Right Time to Scrap & Replace? 15 Feb 2016

George Papadopoulos has just been hired to advise Aristides J. Pittas (B Sc Newcastle, M Sc MIT) CEO of Euroseas (ESEA), when to scrap his old Panamax dry bulk ships and container ships. Since the 19th century, the Pittas family business strategy has been "providing consistent shareholder returns by carefully selecting the timing and structure of our investment in dry bulk and containership vessels….of any age." The ESEA fleet consists of 5 Panamax dry bulk and ten old containerships amounting to around 600,000 dwt, and on order four Kamsarmax-Ultramax vessels (equal to around four Panamax of 70,000 dwt each)). **Table 1** shows the distribution of vessel age as of December 2014, plus the end year balance sheet with those vessels at the carrying value specified in column M. Now the average fleet age is around 20 years, with a remaining life of around 5 years, so Mr. Pittas believes that abandonment value is a significant part of the total value of the fleet, and scrap and replace an even more significant value for ESEA. In September 2015 Mr. Pittas presented a case for a rights issue to raise equity to fund the new ship investments of around $118 million. "We believe that in today's market of extremely low vessel prices, shipping companies should buy vessels and not dispose of them." Both Newbuilding and Five year old Panamax prices were compared to averages over 2000-2015. So he implied that this is the right time to scrap and replace some of the Panamax vessels. However, possibly the old containerships will eventually be scrapped, since there is no current program to replace these vessels.

George had just completed a real options course at graduate business school, and believes that the abandonment and replacement value should be based on real option theory. The primary entry and exit theory based on stochastic prices such as freight rates is documented in Dixit and Pindyck (1994), extending Dixit

****

 Acknowledgements: Parts of this case were originally prepared by Monica Shum, and then revised by Dean Paxson. While many figures are similar to that in the Euroseas Form 20F for the year ending December 2014, some of the characters are fictitious. This case is not intended as an illustration of either good or bad business practices.

(1989, 1992), Mossin (1968), Tourinho (1979) and Brennan and Schwartz (1985). Paxson (2005) considers the possible strategic actions in asset investments, including the opportunity to expand, contract and suspend operations given the volatile nature of future asset values. These alternatives include remaining idle, building and operating assets, expanding, contracting (slow sailing), suspending (mothballing for ships), reverting to normal service or reduced service capacity, or abandoning. An updated version of optimal scrapping and replacement options is Adkins and Paxson (2015), which considers stochastic demolition values as well.

Adkins and Paxson (2016) have developed a simple model of abandonment, assuming that the opportunity of abandonment arises post-investment, when there is no opportunity for a re-investment, and the salvage value is stochastic.

1 The Adkins and Paxson (2015) Model 1:

What are the critical aspects of valuing replaceable assets that a chief real options manager (CROM) should consider? What is the current value of her position, for purposes of selling (or acquiring) partial interests (equity) in that position; or disposing of (or buying) those assets in the second hand market? Naturally, a further focus is on deciding when to obtain the salvage value and buy new assets, the traditional concern of real option authors. As a part of that process, forecasting the input parameter values (cost deterioration and volatility, salvage value drift and volatility, correlation between cost and salvage) is challenging, especially where there is no or a limited history of second hand equipment prices.

1.1 Valuation Function

Adkins and Paxson (2015) determine the real-option replacement policy for a durable productive asset, without technological innovations, subject to input decay in a monopolistic situation whose output yields a constant revenue[1], assuming other flexibilities are inadmissible. The relevant cash flows crucial to the replacement decision are the operating costs and the salvage value, denoted by C and S, respectively, which are treated as stochastic factors, following a geometric Brownian motion process. The replacement policy, represented by an optimal timing boundary separating the decision regions of continuance and replacement, is defined over a two-dimensional cost-salvage (C-S) space. The tax rate τ is applicable to all cash flows, both positive and negative, and regardless of whether they represent income or capital gains. At replacement, the operating cost and salvage value for the newly installed succeeding asset are set to their known initial levels of C_I and S_I respectively. The replacement re-investment cost is a known constant K. To avoid round-tripping, $S_I < K$.

[1] It is straightforward to recast the model in terms of net revenue instead of operating costs.

The asset value together with its embedded replacement option depends on the prevailing factor levels and is denoted by $F_1 = F_1(C,S)$. Following standard analysis, the replacement contingent claim is expressed by the following partial differential equation:

$$\begin{aligned}&\tfrac{1}{2}\sigma_C^2 C^2 \frac{\partial^2 F_1}{\partial C^2} + \rho\sigma_C\sigma_S CS \frac{\partial^2 F_1}{\partial C \partial S} + \tfrac{1}{2}\sigma_S^2 S^2 \frac{\partial^2 F_1}{\partial S^2} \\ &+ \theta_C C \frac{\partial F_1}{\partial C} + \theta_S S \frac{\partial F_1}{\partial S} - rF_1 + (P_I - C)(1-\tau) = 0,\end{aligned} \tag{1}$$

where $r > 0$ is the constant risk-free rate of interest, P_I is the revenue assumed to be constant, σ_C and σ_S are the constant volatilities, and θ_C and θ_S are the respective risk-neutral drift rates, assumed to be equal to the expected C deterioration and S drift rates[2]. The function satisfying (1) is:

$$F_1 = A_1 C^{\eta_1} S^{\gamma_1} + \frac{P_I(1-\tau)}{r} - \frac{C(1-\tau)}{r-\theta_C}. \tag{2}$$

In (2), the expression $A_1 C^{\eta_1} S^{\gamma_1} \geq 0$ represents the replacement option value, so $A_1 \geq 0$. Substituting (2) in (1) yields the characteristic root equation:

$$\begin{aligned}Q_1(\eta_1,\gamma_1,\lambda_1) = \tfrac{1}{2}\sigma_C^2\eta_1(\eta_1-1) + \rho\sigma_C\sigma_S\eta_1\gamma_1 + \tfrac{1}{2}\sigma_S^2\gamma_1(\gamma_1-1) \\ + \theta_C\eta_1 + \theta_S\gamma_1 - r = 0.\end{aligned} \tag{3}$$

Replacement is optimally triggered when the factor levels C,S attain their threshold levels $\hat{C}_1, \hat{S}_1$, respectively, where $\hat{C}_1 \geq C_I, \hat{S}_1 \leq S_I$. This occurs when at exercise, the incumbent value and the successor value less the replacement cost net of salvage value are in exact balance, eliminating the constant P_I from both sides.

The value matching relationship is:

$$\begin{aligned}&A_1 \hat{C}_1^{\eta_1} \hat{S}_1^{\gamma_1} - \frac{\hat{C}_1(1-\tau)}{r-\theta_C} \\ &= A_1 C_I^{\eta_1} S_I^{\gamma_1} - \frac{C_I(1-\tau)}{r-\theta_C} + (1-\tau)\hat{S}_1 - K.\end{aligned} \tag{4}$$

Optimality is assured by the smooth-pasting conditions, one for each factor C,S, which can be expressed in a reduced form by:

$$A_1 \hat{C}_1^{\eta_1} \hat{S}_1^{\gamma_1} = \frac{\hat{C}_1(1-\tau)}{\eta_1(r-\theta_C)} = \frac{\hat{S}_1(1-\tau)}{\gamma_1} \tag{5}$$

The reduced form value-matching relationship can be expressed as:

[2] Adjustments for risks is an important research topic. The discount rates are assumed to be independent of cost volatility.

$$\frac{\hat{C}_1(1-\tau)}{\eta_1(r-\theta_C)}\left[\eta_1+\gamma_1-1+\frac{C_I^{\eta_1}S_I^{\gamma_1}}{\hat{C}_1^{\eta_1}\hat{S}_1^{\gamma_1}}\right]=K+\frac{C_I(1-\tau)}{r-\theta_C}. \tag{6}$$

The C-S model (2) involves solving three simultaneous equations: (i) the reduced form value-matching relationship (6), (ii) the reduced form smooth-pasting condition (5), and (iii) the characteristic root equation $Q_1(\eta_1,\gamma_1)=0$, as shown in Table 2.

2 The Adkins and Paxson (2015) Model 2:

2.1 <u>General Assumptions</u>:

The firm is assumed to be in a monopoly position, and has an opportunity to abandon after the investment has been realized (by obtaining the scrap value), but then there is no option to reinvest at K. This is appropriate for a bankrupt firm, or where X=S is far below K and investment funding is problematical.

2.2 <u>The Model</u>:

The abandonment choice is decided by the prevailing levels of the remaining present value for the ship and the value obtained through the option function depends on the project value V and the abandonment value X. The abandonment option is defined as:

$$F_2(V,X)=A_2V^{\beta_2}X^{\phi_2} \tag{7}$$

Abandonment is justified whenever the prevailing value for V is sufficiently low while that for X is sufficiently high, since the firm would have to be convinced of the expected net benefits accruing from sacrificing the operating project value for the abandonment value. Moreover, the motivation justifying an abandonment intensifies and the corresponding option value increases as V continues to decline or X to rise. This suggests that F_2 is a monotonic decreasing and increasing function of V and X, respectively, and entails that $\beta_2<0$ and $\phi_2>0$.

Owing to value conservation, abandonment is economically warranted when the composite asset values just prior and after exercise are in balance. Just prior to exercise, the value is composed of the sum of the project present value and the abandonment option value. At the instant of exercise, this composite amount is being sacrificed to acquire the benefit of the abandonment value. If the threshold levels signalling exercise are denoted by $\hat{V}_2$ and $\hat{X}_2$ for the project present value and the abandonment value, respectively, then the composite asset value just prior to exercise is specified by

$\hat{V}_2 + F_2\left(\hat{V}_2, \hat{X}_2\right)$, and the asset value just after exercise by $\hat{X}_2$. It follows that the value matching relationship is defined by:

$$\hat{V}_2 + A_2 \hat{V}_2^{\beta_2} \hat{X}_2^{\phi_2} = \hat{X}_2. \tag{8}$$

For an optimal exercise, the smooth pasting or first order conditions must be satisfied. Since there are two factors of interest, there are two smooth pasting conditions, one for each factor, V and X, respectively. These can be expressed as:

$$\hat{V}_2 + \beta_2 A_2 \hat{V}_2^{\beta_2} \hat{X}_2^{\phi_2} = 0, \tag{9}$$

$$\phi_2 A_2 \hat{V}_2^{\beta_2} \hat{X}_2^{\phi_2} = \hat{X}_2. \tag{10}$$

A conjecture $\beta_2 < 0$ and $\phi_2 > 0$ is corroborated, so $\beta_2 + \phi_2 = 1$, which implies that F_2 is a homogenous degree-1 function. The parameter β_2 is evaluated as the negative root solution to (11):

$$Q\left(\beta_2, 1-\beta_2\right) = Q_2\left(\beta_2\right) = 0. \tag{11}$$

Also:

$$\hat{V}_2 = \frac{-\beta_2 \hat{X}_2}{1-\beta_2}, \tag{12}$$

$$A_2 = \frac{1}{-\beta_2}\left(\frac{-\beta_2}{1-\beta_2}\right)^{1-\beta_2}. \tag{13}$$

There are four equations 8-9-10-11, and if it is assumed that $\hat{X} = X$, then there are four unknowns, shown in Table 3, where there is an easier analytical solution.

3 Shipping Market Information[3]

3.1 The Freight Market:

The freight market is affected by changes in demand and supply, through the competition among owners and charterers. Changes in supply, mainly occurring as a result of the changes in the shipbuilding and scrapping market, are likely to have a gradual effect on demand due to the time lag between order and delivery. Unexpected changes in supply may have a significant impact on the freight market. For instance, changes in regulations regarding old ships, bad weather conditions or

[3] Collected by Monica Shum, MSc_QFRM, from Clarksons.

unexpected political issues, force the supply of the shipping market to decrease, which in turn creates an increase in the freight rates.

Figure 1

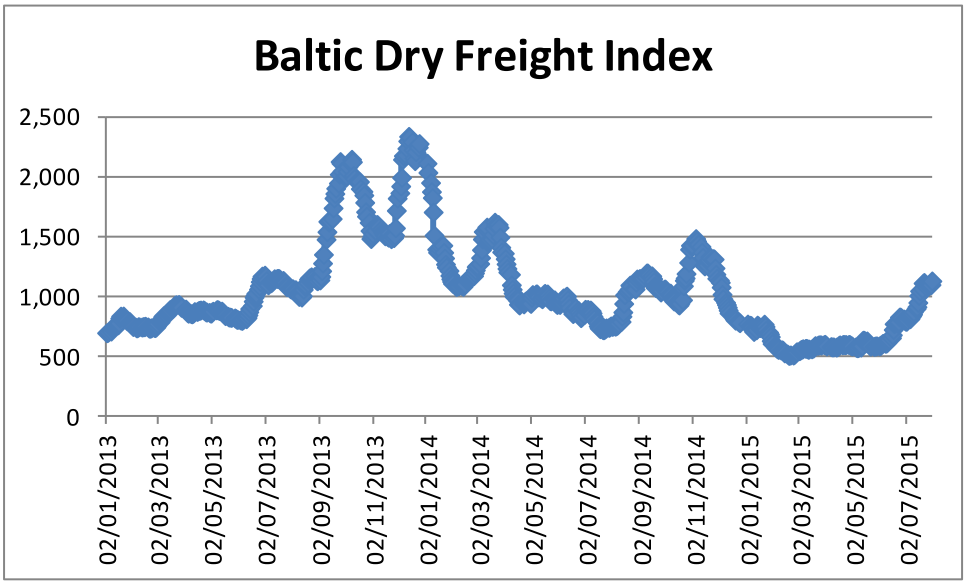
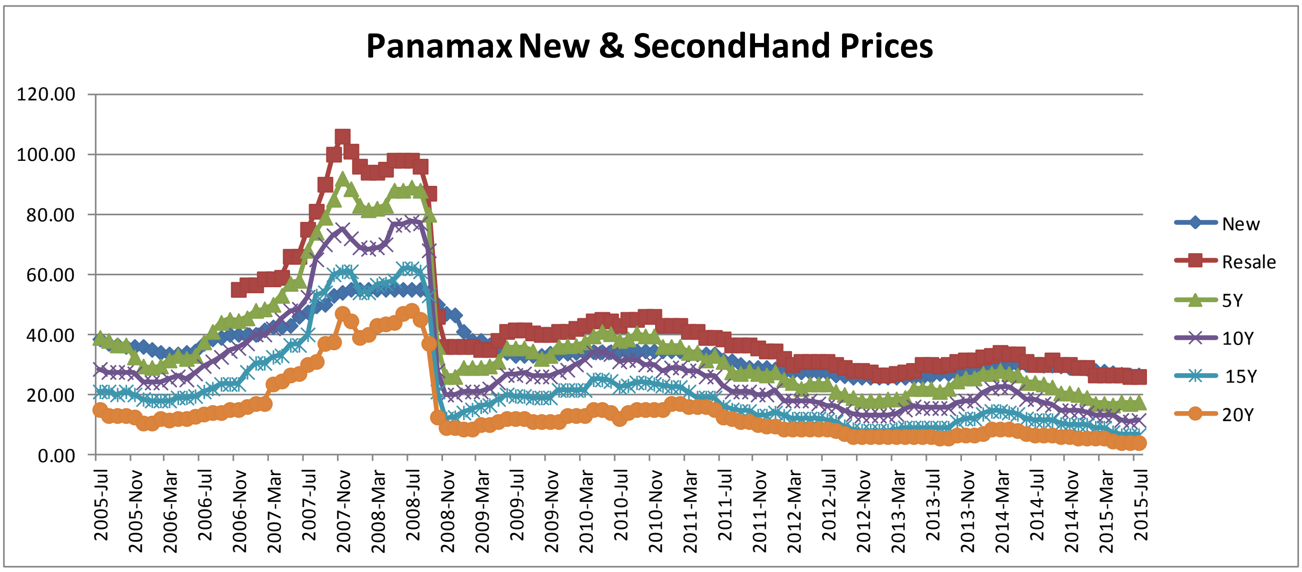


Figure 1 represents the daily Baltic Dry Freight Index for the past few years (longer data series in Euroseas Data.xls). The volatile nature of the dry freight rate market is clearly indicated.

3.2 New Building and Second Hand Ship Market:

Figure 2 illustrates the movement of (new building, 5-10-15-20 year) ship prices for the last ten years. The second-hand vessel market is an auxiliary market. The buying and selling of used ships is unlikely to alter the existing number of ships and the carrying capability in the shipping market.

Figure 2

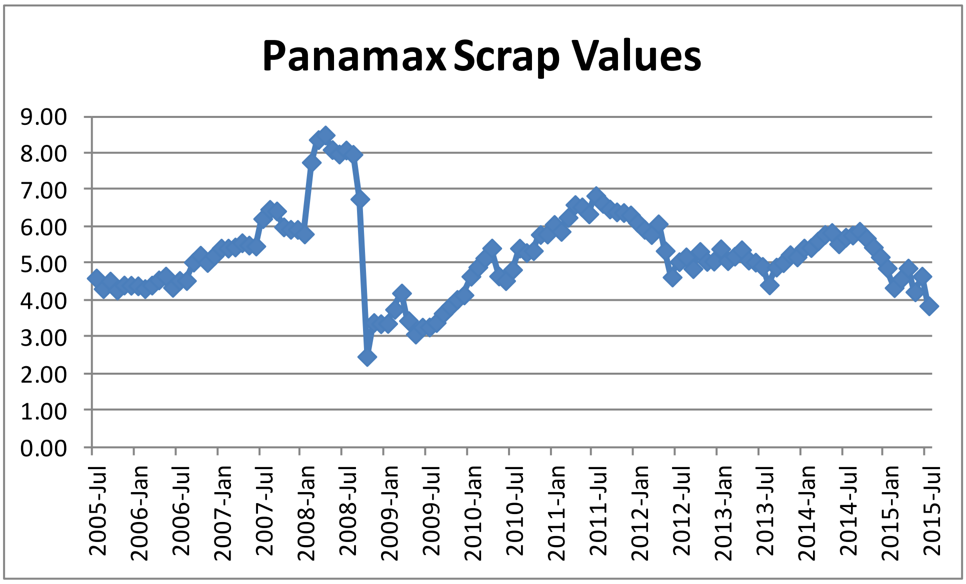


In general, the balance sheet “carrying costs” of ships reflects the historical cost (new building or second hand market purchase) less cumulative straight line depreciation of each vessel (unless impairment tests are not met). A vessel is deemed impaired if the expected future undiscounted net cash flows are less than the current balance sheet carrying value, which is then reduced. ESEAS also reports that the "market value" of certain vessels may be less than the carrying value.

3.3 <u>The Demolition/Scrapping Market</u>:

The demolition market is concerned with old vessels that are being scrapped, primarily for the steel value. **Figure 3** illustrates the demolition prices for Panamax vessels. The abandonment cost can be calculated by the prices of the demolition market, which are stated per lightship (Ldt). According to the IMO a 74,000-dwt Panamax vessels an overall lightship of somewhat less than 10,000.

Figure 3



3.4 ESEA

Table 1 shows the average current net revenue per ship and operating costs based on estimates of Monica Shum, using data from 2014 and the six months ending June 2015. The Dec 2014 balance sheet is also shown with a disclosed "carrying value" and also a PV estimate, which plus current and other assets less liabilities, results in a net asset value per share of $21. Cells L12 and L33 show for all ships a hypothetical abandonment option value using the Adkins and Paxson (2015a) single abandonment model. These valuations are merely illustrative, and based on assumptions that George may consider unrealistic.

References

Adkins, R. and Paxson, D. (2016), *The Effects of an Uncertain Abandonment Value on the Investment Decision*, European Journal of Finance, January doi:10.1080.

Adkins, R. and Paxson, D. (2015), *Valuing Replaceable Assets*, Keynote Address, Asian Association of Financial Engineers, Taiwan, November 2015.

Brennan, M. and E. Schwartz (1985), *Evaluating Natural Resource Investments*, Journal of Business.

Dixit, A. (1989), *Entry and Exit Decisions under Uncertainty*, Journal of Political Economy, 97, 620-638.

Dixit, A. (1992), *Investment and Hysteresis*, Journal of Economic Perspectives, 6, 107-132.

Dixit, A. and Pindyck, R. (1994), *Investments Under Uncertainty*, Princeton, NJ: Princeton University Press.

Mossin, J. (1968), *An Optimal Policy for Lay-up Decisions*, Swedish Journal of Economics, 70, 170-177.

Paxson, D. (2005), *Multiple State Property Options*, Journal of Real Estate Finance and Economics, 30, 341-368.

Euroseas Ltd (2015), *Annual Report 2014 Form 20-F*.

Tourinho, O.A. (1979), *The Valuation of Reserves of Natural Resources: An Option Pricing Approach*, Ph.D. Dissertation, University of California, Berkeley.

Table 1

Euroseas Ltd.													
Vessel Name	**Type**	**Capacity (dwt.)**	**Lightship (lwt.)**	**Year built**	**Age**	**Life**	**Scrap value**	**Abandon PV**	**TCE $/day**	**Net Revenues**	**Present Value**	**Carrying value**	**Carrying value**
											2015	**By Dec 2014**	**By Jun 2015**
Dry Bulk Carriers													
PANTELIS	Panamax	74,020	9,715	2000	15	10	$3,392,580	$1,773,724	$10,553	$3,704,939	$11,227,128	$18,730,000	
ELENI P.	Panamax	72,119	9,505	1997	18	7	$3,319,246	$2,108,087	$10,185	$3,575,912	$8,634,279	$11,180,000	
EIRINI P	Panamax	76,466	9,985	2004	11	14	$3,486,939	$1,406,509	$10,815	$3,797,102	$14,047,252	$20,600,000	
ARISTIDES N.P.	Panamax	69,268	9,829	1993	22	3	$3,432,390	$2,825,553	$8,500	$2,984,315	$4,426,555	$5,090,000	
MONICA P	Handymax	46,667	7,779	1998	17	8	$2,716,509	$1,616,947	$9,500	$3,335,411	$7,403,466	$11,350,000	
Total		**338,540**	**46,813**				**$16,347,664**	**$9,730,819**			**$45,738,680**	**$66,950,000**	
Mean					**16.6**	**8.4**	**$3,269,533**	**$1,946,164**	**$9,911**	**$3,479,536**	**$9,147,736**		
ROV Single Abandonment											**$3,735,831**		
ROV SCRAP & REPLACE													
Under Construction													
Hull Number YZJ 1116**	Kamsarmax	82,000	n/a	2015	0	25							
Hull Number YZJ 1153**	Kamsarmax	82,000	n/a	2016	0	25							
Hull Number DY 160*	Ultramax	63,500	n/a	2015	0	25							
Hull Number DY 161*	Ultramax	63,500	n/a	2016	0	25							
		291,000									**$22,428,693**	**$15,687,490**	**$22,428,693**
Containerships													
EVRIDIKI G	Intermediate	34,654	11,071	2001	14	11	$3,866,110	$1,894,373	$13,500	$4,739,795	$19,875,509	$12,180,000	
TIGER BRIDGE	Intermediate	31,627	8,520	1990	24.5	0.5	$2,975,239	$2,880,313	$7,500	$2,633,219	$3,002,043	$2,870,000	
AGGELIKI P	Intermediate	30,360	10,581	1998	17	8	$3,694,997	$2,199,372	$9,800	$3,440,740	$8,622,219	$6,940,000	
DESPINA P	Handysize	33,667	8,760	1990	24.5	0.5	$3,059,224	$2,961,618	$9,500	$3,335,411	$3,417,732	$3,020,000	
CAPTAIN COSTAS	Handysize	30,007	8,515	1992	23	2	$2,973,528	$2,611,819	$7,750	$2,720,993	$3,235,287	$3,280,000	
JOANNA	Handysize	22,301	6,710	1999	16	9	$2,343,203	$1,307,164	$10,450	$3,668,952	$9,829,111	$5,410,000	
MARINOS	Handysize	23,596	6,710	1993	22	3	$2,343,203	$1,928,931	$11,200	$3,932,274	$6,031,375	$2,640,000	
MANOLIS P	Handysize	20,346	6,710	1995	20	5	$2,343,203	$1,694,290	$7,300	$2,563,000	$2,460,647	$3,420,000	
NINOS	Feeder	18,253	6,026	1990	24.5	0.5	$2,104,343	$2,037,203	$11,500	$4,037,603	$2,827,700	$1,960,000	
KUO HSIUNG	Feeder	18,154	6,269	1993	22	3	$2,189,201	$1,802,156	$10,000	$3,510,959	$4,792,848	$2,480,000	
Total		**262,965**	**79,872**				**$27,892,248**	**$21,317,238**			**$64,094,472**	**$44,200,000**	
Mean					**20.75**	**4.25**	**$2,789,225**		**$9,850**	**$3,458,295**	**$6,409,447**		
ROV Single Abandonment											**$8,694,384**		
Discount rate	6.70%	**Total Scrap Value**											
Scrap Value $/lwt.	$349.21	**44,239,912**								**PV**	**$109,833,152**	**$111,150,000**	**$105,369,275**
Total No. of vessels	15									**Current**	**$19,762,995**	**$30,847,380**	**$19,762,995**
No. of dry bulk carriers	5									**Other**	**$30,340,897**	**$32,893,515**	**$30,340,897**
Voyage days	5,126									**Liabilities**	**$55,743,372**	**$59,936,008**	**$55,743,372**
Voyage days per vessel	351									**Net value**	**$126,622,365**	**$130,642,377**	**$122,158,488**
Vessel Operating costs	$35,663,872									**Shares**	**5,784,025**	**5,784,025**	**5,784,025**
Operating costs per vessel	$2,377,591									**NAV**	**$21.89**	**$22.59**	**$21.12**
										NAV +ROVA	**$24.04**		
										NAV +ROV	**$23.39**		

Table 2

	A	B	C	D
1		**Multi-factor Multiple Replacement Option with Salvage**		
2	INPUT	Stochastic	S & C Template Adkins & Paxson (2015)	
3	PI	3.50		
4	C	2.50		
5	CI	6.00		
6	K	30.00		
7	SI	5.00		
8	σC	0.25		
9	σS	0.25		
10	ρ	0.00		
11	r	0.06		
12	θC	0.00		
13	θS	0.00		
14	S*	3.30		
15	τ	0.00		
16	SOLVER			
17	Q(η,γ)	0.0000	0.5*(B8^2)*B25*(B25-1)+0.5*(B9^2)*B26*(B26-1)+B10*B8*B9*B25*B26+B12*B25+B13*B26-B11	EQ 3
18	SP1	0.0000	B27*(1-B15)/(B25*(B11-B12))-B14*(1-B15)/B26	EQ 5
19	R VM	0.0000	B20*(B25+B26-1+B21)-B22	EQ 4
20	PART 1	112.30	B27*(1-B15)/(B25*(B11-B12))	
21	PART 2	0.26	((B5^B25)*(B7^B26))/((B27^B25)*(B14^B26))	
22	PART 3	135.26	B6+B5*(1-B15)/(B11-B12)	
23	SUM	0.0000	Solver: Set B23=0, changing B25:B27	
24	OUTPUT			
25	η1	**1.92**		
26	γ1	**0.03**		
27	C*	**12.29**		
28	A1	0.88	B29/((B27^B25)*(B14^B26))	
29	SP1 RHS	112.30	B27*(1-B15)/(B25*(B11-B12))	
30	PV1	14.47	B3*(1-B15)/B11-B4*(1-B15)/(B11-B12)	EQ 2
31	ROV1	5.29	B28*((B4^B25)*(B14^B26))	EQ 2
32	F1	19.76	B30+B31	EQ 2

Note r>θ_C constraint, and also assumption regarding ROV as perpetuity.

Table 3

	A	B	C
1			**Adkins & Paxson EJF 2016**
2	**INPUT**		
3	V2	6.4094	PV OF SHIP
4	X2	2.7892	
5	v2	0.2753	Volatility of freight rates
6	x2	0.3813	Volatility of demolition market
7	r V2X2	-0.0219	
8	r	0.0500	
9	qV2	0.0321	
10	qX2	0.0000	
11	**OUTPUT**		
12	$Q(b_1,b_2)$	0.0000	0.5*(B5^2)*B19*(B19-1)+0.5*(B6^2)*B18*(B18-1)+B7*B5*B6*B18*B19+B9*B19+B10*B18-B8
13	SP1	0.0000	B20+B19*B17*(B20^B19)*(B21^B18)
14	SP2	0.0000	B18*B17*(B20^B19)*(B21^B18)-B21
15	VM	0.0000	B17*(B20^B19)*(B21^B18)+B20-B21
16	SOLVER	0.0000	Set B16=0, Changing B17:B20
17	A2	0.4340	
18	φ2	1.3977	
19	β2	-0.3977	
20	V2*	0.7937	
21	X2*	2.7892	
22	ROV S2	**0.8694**	IF(B3>B20,B17*(B3^B19)*(B4^B18),B21-B20)
23	V2*/X2*	0.2846	

	D	E	F	G	H	I	J	K	L	M
1	**ANALYTICAL ABANDONMENT**									
2	INPUT									
3	V2	6.41		PV OF SHIP						
4	X2	2.79								
5	σV2	0.28		Volatility of freight rates						
6	σX2	0.38		Volatility of demolition market						
7	ρ V2X2	-0.02								
8	r	0.05								
9	θV2	0.03								
10	θX2	0.00								
11	OUTPUT									
12	σVX	0.4751		SQRT((E5^2)+(E6^2)-2*E7*E5*E6)						
13	A2	0.4340	EQ 13	(1/-E15)*(-E15/(1-E15))^(1-E15)						
14	ϕ2	1.3977		1-E15						
15	β2	-0.3977	EQ 11	0.5-(E9-E10)/(E12^2)-SQRT((0.5-(E9-E10)/(E12^2))^2+2*E8/(E12^2))						
16	V2*	0.7937	EQ 12	-E15*E17/(1-E15)						
17	X2*	2.7892								
18	**ROV2**	**0.8694**	EQ 7	**IF(E3>E16,E13*(E3^E15)*(E4^E14),E19)**						
19	V*/X*	0.2846		E16/E17						

RIGHT TIME CASE QUESTIONS:

1. **What is the historical volatility of Panamax new and second hand ship prices, and demolition rates? Are these prices becoming more or less volatile over time? What is the correlation of demolition and 20 year ship prices?**
2. **Using appropriate parameter values, what is the scrap and replace price threshold and values using the Adkins and Paxson (2015) model?**
3. **George wants to use the Adkins and Paxson (2015) values for the additional ROV to supplement the calculated PV annuities and PV salvage value in Table 1 for the Panamax ships. Is this the right time to scrap and replace these ships, funded by an equity issue?**
4. **ESEA raised only @ $10m by issuing shares in Oct 2015. What is the pro-forma balance sheet if only some of the remaining K (60% of each K) is funded by debt? What is Mr. Pittas's problem?**