition of working abroad or at sea to support their families because they earn more than by working ashore in their country.

Complementing this supply mainly in the officer market, some 18.5 % of the total workforce comes from European countries<sup>13</sup> (23% of the officers and 15% of the ratings). Within the EU seafarers, 57.5% come from Western Europe and 42.5% from Eastern Europe<sup>14</sup> (European commission, 2011). Even though Western European countries (like other OECD countries) remain an important source of seafarers (and officers), seamen from developed countries are less and less numerous. Because of remoteness and hard working conditions, they are reluctant to join the shipping industry. In the coming years, an increasing number of officers from developing countries is expected to offset this decline. As a consequence, the multiculturalism of crews increases significantly. In 2002, less than 35% of the vessels were crewed by seamen sharing the same nationality (Silos et al., 2012).

Despite the growing globalization of the seafaring labor market, the latter remains segmented and faces discriminatory practices. Many barriers hinder the free mobility of labor, i.e. the employment of seafarers of any nationality on any flag register. Some particular flags merely deny employment to foreign seafarers. Cultural differences also limit indirectly the free movement of labor and separate markets. For example, linguistic ability in English is often cited as a reason for restricting the employment of foreign seafarers (Wu et al. 2006; Leggate McLaughlin, 2012). Workers in the seafaring market are therefore distinguished by nationality and jurisdiction, opening the door to discriminatory practices. Such practices occur even though qualifications, certificates and licenses comply with international standards. Shipowner's preferences for certain categories of seamen are not always based on training and skills (Silos et al., 2012). Ziarati et al. (2013)<sup>16</sup> have conducted a survey near some representatives of the maritime community (schools, charter companies, skippers...) to find out their views about the lack of mutual recognition of seamen's

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13) Plus Norway.

14) Bulgaria, Romania and Norway cumulate the highest number of seamen with respectively 33,269, 24,343 and 23,382 officers and ratings. Romania and Poland have the highest number of officers in Europe and Bulgaria provides the highest number of ratings (European Commission, 2011).

European Commission (2011), Study on EU seafarers employment, Final report.

15) Silos J.M., Piniella F., Monedero J., Walliser J. (2012), Trends in the global market for crews: a case study, Marine Policy, 36, p. 845-858.

16) Ziarati M., Ziarati R., Acar U. (2013), Removing barriers to mobility of seafarers, IMLA21 Conference, St John's Newfoundland and Labrador, Canada, October 9th-12th 2013, 7 p.

qualifications between countries. This survey reveals that the lack of recognition mainly results from the protectionism of national authorities and misinformation. According to Tsamourgelis (2009)<sup>17</sup>, seamen from developed countries are mainly employed in senior positions on board because they are considered more efficient and loyal. For less qualified positions on board, the cost of employment is the prevailing driver. As a result, both wages and the performance differential between national and non-national seafarers determine the employment of nationals.

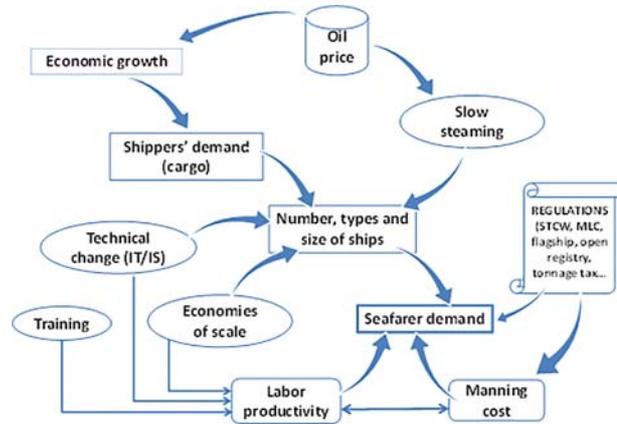
## 2. Shortage, what shortage?

The global seafaring labor market is usually characterized by a supply coming from the seafarers and a demand expressed by shipowners and ship managers. The labor supply is far from being homogenous, with different education levels, skills, specificities and languages, raising complex issues to adjust the manpower to the fluctuating demand in real time. Some authors advocate for a better international mobility of seafarers by homogenizing the training syllabi across flags and countries (Ziarati *et al.*, 2013). The labor demand itself is a derived demand resulting from the need for shipping services which is further induced by the international trade of products and services, dependent in turn of the worldwide economic growth<sup>18</sup>. One can therefore easily understand the booms and busts or lagged effects on the labor market due to the cyclical pattern of the world economy. The seaborne traffic can obviously over-respond to an increasing worldwide output because of the international division of labor and supply chains: e.g. for any additional personal computer designed in the USA or Taiwan and assembled in Malaysia, a network of shipping services for intermediate inputs will trickle down to many other places of the world to generate additional demand for transport (memory card in Germany, hard drive in Singapore, microprocessor in Costa Rica, power adaptor in Thailand, etc.), and conversely the same demand of seafarers will proportionately disappear for any percent decline of trade. Consequently, the seafarer demand forecast takes usually the following form (figure 1):

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17) Tsamourgelis I. ( 2009 ), Selective replacement of national by non - national seafarers in OECD countries and the employment function in the maritime sector , *Maritime Policy and Management*, 36 ( 5 ), p.457- 68.

18) Leggate McLaughlin H. (2012), *Seafarers and seafaring*, in W.K. Talley, *The Blackwell Companion to Maritime Economics*, Blackwell Publishing Ltd, Chapter 16: 321-332.



**Figure 1. The drivers of demand on the seafaring global market**

Source: Own elaboration of authors from various references cited in the text

The BIMCO/ISF forecasted a demand of 1,523,440 officers and ratings in 2015 against a supply of 1,454,199 only, hence a shortage of 69,241 (of which nearly half are officers and half ratings) due to the demand in excess, falling to 37,917 in 2020 (of which 7,917 officers). The seafarer shortage is usually explained by the relatively early age of retirement and the difficulty in recruiting seafarers highly experienced and qualified. The BIMCO/ISF estimations are based on assumptions of annual growth rate both for labor supply (+1.3% between 2011 and 2020) and demand (+1.8%), the latter depending on the size, number, ship type and age composition of the world fleet. The estimations are nonetheless challenged by other authors considering explicitly the market conditions underpinning the demand for seafarers. The Drewry Shipping Consultants (2009)<sup>19</sup> estimated the shortfall of officers to 33,000 in 2009, rising up to 42,700 in 2013. The Japanese Maritime Center<sup>20</sup> also revisited the forecast made by BIMCO/ISF to reduce the shortage at less than 4,612 in 2015 and 13,867 in 2020 for both officers and ratings. In most cases, authors consider that the BIMCO/ISF study tends to under-estimate supply and over-estimate demand for seafarers.

An econometric estimation of the labor demand function (i.e. seafarer demand = number of ships x average manning level) is proposed by Li and Wonham (1999)<sup>21</sup>,

19) Drewry Shipping Consultants (2009), *Manning 2009*, London: Drewry Publishing.

20) Japan Maritime Centre (2013), *Seafarers demand forecast considering economic indicators*, [http://www.jpmac.or.jp/img/en/outline/Summary\\_Eng.pdf](http://www.jpmac.or.jp/img/en/outline/Summary_Eng.pdf)

21) Li K.X. and Wonham J. (1999), *A method for estimating world maritime employment*, *Transportation Research Part E* 35: 183-189.

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where the Average Manning Level (AML) is estimated by:  $AML = 675.81 + 0.336 * Year + 0.00095 * Size$ , where AML depends both on the year of estimation and the average size of the fleet, all coefficients being significant at the 1% level. The year variable is included to account for the technological change which allows fewer crew members to operate a ship throughout time. The average manning level for a general cargo ship was 60% smaller in 2002 than in 1970<sup>22</sup>. Another example is given by the average fleet size of the Panamanian fleet (13,453 GT), the average crew size in 1996 being thus estimated at 17. This figure may well decrease to 14 or 12 ten or fifteen years later. The demand forecast is then extrapolated through the expected growth of the worldwide fleet which can follow a single annual rate for each flag state (e.g. 1.5%), like in the BIMCO/ISF study, or an actual rate according to the fleet segments and flags. The most recent conclusions of Li and Wonham confirm the over-estimation of the officer shortfall<sup>23</sup>. Beyond the incomplete dataset and the difficulty to obtain accurate data from China, one of the reasons lies in the variety of definitions used for the concept of seafarers: (1) Seafarers at work, i.e. actually working onboard at a given time; (2) Number of posts, i.e. minimum personnel to operate a ship safely according to international standards; (3) Employed seafarers, i.e. having an employment contract with shipping companies or operators, including seamen at shore because of illness or holiday; (4) Active seafarers, i.e. qualified seamen currently employed or seeking work onboard; (5) Qualified seafarers who have an appropriate certificate of competency but who are not necessarily looking for a job onboard ships. The BIMCO/ISF survey refers to the last definition although the number of active seafarers would be certainly more appropriate because of the significant proportion (up to 10% in some European countries) of qualified seamen who are turning to alternative jobs ashore and no longer want to return at sea.

Whatever the shortage amount, it should be reflected by higher wage levels on the global market for seafarers. The International Transport Workers Federation (ITF)<sup>24</sup> classifies the monthly salaries of seamen in three groups: (1) Low salary (from \$300 to \$499); (2) Medium (from \$500 to \$2,999); (3) High (from \$3000 and above). According to the International Labor Organization (ILO)<sup>25</sup>, in 2006, 18% of seamen were found in the first group, 75% in the second one and 7% only in the third one. The minimum monthly salary in maritime work reported by the ILO has increased fivefold between 1970 and 2006, thanks to the increasing standards set both by ILO and ITF (Silos *et al.*, 2012). However, disparities are still very important (in 1995, the

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22) Silos J.M., Piniella F., Monedero J., Walliser J. (2012), Trends in the global market for crews: a case study, *Marine Policy* 36: 845-858.

23) Li K.X. and J. Wonham (2014), Who mans the world fleet? A follow-up to the BIMCO/ISF manpower survey, *Maritime Policy & Management* 26(3): 295-303.

24) [www.itfglobal.org/en/transport-sectors/seafarers/](http://www.itfglobal.org/en/transport-sectors/seafarers/)

25) ILO (2006), *Seafarers wages and hours of works and the manning of ships recommendation*. Geneva: Joint Maritime Commission, International Labor Organization (Pub: SJMC/2006/1); 2006

salary of a Japanese seaman was 41 times higher than that of a Bangladeshi seaman, against a factor of 19 between the highest and lowest three years earlier), and the average monthly salary had fallen by a quarter in 2009 with respect to 1992 (*Ibid.*). Consequently, it becomes hard to consider a general shortfall that would concern uniformly all flags and types of fleet.

The recurrent shortage observed in the seamen labor market can also stem from transaction costs, i.e. the costs of matching the demand and supply of seafarers in real time (search costs, contract negotiation, uncertainty about regulation changes, available skills on the market, training periods, illness...). Ship management companies employ thousands of seafarers from different nationalities, skills, ranks, with varying terms and conditions of employment, making adjustments between posts and seamen always more complex<sup>26</sup>. The administrative productivity matters as much as the seafarer productivity onboard and new IT tools are designed to manage the workforce more efficiently, contributing to increase productivity both ashore and on board (Menelaou A., 2012).

### 3. Labor productivity of seafarers and economies of scale

In a theoretical economy where factor mobility is perfect, seamen are expected to be rewarded with regard to their marginal productivity, i.e. the incremental amount of service output obtained with an additional unit of labor. In the shipping industry, due to the overall use of international manning, the unit labor cost also depends on the standards of living in the country where the seafarer lives, leading seamen to «accept pay and conditions that may be worse than current international standards but much better than what they could obtain in their places of origin» (Silos *et al.*, 2012). In that respect, we cannot expect that wage differentials between seafarers at the international level will correspond to productivity differences. Several other factors affect the relationship between labor costs and productivity.

The apparent productivity of labor is indirectly improved by the tremendous economies of scale and technical change cumulated by the shipping industry over the past decades (Fig. 1). It is well known that capital costs and bunker costs are important sources of economies of scale in the shipping industry<sup>27</sup>, but the case of manning costs is more rarely put forward, in spite of its important weight in the operating

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26) Menelaou A. (2012), Enhancement of productivity through an integrated crew management system, skills and work, Higher Education, *Skills and Work-Based Learning* 2(2): 201 – 215.

27) Cullinane K. and Khanna M. (1999) Economies of scale in large containerhips: optimal size and geographical implications, *Journal of Transport Geography* 8: 181-195. See also on this issue Stopford M. (2009), *Maritime Economics*, Routledge, 3<sup>rd</sup> edition, pp. 545-546.

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costs. According to Drewry (2013)<sup>28</sup>, the manning costs represent 39% of total operating costs for a 2-3,000 TEU containership, but only 29% of a 10-12,000 TEU ship; the same costs represent 43.6% of a 30-35,000 dwt handymax oil tanker, 37.3% of a 170-180,000 dwt Suezmax, and only 34.6% of a 300-320,000 dwt ULCC. In other words, by increasing the capacity by 77% from a Suezmax to a ULCC, the manning cost would only increase by 8.5% (from 3,760 to 4,080 US\$ per day) or when the capacity of a containership increases by 340%, the labor costs rise by 40% only. The ratio between the two percent changes gives a proxy of the cost-elasticity to output capacity, which is an inverse measurement of returns to scale, i.e. the ratio of average cost over marginal cost. Whenever this ratio is greater than 1, the industry faces increasing returns to scale. In the present case, the values are estimated around 8.5 or 9, well above the unitary value, demonstrating the strong presence of economies of scale.

Interestingly, the growth rates of the manning costs between 2008 and 2013 have been higher for the largest categories of ships. On average, the increase has been around +1.73% annually, but when it comes to the LNG carriers of more than 150,000 cbm, the average growth rate over the period has been around 3%, even reaching +6 to 8% in 2012 and 2013 (against 1% for the other types of gas carriers). And the same goes for the other types of ships: the larger the ship and the higher the growth of manning costs. The demand for highly qualified seafarers, with better salary, may well be directed to these large categories of ships. Because the size of crew does not augment proportionately to the carrier capacity and due to the greater responsibility of the cargo operated by the crew, the most qualified seafarers are attracted at larger expenses by the shipowners, hence a greater shortfall for experimented officers on this specific market segment. But the unit manning cost per dwt still remains much lower for the largest size of ships. When manning costs fetch around 0.10 USD per day and per unit of capacity for a handymax oil tanker, it costs 0.013 for a ULCC tanker (i.e. 8 times cheaper in the latter case). The unit manning cost per day for a 10-12,000 TEU containership is also three times smaller than for a 2-3,000 TEU ship.

But the shipping labor cost can also be influenced by recent coping strategies of shipowners responding to external shocks such as an increase of oil prices. We saw that an important factor of the demand forecast of seafarers was the expected number of ships. Several authors have shown that the number of ships used in a rotation cycle had increased significantly with the development of slow steaming strategies, raising this number for example from 8 to 10 per round trip on the Far-East Asia-Europe routes between 2008 and 2011<sup>29</sup>. The oil price falling in 2015, slow steaming

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28) Drewry Maritime Research (2012), Ship operating costs – annual review and forecast, Annual Report 2013/14, 164 p.

29) Notteboom T., Cariou P. (2013), Slow steaming in container liner shipping: is there any impact on

is perhaps no longer on top of the shipowners' agenda, but a new oil shock, by increasing the number of ships per trip, would tend to sustain the demand for seafarers, hence putting pressure on the global market of seafarers.

## Conclusion

The global seafaring market has been intensively transformed throughout the twentieth century, still raising challenges for the new century. Technological change, legal issues and economic booms and busts have substantially affected the development of the maritime industry, hence the derived demand for seafarers. Shipping companies have always competed fiercely to survive and have looked for solutions to cut their production costs. Workers represent an adjusting variable (among others) to cope with such a changing environment.

The seafaring labor market is one of the most globalized among all industries. Seafarers are educated and trained in their home countries, where they also live in most cases, and they join international networks of agencies and management companies to work on board. Many cultural and legal barriers related to flagship conditions and the lack of recognition of training programs still create important barriers to the mobility of seafarers. The crew structure by nationality of the controlled capital is different from the structure by flag. For example, Wu and Winchester (2005) show that 60% of the Chinese seafarers work onboard nationally controlled vessels, compared with only 20% on nationally flagged vessels. The same result goes for seafarers working on ships controlled by developed countries, where the officers are rather nationals while ratings originate from foreign countries. The supply labor force is therefore heterogeneous and the market is largely segmented. Consequently, the labor supply cannot easily match the demand at the worldwide level. The global labor market for seafarers relies less on the quantitative number of available seamen than on the quality of the workforce. Labor productivity matters as much, if not more, as the average salary.

The seafarers' wages reflect partially their marginal productivity. Many factors can explain the gap between the wage and productivity levels. The productivity first depends on the size of the vessels operating at sea. Labor cost, as capital and energy, represents an important source of scale economies, explaining why unit labor costs (per dwt or teu) are far lower for larger ships than for smaller ones, even though the standards of qualification required on larger vessels and manning costs are higher. In addition, even if the slow steaming strategy helps to sustain the demand

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fuel surcharge practices?, *The International Journal of Logistics Management* 24(1): 73-86; see also figures of Drewry Container Forecaster, <http://www.drewry.co.uk/publications/>.



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for seafarers, ship management companies keep the market under pressure by maintaining labor costs as low as possible, playing on the differences between national living standards. Each worker is evaluated by his job performance and a common ground for personal comparison across nationalities already exists. But in this market, seafarers performing equally for the same job can perceive a different wage according to their nationality.

For all these reasons, it can be concluded that the seafarer labor market is may be open and international but cannot be fully seen as a «global» market yet. More investigation is certainly needed to look at this incomplete achievement of the global market for seafarers and the international policies to promote it.

